PRODUCT INFORMATION

AUTOMOTIVE

INDUSTRIAL

AGRICULTURAL
Ecotech Lubricants products aims to give you peace of mind by delivering the right products and technical services when you need them, and through its technology and industry knowledge.

Our Products are designed to meet your current and anticipated needs, and to help you relax in the knowledge that your lubricated equipment is well protected and operating efficiently. We can also make it easier to select the right products for your equipment, operating conditions and business needs.

DEDICATED SERVICE AND SECURED DELIVERY

You can be confident in our ability to keep your business moving by delivering the products you need, when and where you need them. You can order these lubricants at any time by telephone and email.

TECHNICAL SERVICES THAT IMPROVE YOUR EQUIPMENT RELIABILITY

Peace of mind also comes from knowing that you can improve the reliability of your equipment and have the training and expertise to solve lubrication challenges that might arise. Through our technical services, we can recommend the right products for your needs, offer flexible training programs, help to optimize equipment performance and analyze and diagnose lubricant-related problems.

HEALTH, SAFETY, SECURITY AND ENVIRONMENT

Ecotech Lubricants has a clear commitment to health, safety, security and the environment, and works continuously to embed a safety culture throughout its organization. We apply rigorous operating procedures and quality standards, and the latest technologies to enable safe and reliable deliveries to our customers. The standards we set for ourselves are also those we insist on from the contractors and partners working on our behalf.

OILS & LUBRICANTS – WE’VE GOT IT ALL COVERED
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ENGINE OIL & LUBRICANTS
SUPPLIER PRINCIPLES
PETROCHE MICAL GLOSSARY
What is oil viscosity?

Viscosity is an important criterion of any lubricating oil. It is a measure of a fluid’s thickness or resistance to flow. For example, honey is thick and water is thin, so honey has a higher viscosity than water. Oil viscosity needs to suit the right ambient temperatures. If it’s too thick when the engine is cold, it won’t move around the engine. And if it becomes too thin when the engine is hot, it won’t give the right protection to the engine parts.

Optimizing an oil’s viscosity, or thickness, helps maximize energy efficiency while avoiding component wear.

Viscosity modifiers increase the viscosity of your oil at high temperature but have little effect on low-temperature viscosity. These enable your oil to flow properly when cold and also to remain thick enough to protect your engine components at high temperatures.

Lower-viscosity grades of oil such as Ecotech Lubricants make it easier for your engine to start from cold because they present less resistance to moving parts and hence take less power from your engine. This also means that you get enhanced fuel economy.

To find the right oil viscosity for your engine, check your manufacturer’s guidelines and bear in mind the weather conditions you live and drive in.

**Fig. 1 Viscosity grade vs temperature selection chart**
What is in a Can of Oil?

Introduction Despite the fact of modern day’s information explosion and the relative ease of access to data on almost any topic, it is surprising the number of people who do not know or understand what is written on a can of oil and therefore has no idea of what they are buying/using. Even more surprising is the fact that automotive oils to a large extent, and engine oil in particular, has been “degraded to a commodity product, more often than not being purchased by the housewife as part of the monthly groceries list, where price is almost the only driver in product selection. The purpose of this article is to provide a guideline on the basic understanding of the jargon used on oil labels and the importance of such information in terms of what the oil is supposed to do and how it will perform in a given application.

The following minimum information should appear on an oil label:

1. The purpose for which it is intended (i.e. Motor oil, Gear oil, etc.)
2. The viscosity grade (i.e. SAE 20W/50, SAE 80W/90, etc.)
3. The specifications that it meets (i.e. API, ACEA, etc.)
4. Manufacturer’s approvals (i.e. MB 229.3, VW505.00, etc.)

What this information means and why it is important For the purpose of clarity, the above four points will be discussed in sequence.

1. Application: Although it may sound obvious, it cannot be over emphasized that all oils are intended for a specific application and in general are not interchangeable. Therefore, do not for example put an Automatic Transmission Oil or a Gear Oil in the engine or vice versa. It is important to know what the oils intended purpose is.

2. Viscosity: Most oils on the shelves today are ”Multigrades”, which simply means that the oil falls into 2 viscosity grades e.g. SAE 20w/50, etc.). Multigrades were first developed some 60 years ago to avoid the old routine of using a thinner oil in winter and a thicker oil in summer. In a SAE 20W/50 for example the “20W” part (W = winter grade) simply means that the oil must have a certain maximum viscosity or flow at low temperature. The lower the ”W” number, the better the oil’s low temperature/cold start performance. The “50” on the other hand, means that the oil must fall within certain viscosity limits at 100°C, the latter reflecting more or less the normal operating temperature of the engine. This is a fixed limit and all oils that end in “50” must achieve these limits. Once again the lower the number, the thinner the oil, i.e. a SAE 40 oil is thinner than a SAE 50 oil at 100°C etc. The vehicle’s user handbook will usually specify what viscosity grade is required. A rough guide, as far as operating temperature is concerned, is given in Fig. 1

3. Specifications: Specifications are important as these indicate the performance level of the oil and whether it has met or passed the latest tests or whether the formulation is effectively obsolete or out of date.

4. There are at least two specifications that one should look for on an engine oil label and these are the American Petroleum Institute (API) the Association des Constructeurs Europeen d'Automobiles (ACEA) specs. An understanding of what these mean is important and always ensure that the oil used is in compliance with the manufacturer’s recommendation. Cheap oils generally carry out-of-date specifications and additive technology.

(i) API – These specifications are split into two categories notably “S” for Spark Ignition Petrol Engines and “C” for Compression Ignition Diesel Engines. Most oils carry both petrol and diesel specifications.
Mineral or synthetic?

**Mineral** oils are based on oil that comes from dear old Mother Earth which has been refined. **Synthetic** oils are entirely concocted by chemists wearing white lab coats in oil company laboratories. The only other type is **semi-synthetic**, sometimes called premium, which is a blend of the two. It is safe to mix the different types, but it's wiser to switch completely to a new type rather than mixing.

**Synthetic motor oil**

**Synthetics**

Despite their name, most synthetic derived motor oils (ie Mobil 1, Castrol Formula RS etc) are actually derived from mineral oils - they are mostly Polyalphaolifins and these come from the purest part of the mineral oil refraction process, the gas. PAO oils will mix with normal mineral oils which means Joe public can add synthetic to his mineral, or mineral to his synthetic without his car engine seizing up. These bases are pretty stable, and by stable it mean 'less likely to react adversely with other compounds'. They tend not to contain reactive carbon atoms for this reason. Reactive carbon has a tendency to combine with oxygen creating an acid. (As you can imagine, in an oil this would be A Bad Thing.) They also have high viscosity indices and high temperature oxidative stability. Typically a small amount of diester synthetic (a compound containing two ester groups) is added to counteract seal swell too. These diesters act as a detergent and will attack carbon residuals. So think of synthetic oils as custom-built oils. They're designed to do the job efficiently but without any of the excess baggage that can accompany mineral based oils.

**Pure synthetics**

Pure **synthetic oils** (polyalkyleneglycol) are the types used almost exclusively within the industrial sector in polyglycol gearbox oils for heavily loaded gearboxes. These are typically concocted by even more intelligent blokes in even whiter lab coats. These chaps break apart the molecules that make up a variety of substances, like vegetable and animal oils, and then recombine the individual atoms that make up those molecules to build new, synthetic molecules. This process allows the chemists to actually "fine tune" the molecules as they build them. Clever stuff. But Polyglycols don't mix with normal mineral oils.

**If I put new, fully synthetic oil in my older engine, will the seals leak?**

This question comes up a lot from people who've just bought a used vehicle and are wanting to start their history with the car on fresh oil. The short answer: generally speaking, **not any more**. The caveat is that your engine must be in good working order and not be leaking right now. If that's the case, most modern oils are fully compatible with the elastomeric materials that engine seals are made from, and you shouldn't have any issues with leaks.

The longer answer:

**Mixing Mineral and Synthetic oils - current thinking**

Here's the current thinking on the subject of mixing mineral and synthetic oils. This information is based on the answer to a technical question posed on the Shell Oil website.

There is no scientific data to support the idea that mixing mineral and synthetic oils will damage your engine. When switching from a mineral oil to a synthetic, or vice versa, you will potentially leave a small amount of residual oil in the engine. That's perfectly okay because synthetic oil and mineral-based motor oil are, for the most part, compatible with each other. (The exception is pure synthetics. Polyglycols don't mix with normal mineral oils.)
There is also no problem with switching back and forth between synthetic and mineral based oils. In fact, people who are “in the know” and who operate engines in areas where temperature fluctuations can be especially extreme, switch from mineral oil to synthetic oil for the colder months. They then switch back to mineral oil during the warmer months. There was a time, years ago, when switching between synthetic oils and mineral oils was not recommended if you had used one product or the other for a long period of time.

People experienced problems with seals leaking and high oil consumption but changes in additive chemistry and seal material have taken care of those issues. And that's an important caveat. New seal technology is great, but if you're still driving around in a car from the 80's with its original seals, then this argument becomes a bit of a moot point - your seals are still going to be subject to the old leakage problems no matter what newfangled additives the oil companies are putting in their products.
AGRI 10W30 TDH

FEATURES

AGRI 10W30 TDH is a premium quality, anti-wear hydraulic fluid and has been specifically designed for use in mobile and stationary high pressure hydraulic systems.

BENEFITS

Maximizes transmission - life extremely shear stable formulation maintains film sickness under severe transmission and hydraulic system operation.

Longer Oil Life - Very high oxidation stability protects against the formation of gums and varnishes, reducing oil thickening and increasing oil life.

Saves on maintenance - Highly refined base oils and effective oxidation inhibitors provide excellent thermal and oxidation stability, providing superior resistance to the formation of lacquer, deposits and corrosive oil degradation by-products. Excellent viscosity characteristics at low temperatures ensure rapid oil circulation on start-up, preventing wear which contributes to power loss.

Smooth and quiet operation - Special friction modifier component allows smooth action of the wet brakes and power take off clutch minimizing chatter, stick slip and squawk and ensures maximum brake efficiency.

APPLICATION

AGRI 10W30 THD Premium

- Industrial hydraulic systems
- Hydraulics of mobile and construction equipment
- Hydraulic systems with vane, gear or piston pumps
- Plastic injection moulding machines
- Machine tools
- Enclosed gear systems
- Industrial circulating systems

PERFORMANCE

- JI Case MS 1209, 1207 & 1206 (now CNH)
- John Deere J20C and J20D
- Massey Ferguson M1143, M1141
- CNH, MAT 3525 (134-D) Fluid
- M2C 134-D & M2C86-C (former Ford New Holland)
- Ford M2C41-b (M2C 134D)
- Volvo 97303 (VME WB 101)
- ZF TE-ML 03E (transmissions for off-road equipment) TE-ML 05F (axles for off-road equipment)
- TE-ML 06K (tractor transmissions, hydraulic lifts)
- API Service Category GL-4

TYPICAL PHYSICAL CHARACTERISTICS:

<table>
<thead>
<tr>
<th>KEY PROPERTIES</th>
<th>10W30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity, Kinematic mm/s @ 40 °C</td>
<td>58.2</td>
</tr>
<tr>
<td>mm/s @ 100 ° C</td>
<td>9.4</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>147</td>
</tr>
<tr>
<td>Pour Point</td>
<td>-39</td>
</tr>
<tr>
<td>Zinc Content, mass %</td>
<td>0.14</td>
</tr>
<tr>
<td>Phosphorus, mass %</td>
<td>0.1</td>
</tr>
</tbody>
</table>
STOU 15W40 & 20W40

DESCRIPTION

STOU is an agricultural stable multi-grade oil, formulated from HVI base oils with a VI improver, plus a high performance detergent/dispersant additive. The oil is designed primarily for use in both normally aspirated and turbo-charged diesel engines, most transmissions and hydraulic systems found on modern agricultural implements. The load-carrying properties of the oil have been enhanced to ensure protection of the mating gear teeth even under the most arduous conditions. To provide the necessary lubrication for oil-immersed brakes, as found in some transmission systems used on tractors, an effective anti-squawk agent is incorporated.

APPLICATION

STOU is designed for use in both naturally aspirated and turbo-charged engines, most transmissions and hydraulic systems found on modern agricultural implements on the farm.

PERFORMANCE

MEETS OR EXCEEDS:

- MASSEY FERGUSON CMS M1144, 1143, 1139 AND 1145
- AFNOR NFE 68603 E
- CG4, ACEAE3, SF, CF4
- JOHN DEERE J27 AND 120C
- FORD M2C – 159B/C
- FORD M2C 134 D
- ZF TE ML 06A, B (ALSO INCLUDES ZF TE ML06R), C AND 07B
- CASE NEW HOLLAND MAT 3525 AND 3526
- NEW HOLLAND 82009201/2/3
- CCMC D4
- API GL-4
- MERCEDES BENZ 227.1
- SPERRY VICKERS / EATON I-280-5 AND M2950 5
- MAN 271
- NEW HOLLAND NH030 AND NH 024C
- NEW HOLLANLD NH 410 B AND NH 420 A
- ALLISON C-4
- TEML 03A, 05K, 06AB
- SAUER SUNSTRAND / DANFOSS NFE 68603 E

ADVANTAGES

- One oil for the farm
- Superior lubrication
- Protection against low temperature sludge and ring sticking
- Protection against rusting, foaming and corrosive wear
- Effective ant-squawk properties

TYPICAL PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>SAE Viscosity Grade</th>
<th>15W40</th>
<th>20W40</th>
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<tbody>
<tr>
<td>Viscosity 40 °C</td>
<td>105</td>
<td>127</td>
</tr>
<tr>
<td>Viscosity 100 °C</td>
<td>14.4</td>
<td>14.5</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>140</td>
<td>114</td>
</tr>
<tr>
<td>Pour Point</td>
<td>-27</td>
<td>-27</td>
</tr>
<tr>
<td>TBN mg KOH/g</td>
<td>10.66</td>
<td>10.66</td>
</tr>
</tbody>
</table>
AUTOMOTIVE GEAR OILS

DESCRIPTION

High performance mild extreme pressure gear lubricant, containing multi-functional additives required for mild extreme pressure conditions.

APPLICATION

Manual transmission transaxles, planetary hub & other spur gear axles which specifically require mild EP gear oils meeting API GL-4

PERFORMANCE LEVELS

- MIL-2105-D (ABSOLUT)
- MAN 342 N
- ZF TE MC 05A, 07A, 12E, 16B, C, D, 17B AND 19B

BENEFITS

High performance, EP additives systems controls transmission gear tooth wear, excellent load carrying capacity to protect gear equipment against surface stress under heavily loaded conditions. GL-4 gear oils have been fortified with anti-wear, anti-oxidant, anti-foam, anti-corrosion and extreme pressure additives.

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th>EP 80W90</th>
<th>EP 90</th>
<th>EP 85W140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density @20 °C kg/1</td>
<td>0.893</td>
<td>0.9</td>
<td>0.912</td>
</tr>
<tr>
<td>Viscosity @ 40 °C</td>
<td>170</td>
<td>172</td>
<td>430</td>
</tr>
<tr>
<td>Viscosity Cst @ 100 °C</td>
<td>16.4</td>
<td>16.7</td>
<td>29</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>102</td>
<td>97</td>
<td>99</td>
</tr>
<tr>
<td>Pour Point C (Max)</td>
<td>-33</td>
<td>-24</td>
<td>-27</td>
</tr>
<tr>
<td>Flash Point C (Min)</td>
<td>175</td>
<td>222</td>
<td>212</td>
</tr>
</tbody>
</table>
INDUSTRIAL GEAR OILS
IGO 68, 100, 150, 220, 320, 460, 680, 1000

DESCRIPTION

Ecotech Industrial Gear Oils are superior performance gear lubes. Premium base oils with an effective sulfur-phosphorous EP additive system, minimize wear of enclosed gears and other equipment operating under heavy loads and shock conditions. These premium gear lubes utilize high viscosity index (HVI) base oils to provide high flash points, low volatility and superior oxidation stability. They provide outstanding protection in industrial gear sets operating under severe conditions, such as intermittent shock loads, high peak loads and heavy tooth loads. These premium gear lubes utilize high viscosity index (HVI) base oils to provide high flash point.

These quality extreme-pressure gear oils offer:

- Superior bearing protection
- Excellent anti-foam protection
- Excellent rust and corrosion protection
- Outstanding demulsibility characteristics
- Resistance to oxidative sludge and varnish
- Protection from galling, scuffing and welding of gear teeth
- Spec Oil EP Industrial Gear Oils are ideal for heavy-loaded enclosed gear sets where extreme-pressure properties and adequate film strength are critical for industrial hypoid gear cases, as well as plain, ball, roller and sleeve type bearings. They may also be used for the lubrication of slides, ways, sprockets, chain drives, winches, hoist and machine tools.

These Gear Oils also meet or exceeds the following performance requirements in the appropriate grades.

- US Steel 224
- AGMA 250.04, 251.02
- David Brown S1.53.101
- DIN 51517, Part 3
- Cincinnati Machine

TYPICAL PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>IGO</th>
<th>68</th>
<th>100</th>
<th>150</th>
<th>220</th>
<th>320</th>
<th>460</th>
<th>680</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic Viscosity @ 40°C</td>
<td>68</td>
<td>100</td>
<td>150</td>
<td>220</td>
<td>320</td>
<td>460</td>
<td>680</td>
<td>1000</td>
</tr>
<tr>
<td>100°C mm²/s</td>
<td>8.7</td>
<td>11.4</td>
<td>15</td>
<td>19.4</td>
<td>25</td>
<td>30.8</td>
<td>38</td>
<td>43.8</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>97</td>
<td>92</td>
<td>84</td>
</tr>
<tr>
<td>Density @ 15°C kg/l</td>
<td>0.887</td>
<td>0.891</td>
<td>0.897</td>
<td>0.899</td>
<td>0.903</td>
<td>0.904</td>
<td>0.912</td>
<td>0.931</td>
</tr>
<tr>
<td>Flash Point °C</td>
<td>191</td>
<td>193</td>
<td>196</td>
<td>199</td>
<td>202</td>
<td>204</td>
<td>204</td>
<td>205</td>
</tr>
</tbody>
</table>

10
HYDRAULIC OIL
32, 46, 68, 100, 150, 220

DESCRIPTION
High quality anti-wear hydraulic fluid formulated for use in high pressure stationery and mobile hydraulic systems. Incorporates zinc phosphate additive technology.

Not recommended for systems with silver plated components.

APPLICATION
- Wide range of industrial hydraulic equipment.
- Hydraulics on construction and mobile equipment.
- Hydraulic systems with gear, vane or piston pumps.
- Industrial circulating systems.
- Machine tools and enclosed gear systems.
- Plastic injection moulding.

BENEFITS
- Outstanding pump and equipment protection, even in very severe operating conditions.
- Extends oil and equipment service life by avoiding problems such as servo valve sticking.
- Prolongs oil change intervals.
- Reduces yellow metal corrosion by controlling oil stability.
- Prevents downtime by minimizing flow restrictions due to clogged filters and extends life equipment.
- Suitable for many other industrial applications.

SPECIFICATIONS
- DIN 51524 Part 2 (HLP) & Part 3 (HVLP)
- GM LS2
- ISO 11158 Categories HM and HV
- ASTM D 6158 Type HM and HV
- Afnor NF E 48-603 HM and HV
- US Steel 126 and 127
- Cincinnati P-68, P-69, P-70
- Denison HF-0, HF-1 and HF-2
- Eaton 694 for 35VQ25A (formerly M-2950 and I-286-S)

KEY PROPERTIES

<table>
<thead>
<tr>
<th>ISO Grade</th>
<th>32</th>
<th>46</th>
<th>68</th>
<th>100</th>
<th>150</th>
<th>220</th>
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</thead>
<tbody>
<tr>
<td>Air Release @ 50 ºC; min</td>
<td>5.0</td>
<td>6.7</td>
<td>8.6</td>
<td>11.0</td>
<td>11.2</td>
<td>11.4</td>
</tr>
<tr>
<td>Viscosity @ 40 ºC</td>
<td>32</td>
<td>46</td>
<td>68</td>
<td>100</td>
<td>150</td>
<td>220</td>
</tr>
<tr>
<td>Viscosity Cst @ 100 ºC</td>
<td>5.4</td>
<td>6.7</td>
<td>8.6</td>
<td>11.1</td>
<td>14.8</td>
<td>20.3</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>99</td>
<td>98</td>
<td>97</td>
<td>96</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Flash Point ºC (Min)</td>
<td>210</td>
<td>220</td>
<td>226</td>
<td>240</td>
<td>254</td>
<td>262</td>
</tr>
<tr>
<td>Pour Point ºC (Max)</td>
<td>-33</td>
<td>-30</td>
<td>-24</td>
<td>-22</td>
<td>-21</td>
<td>-18</td>
</tr>
</tbody>
</table>
HYDRAULIC UHVI 46 & 68
ZINC TYPE ANTI-WEAR HYDRAULIC FLUID

DESCRIPTION

Hydraulic UHVI 46 and 68 is premium High Viscosity index anti-wear hydraulic oil. It is blended from virgin paraffin base oils. It contains anti-wear, anti-rust and anti-foam additives to give excellent performance and wear protection. In addition it contains a viscosity index improver to lessen the impact of high operating temperatures. It is recommended for use in any circulating hydraulic system where zinc containing anti-wear hydraulic oil is called for especially those running at higher than normal temperatures.

Hydraulic UHVI 46 and 68 has the following features:

- Bosch Rex Roth
- Good corrosion protection
- Effective anti-wear properties
- Long equipment life
- Excellent oxidation resistance
- Excellent temperature/viscosity performance
- DIN 51524 Part III
- Denison HF-0, HF-1, HF-2
- Vickers M-2950 S (Mobile Systems) and I-286-S
- M-1286 S (Industrial Systems)
- Cincinnati Machine P68/69/70 Eaton Brochure 694 for 35VQ25A
- ASTM 6158 Type HM and HV
- AFNOR NF E 48-603 HM and HV
- Eaton
- US Steel

DIRECTIONS FOR USE

Hydraulic UHVI 46 and 68 may be used in any circulating hydraulic system, which calls for use of anti-wear hydraulic oil containing a zinc anti-wear additive. It is called for whenever the temperature of the system runs hotter than normal to ensure that loss of pressure does not occur due to viscosity drop. It should not be used in a system, which contains silver plated components.

<table>
<thead>
<tr>
<th>ISO Grade</th>
<th>46</th>
<th>68</th>
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</thead>
<tbody>
<tr>
<td>Viscosity 100 ° C</td>
<td>6.8</td>
<td>8.8</td>
</tr>
<tr>
<td>Viscosity Index</td>
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<td>97</td>
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<tr>
<td>Flash Point ° C220</td>
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<td></td>
</tr>
<tr>
<td>Pour Point ° C</td>
<td>-33</td>
<td>-24</td>
</tr>
</tbody>
</table>
HYDRAULIC OIL
ASHLESS 32, 46, 68

DESCRIPTION
This is a superior quality, ashless, high viscosity index, anti-wear hydraulic oil developed to meet the requirements of modern hydraulic systems. This high performance oil contains a balanced selection of non-zinc additives that afford anti-rust, oxidation stability, anti-foam and anti-wear properties.

APPLICATION
Is recommended for use in industrial hydraulic systems and also in other industrial applications where high quality oils are required. These include circulation systems and machine tools where high oxidation stability, anti-wear properties and high filtration speeds are of importance.

BENEFITS
- Superior wet and dry filterability.
- Excellent anti-wear performance.
- Good rust and corrosion protection.
- Outstanding oxidation stability.
- Fast air release.

PERFORMANCE LEVELS
- Denison HFO, HF-1, HF-2
- Vickers Eaton I-286-S; M-2950-S
- AFNOR NFE 48603 (HM)
- DIN 51524 Part I and II

KEY PROPERTIES

<table>
<thead>
<tr>
<th>ISO Grade</th>
<th>32</th>
<th>46</th>
<th>68</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Release @ 50 °C; min</td>
<td>5.0</td>
<td>6.7</td>
<td>8.6</td>
</tr>
<tr>
<td>Viscosity @ 40 °C</td>
<td>32</td>
<td>46</td>
<td>68</td>
</tr>
<tr>
<td>Viscosity Cst @ 100 °C</td>
<td>5.4</td>
<td>6.7</td>
<td>8.6</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>99</td>
<td>98</td>
<td>97</td>
</tr>
<tr>
<td>Flash Point °C (Min)</td>
<td>210</td>
<td>220</td>
<td>226</td>
</tr>
<tr>
<td>Pour Point °C (Max)</td>
<td>-33</td>
<td>-30</td>
<td>-24</td>
</tr>
</tbody>
</table>
15W40 CH4/SJ

DESCRIPTION:
This oil is a high performance, dedicated heavy duty engine lubricant designed for use in modern high speed turbocharged diesel engines. It uses an exclusive additive formulation in conjunction with highly refined base oils to deliver longer life and enhanced protection relative to its predecessors. The product has been reformulated for severe duty service in engines specifically designed to meet 1998/euro 2 on-highway exhaust emission standards as being suitable for a wide range of heavy duty off-highway applications.

APPLICATION:
For all naturally aspirated and heavy duty turbocharged and intercooler diesel engines.

PERFORMANCE LEVEL (API CH4/SJ)
- CUMMINS CES 20076/77/78
- DEUTZ DQC-111
- MAN 3275
- MACK OE – M/PLUS
- VOLVO VDS-3
- MTU-Type 2,
- CATERPILLAR ECF 1A-Performance demonstrated
- GLOBAL DHD-1
- LLISON C4 LEVEL
- RENAULT TRUCK RLD-2,
- MERCEDES BENZ 228.3
- ACEA E7-04, JASO DH-1

BENEFITS:
Saves on fleet maintenance cost. The detergency/dispersancy level is specially balanced to provide both high temperature deposit control in a wide range of heavy duty and turbocharged diesel engines. Reduce Downtime and prolong engine life. Universal engine oil for cars, trucks and off-road applications.

SPECIFICATIONS:

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th>15W40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density @20 C KG L</td>
<td>0.888</td>
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<tr>
<td>Viscosity @ 40 C</td>
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<tr>
<td>Viscosity Cst @ 100 C</td>
<td>14-15</td>
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<td>Viscosity Index</td>
<td>137</td>
</tr>
<tr>
<td>Pour Point C (Max)</td>
<td>-35</td>
</tr>
<tr>
<td>Flash Point C (Min)</td>
<td>230</td>
</tr>
<tr>
<td>TBN mg KOH / g</td>
<td>12</td>
</tr>
</tbody>
</table>
### 15W40 CI4/SL

**DESCRIPTION:**

High performance, heavy duty diesel engine oil formulated for use in a wide variety of European, Japanese and North American diesel and petrol engines operating under the most severe service conditions. Designed to provide improved engine protection and increased oil life. Compatible with low-emission engine technology used in road transport, construction, mining and many other industries.

**APPLICATION:**

Modern high power heavy duty diesel engines in mixes fleets of European, Japanese and North American manufacturers in both on-road and off-highway applications. Mixed fleets of diesel and petrol vehicles. High-tech, electronically controlled and low emission engines. Normally aspirated, turbocharged and supercharged engines with or without intercooling. EGR engines experiencing high soot loadings. Agricultural equipment, marine and stationary engines.

**BENEFITS:**

Excellent protection against engine wear and bore polishing. Improved engine cleanliness and reduced piston deposits. Extended oil drain intervals and less maintenance costs, even in older engines. Reduced downtime and prolonged engine life. Universal engine oil for cars, trucks and off-road applications.

**PERFORMANCE SPECIFICATIONS:**

- ACEA E7-04
- API CI-4, CG-4, CF-4, CF, SL
- JASO DH-1
- GLOBAL DHD-1
- ALLISON C4
- CATERPILLAR ECF 1A
- CUMMINS CES 20076, 20077, 20078
- DEUTZ DQC-III
- MACK EO-M, EO-M PLUS
- MAN M 3275
- MERCEDEZ BENZ 228.3
- MTU TYPE-2
- RENAULT TRUCK RLD-2
- VOLVO VDS-3

**TYPICAL PHYSICAL CHARACTERISTICS:**

<table>
<thead>
<tr>
<th>SAE Viscosity Grade</th>
<th>15W40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic Viscosity</td>
<td></td>
</tr>
<tr>
<td>mm²/s 40 °C</td>
<td></td>
</tr>
<tr>
<td>mm²/s 100 °C</td>
<td>14.7</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>138</td>
</tr>
<tr>
<td>Base Number; mgKOH/g</td>
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</tr>
<tr>
<td>20 °C (ASTM D 2602)</td>
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</tr>
<tr>
<td>Sulphated Ash; mass %</td>
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</tr>
<tr>
<td>Density @ 15 °C kg/l</td>
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</tr>
<tr>
<td>Flash Point (COC) °C</td>
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</tr>
<tr>
<td>Pour Point °C</td>
<td></td>
</tr>
<tr>
<td>ZINC; MASS %</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTM D445</td>
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<tr>
<td>ASTM D2896</td>
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<tr>
<td>ASTM D4739</td>
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<tr>
<td>ASTM D874</td>
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<td>ASTM D4052</td>
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<td>ASTM D92</td>
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<td>ASTM D97</td>
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<tr>
<td>ASTM D4951</td>
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</tr>
</tbody>
</table>
SAE 20W50 SF/CD

DESCRIPTION

This engine oil is designed to be used for passenger cars, light trucks as well as farm equipment, especially where multi-grade oils are preferred. These oils contain inhibitors to combat acids, oxidation, and foam and have corrosion as well as ant-wear and dispersant / detergent additives.

APPLICATION

Suitable for all petrol and naturally aspirated diesel engines of passenger cars, light commercial vehicles and farm equipment for which multi-grade viscosity grade oils are specified.

BENEFITS:

- Provides excellent lubrication
- Keeps engine clean
- Prolongs Engine life

PERFORMANCE LEVELS

MEETS OR EXCEEDS:

- API SF/CD
- MIL – L – 46152
- CRC L – 38 BEARING TEST
- SABS 1361

<table>
<thead>
<tr>
<th>KEY PROPERTIES</th>
<th>SAE 20W50</th>
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</thead>
<tbody>
<tr>
<td>Density at 20 °C g/mls</td>
<td>0.894</td>
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<tr>
<td>Viscosity at 100 °C mm²/s</td>
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<tr>
<td>Viscosity at 40 °C mm²/s</td>
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<tr>
<td>Viscosity Index Min.</td>
<td>136</td>
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<tr>
<td>Flash Point C.O.C. Min.</td>
<td>250</td>
</tr>
<tr>
<td>Pour Point °C</td>
<td>-18</td>
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</tbody>
</table>
5W30 SM/CF

DESCRIPTION
This is a semi-synthetic motor oil providing superior performance. It holds excellent viscosity retention and superior engine protection under all modern driving conditions.

APPLICATION
All aspirated, fuel injected, turbocharged and multi-valve passenger car engines fuelled by either gasoline, diesel or LPG.

PERFORMANCE FEATURES
- Excellent engine protection

Provides excellent protection in today’s efficient passenger car engines.
- Catalyst and turbo proven

Exceeds industry standards.
- Fuel efficient

Helps to improve fuel efficiency
- Suitable for extended drain intervals

Meets latest industry standards for use in applications where extended oil drain intervals are required.
- Reduced chlorine content

To meet environmental requirements – safer used oil disposal.

PERFORMANCE SPECIFICATIONS
MEETS OR EXCEEDS:
- API SM/CF
- ACEA A3 / B4-04
- JAPANESE ENGINES Qualified
- FORD MOTOR Co. M2C-153E
- VW NORM 502.00, 505.00
- PEUGEOT-CITROEN – Meets requirements of PSA E-98 (level 2 for extended drain application)
- ROVER GROUP Registered
- MERCEDES-BENZ Sheet 229.3

TYPICAL PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>SAE Grade</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Kinematic Viscosity</td>
<td></td>
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<tr>
<td>@ 40 °C</td>
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<tr>
<td>@ 100 °C</td>
<td>12</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>180</td>
</tr>
<tr>
<td>Density @ 15 °C</td>
<td>0.85</td>
</tr>
<tr>
<td>Flash Point °C (PMCC)</td>
<td>225</td>
</tr>
<tr>
<td>Pour Point °C</td>
<td>-48</td>
</tr>
</tbody>
</table>
DESCRIPTION

This is a semi-synthetic motor oil providing superior performance. It holds excellent viscosity retention and superior engine protection under all modern driving conditions.

APPLICATION

All aspirated, fuel injected, turbocharged and multi-valve passenger car engines fuelled by either gasoline, diesel or LPG.

PERFORMANCE FEATURES

- Excellent engine protection
  - Provides excellent protection in today’s efficient passenger car engines.
- Catalyst and turbo proven
- Exceeds industry standards.
- Fuel efficient
- Helps to improve fuel efficiency
- Suitable for extended drain intervals
- Meets latest industry standards for use in applications where extended oil drain intervals are required.
- Reduced chlorine content
  - To meet environmental requirements – safer used oil disposal.

PERFORMANCE SPECIFICATIONS

MEETS OR EXCEEDS:

- API SM/CL
- ACEA A3 / B4-04
- JAPANESE ENGINES Qualified
- FORD MOTOR Co. M2C-153E
- VW NORM 502.00, 505.00
- PEUGEOT-CITROEN – Meets requirements of PSA E-98 (level 2 for extended drain application)
- ROVER GROUP Registered
- MERCEDES-BENZ Sheet 229.3
- GM-LL-B-025

TYPICAL PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th></th>
<th>5W30</th>
<th>5W30</th>
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</thead>
<tbody>
<tr>
<td>SAE Grade</td>
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<td></td>
</tr>
<tr>
<td>Kinematic Viscosity @ 40 °C</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Kinematic Viscosity @ 100 °C</td>
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<td></td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>Density @ 15 °C</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>Flash Point °C (PMCC) Pour</td>
<td>225</td>
<td></td>
</tr>
<tr>
<td>Pour Point °C</td>
<td>-48</td>
<td></td>
</tr>
</tbody>
</table>
10W40 SM/CF

DESCRIPTION

10W40 is the ultimate, fully synthetic diesel engine oil exceeding the most demanding European specifications and meeting the increasing market demand for “fuel-efficient” oils. It features a unique developed formulation that is recognized by leading engine builders as offering the best performance available for modern European diesel engines.

APPLICATION

Ultimate European Diesel Engine Oil Performance
Outstanding performance in automotive high-speed heavy duty diesel engines built in Europe and particularly suited for use in Daimler Chrysler and MAN EURO 2 and EURO 3 engines.

Commercial Road Transport Operations
Designed for use in the latest highly rated turbocharged 4-stroke diesel engines under all operating conditions. Optimized for EURO 2 and EURO 3 engine technology.

PERFORMANCE FEATURES AND BENEFITS

- A cleaner engine
- Low wear-Extended engine life
- Shear stable
- Low volatility

Low oil top-up rates between recommended service intervals.
- Lower operating costs

Makes a significant contribution towards reducing the operating cost of a vehicle through:

- Reduces downtime
- Longer service intervals (approved by all leading OEMs)
- Sustained high performance for the life of the vehicle
- Fuel economy
- Low oil consumption
- Better cold starting

10W40 allows quicker cold starting than conventional 15W40 oils. This means less wear on batteries and starter motors as well as less engine wear.

PERFORMANCE SPECIFICATIONS

MEETS OR EXCEEDS:
- GM-LL-B-025
- API SM/CF
- ACEA A3 / B4-04
- MERCEDES-BENZ 229.1
- MAN M 3277

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS SAE GRADE (J 300)</th>
<th>10W40</th>
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<tbody>
<tr>
<td>Kinematic Viscosity @ 40 °C</td>
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<tr>
<td>@ 100 °C (ASTM 445)</td>
<td>14.3</td>
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<td>Viscosity Index (ISO 2909)</td>
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<td>Density @ 15 °C (ASTM D 4052)</td>
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<td>Flash Point COC °C (ISO 3016)</td>
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<td>POUR POINT °C (ISO 3016)</td>
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</tr>
<tr>
<td>TBN mg KOH/g (ISO 3771)</td>
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<tr>
<td>SULPHATED ASH % (ISO 3987)</td>
<td>1.3</td>
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</table>
SAE 75W90 GL5 GEAR OIL (Synthetic)

DESCRIPTION

EP SAE 75W90 GL5 Gear Oil contains extreme pressure additives, which reduce wear in synchromesh transmissions of passenger cars and commercial vehicles operating under moderate service conditions. EP SAE 75W90 GL5 Gear Oil is suitable for spur and helical gear units where high levels of extreme pressure additives are not required. EP SAE 75W90 GL5 Gear Oil may also be used in hypoid axles, under moderate operating conditions.

SPECIAL PROPERTIES

- Improved load carrying abilities
- Enhanced lubricant performance
- Manufactured to SABS quality standards
- Selected additive package, providing
  - Anti-wear
  - Anti-oxidation at high temperatures

PERFORMANCE LEVELS

- API GL5
- ZF TE-ML 02/08
- MAN 341 (EOD)
- BMW – REAR AXLES

TYPICAL PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Physical Characteristic</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic Viscosity @ 40 °C</td>
<td>90</td>
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<tr>
<td>Kinematic Viscosity @ 100 °C</td>
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<tr>
<td>Density @ 20 °C</td>
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<tr>
<td>Viscosity Index</td>
<td>175</td>
</tr>
<tr>
<td>Pour point °C</td>
<td>-27</td>
</tr>
<tr>
<td>Flash Point</td>
<td>195</td>
</tr>
</tbody>
</table>

TEST METHOD

- ASTM D445
- ASTM D97
- ASTM D2270
- ASTM D92
COMPRESSOR OIL
32, 46, 68 & 100

DESCRIPTION

Spec Oil Compressor Oil is a range of premium quality highly refined virgin paraffinic base oils. They contain a balanced additive system consisting of anti-wear, anti-rust, anti-oxidant and anti-foam additives to give outstanding levels or performance for use in reciprocating air, vane, rotary and piston compressors.

BENEFITS

- Outstanding overall performance
- Extended service intervals
- Excellent oxidation resistance
- Excellent corrosion inhibitors
- Excellent separation from water (IP19 and D1401)
- Excellent rust control even after water wash
- Resistance to sludge formation / filterability
- Ashless / calcium free

PERFORMANCE LEVELS

- Denison HFO, HF-1, HF-2
- Vickers Eaton I-286-5 Industrial Equipment
- Vickers Eaton M-2950-85 Mobile Equipment
- Cincinnati Machine P68, P69, P70
- Bosch Rexroth RE 90, 220
- DIN 51524 Part I, II and III
- ISO 11158 Categories HH, HL, HM and HV
- ASTM D6158-99

KEY PROPERTIES

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th>32</th>
<th>46</th>
<th>68</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity Cst @ 100 °C</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>9.8</td>
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<tr>
<td>Flash Point °C</td>
<td>207</td>
<td>210</td>
<td>215</td>
<td>220</td>
</tr>
</tbody>
</table>
CIRCULATING OIL  
32, 100, 150 & 220

DESCRIPTION
Circulating Oil is premium quality, solvent refined, high viscosity index and mineral oils specially chosen for their ability to provide superior lubrication in a wide range of industrial applications.

This product is formulated with superior base oils and contains oxidation and rust inhibitors, defoamers and anti-wear additives. It is a high quality circulating oil and general purpose lubricant. It has the ability to rapidly separate from water, prevention of emulsion and sludge build up, which hampers lubricating efficiency. It has marked resistance to foaming and good air release which is important in circulation systems.

APPLICATION
It is primarily used for continuous recirculation where maintenance factors ensure low leakage losses. Specialized uses include hydraulic systems, certain marine turbines as well as their associated reduction gears. These oils find application in bearings and industrial enclosed spur or bevel gears, provided EP is not required, Circulation oil applications include, ring collar and chain-oiled bearings, splash oiling and bath systems. It is particularly suited to the lubrication of antifriction bearings of paper mill dryer rolls, plastic film calendars and paper corrugators where their excellent resistance to the formation of harmful deposits produces outstanding benefits.

- Plain and rolling element bearings
- Enclosed spur, helical, bevel & worm gearboxes where a non-additive mineral oil approved by the gear manufacturer
- Machine tool circulatory systems
- May be used in industrial applications where loadings and temperatures are moderate

PERFORMANCE FEATURES
- Good oxidation and thermal stability:
- Natural resistance to the formation of sludge and other harmful products of oxidation.
- Long oil life.

Water shedding properties:
Circulating oils have excellent water separation properties. Excess water can be drained easily from lubrication systems. (Water can greatly accelerate surface fatigue on gear and bearing interfaces and promote ferrous corrosion on all internal surfaces. Water contamination should be avoided or removed as quickly as possible after occurrence).

High Viscosity Index:
Minimal change of oil viscosity over the operating temperature range.

KEY PROPERTIES

<table>
<thead>
<tr>
<th>CIRCULATING OIL</th>
<th>32</th>
<th>100</th>
<th>150</th>
<th>220</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity Grade (ISO 3448)</td>
<td>32</td>
<td>100</td>
<td>150</td>
<td>220</td>
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<tr>
<td>Viscosity @ 40 °C</td>
<td>32</td>
<td>100</td>
<td>150</td>
<td>220</td>
</tr>
<tr>
<td>Viscosity @ 100 °C (IP 71)</td>
<td>5.4</td>
<td>19.20</td>
<td>11.20</td>
<td>14.80</td>
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<td>Viscosity Index (IP 226)</td>
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<td>95</td>
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<td>95</td>
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<tr>
<td>Density 20 °C kg/l (IP 365)</td>
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<td>0.877</td>
<td>0.883</td>
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<tr>
<td>Flash Point °C (Min)</td>
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<td>225</td>
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<td>Pour Point °C (Max)</td>
<td>-12</td>
<td>-9</td>
<td>-9</td>
<td>-9</td>
</tr>
</tbody>
</table>
CLASSIC CUTTERBAR (REGEN)

DESCRIPTION

This cutter bar is specially formulated mineral oil recommended for the lubrication of cutting chains, cutter bars and drive gear on hand-held chain saws. The oil contains a superlative additive pack to ensure that adequate lubricant adhere to the rubbing surfaces of this total loss system. Its exceptionally high viscosity index which means that the product retains its viscometrics even at high operating temperatures, reducing fling-off and protecting the components. ECOTECH RG is recommended for all makes of hand-held chain saws.

BENEFITS/APPLICATION

- Excellent lubrication and super adhesive-cohesive properties
- Lower oil consumption and extended chain life.
- Prevents wear and is cost effective.

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th>Typical</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Amber</td>
<td>Visual</td>
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<tr>
<td>Density @ 40 °C</td>
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<td>Viscosity Index</td>
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<td>Flash Point °C</td>
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<tr>
<td>Total Acid Number</td>
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<td>ASTM D974</td>
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</table>
CLASSIC CUTTERBAR
(VIRGIN)

DESCRIPTION

This Cutterbar is specially formulated mineral oil recommended for the lubrication of cutting chains, cutter bars and drive gear on hand-held chain saws. The oil contains a superlative additive pack to ensure that adequate lubricant adhere to the rubbing surfaces of this total loss system. Its exceptionally high viscosity index which means that the product retains its viscometrics even at high operating temperatures, reducing fling-off and protecting the components. ECOTECH cutterbar virgin is recommended for all makes of hand-held chain saws.

BENEFITS/APPLICATION

- Excellent lubrication and super adhesive-cohesive properties.
- Lower oil consumption and extended chain life.
- Prevents wear and is cost effective.

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th>Typical</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Amber</td>
<td>Visual</td>
</tr>
<tr>
<td>Density (@ 40 °C)</td>
<td>0.88</td>
<td>IP 190</td>
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<tr>
<td>Viscosity cst (@ 40 °C)</td>
<td>150</td>
<td>ASTM D445</td>
</tr>
<tr>
<td>Viscosity Index</td>
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</tr>
<tr>
<td>Flash Point °C</td>
<td>220</td>
<td>ASTM D92</td>
</tr>
<tr>
<td>Total Acid Number</td>
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</table>
CUTTERBAR
150

DESCRIPTION

This Cutter bar is specially formulated mineral oil recommended for the lubrication of cutting chains, cutter bars and drive gear on hand-held chain saws. The oil contains a superlative additive pack to ensure that adequate lubricant adheres to the rubbing surfaces of this total loss system. It’s exceptionally high viscosity index which means that the product retains its viscometrics even at high operating temperatures, reducing fling-off and protecting the components. Cutterbar 150 is recommended for all makes of hand-held chain saws.

BENEFITS

- Excellent lubrication and super adhesive-cohesive properties
- Lower oil consumption and extended chain life
- Prevents wear and is cost effective

KEY PROPERTIES

<table>
<thead>
<tr>
<th>PHYSICAL CHARACTERISTICS</th>
<th>Typical</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Amber</td>
<td>Visual</td>
</tr>
<tr>
<td>Density @ 40 °C</td>
<td>0.88</td>
<td>IP 190</td>
</tr>
<tr>
<td>Viscosity cst @ 40 °C</td>
<td>140-160</td>
<td>ASTM D445</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>238</td>
<td>ASTM D2270</td>
</tr>
<tr>
<td>Flash Point °C</td>
<td>220</td>
<td>ASTM D92</td>
</tr>
<tr>
<td>Total Acid Number</td>
<td>0.6-1.1</td>
<td>ASTM D974</td>
</tr>
</tbody>
</table>
SLIDEWAY OIL
32 & 68

DESCRIPTION

Slideway Oils are based on highly refined, high viscosity index, mineral oils. They contain tackiness and other special additives to meet the lubrication demands of present day machine tools.

APPLICATION

All machine tool parts, including bearings and gearboxes, lubricated by circulation systems Machine tool hydraulic systems (ISO 32 & 68 grades) Machine Tool slideways

PERFORMANCE FEATURES

Excellent low friction
- Particularly on plastic coated slideways. Reduced chatter and vibration caused by the phenomenon of stick-slip.

Oxidation stability
- Withstands high operating temperatures and prolongs oil life.

High Viscosity Index
- Low Viscosity at machine tool start-up temperatures and adequate viscosity at high working temperatures.
  Minimum oil leakage through seals.

Improved emulsion separation performance
- Resist wash-off by coolants.

Anti-corrosion performance
- Provides protection on all machine tool metal surfaces.

Stain – free machining
- Components being machined stay stain – free.

Excellent anti-wear characteristics
- Minimum machine tool downtime reduced servicing costs.
  - Cincinnati Milacron P47, P50 and P53 approved

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>SLIDEWAY OIL</th>
<th>32</th>
<th>68</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO Viscosity Grade</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td>ISO Viscosity Type</td>
<td>G/GH</td>
<td>G/GH</td>
</tr>
<tr>
<td>Viscosity @ 40 °C</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td>Viscosity @ 100 °C</td>
<td>5.9</td>
<td>9.3</td>
</tr>
<tr>
<td>Density @15 C KG/L (IP 365)</td>
<td>0.872</td>
<td>0.882</td>
</tr>
<tr>
<td>Flash Point °C (PMCC) (IP34)</td>
<td>216</td>
<td>219</td>
</tr>
<tr>
<td>Pour Point °C (IP 15)</td>
<td>-30</td>
<td>-27</td>
</tr>
<tr>
<td>Neutralization No. mg</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>KOH/g(IP 139) Rust Preventing Salt water procedure (IP 135B)</td>
<td>No Rust</td>
<td>No Rust</td>
</tr>
<tr>
<td>Copper Corrosion 3 hours @ 100 °C</td>
<td>Class 1</td>
<td>Class 1</td>
</tr>
</tbody>
</table>
HEAT TRANSFER
22, 32 & 100

DESCRIPTION

Heat Transfer 22, 32 & 100 is paraffinic mineral base oil used in enclosed circulating systems for the transfer of heat. Heat Transfer 22, 32 & 100 has good oxidation and thermal stability without the use of anti-oxidants. They are high Viscosity index base oils with good chemically stability. Neutral oxidation resistance at high operating temperatures and low pour point which makes them suitable for outdoor and low temperature uses.

OUTSTANDING FEATURES

Heat Transfer has the following features:

- Non additive mineral oil
- Good oxidation and thermal stability
- Heat Transfer 22, 32 are especially suitable for quenching of large numbers of smaller steel ports in a given line. They provide a slow to moderate rate which results in sufficient hardness without the danger of cracking the materials.
- Low lubricant cost in wasteful conditions.

DIRECTION FOR USE

Heat Transfer is recommended for use in all heat transfer operations where additives are not required. Heat transfer 22 and 32 are recommended for use as general purpose lubricants in equipment operating under lightly loaded or wasteful conditions e.g. as a flushing oil for cleaning out circulating systems and oil reservoirs during oil change-over procedures typical application include conveyers, chairs and outdoor machinery. They are also used as heat exchanging medium in closed systems operating at temperatures up to 300 °C. Heat sources should apply heat gradually while oil is circulating to avoid local overheating, oil cracking and cooking of the heater elements. They are suitable for quenching of large numbers of smaller steel parts in a given time. They provide a slow to moderate quenching rate which results in sufficient hardness without the danger of cracking the material.

<table>
<thead>
<tr>
<th>TECHNICAL DATA</th>
<th>22</th>
<th>32</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Pale yellow Fluid</td>
<td>Pale Yellow</td>
<td>Pale Yellow</td>
</tr>
<tr>
<td>Density @20 °C</td>
<td>0.864</td>
<td>0.869</td>
<td>0.88</td>
</tr>
<tr>
<td>Viscosity @ 40 °C</td>
<td>20 – 24 Cst</td>
<td>30 – 34</td>
<td>98 – 105</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>97</td>
<td>95</td>
<td>98</td>
</tr>
<tr>
<td>Pour Points</td>
<td>-15</td>
<td>-12</td>
<td>-10</td>
</tr>
</tbody>
</table>
MOULD RELEASE EM

DESCRIPTION

This is a Mould Release Emulsion that prevents concrete stitching to either the mould or shuttering form work. It produces a smooth finish on the concrete and keeps to mould a shuttering suitable for re-use. Excellent on moulds for pre-cast fencing and similar intricate shapes. It is a very thin non-staining, ready-to-use slightly oily, concrete emulsion mould release oil.

APPLICATION

This product should be used neat. Application can be by brushing, spraying or swabbing, aiming at a concrete coverage with the thinnest possible film.

BENEFITS

- Adheres tenaciously to mould and shutters.
- Ensures that the mould or shuttering does not stick to the concrete.
- Easy application at all ambient temperatures.
- Provides a smooth finish.
- Protection of metal moulds from rust and corrosion.

KEY PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density @20 °C KG L</td>
<td>0.862</td>
</tr>
<tr>
<td>Viscosity @ 40 °C</td>
<td>7</td>
</tr>
<tr>
<td>Flash Point °C</td>
<td>Non-Flash</td>
</tr>
</tbody>
</table>
CHARACTERISTICS

Honing Oil Vulcohone DD contains a combination of synergistic working high-pressure additives.

APPLICATION

Honing Oil Vulcohone DD is special thin honing oil used on different honing machines and for all types of metal alloys.

ADVANTAGES

- It has a light colour
- Odourless
- Oxidation stable
- Excellent corrosion protection

KEY PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour Light</td>
<td>Yellow</td>
</tr>
<tr>
<td>Density @ 20 °C</td>
<td>0.875</td>
</tr>
<tr>
<td>Viscosity @ 40 °C</td>
<td>11</td>
</tr>
<tr>
<td>ISO Class</td>
<td>11</td>
</tr>
<tr>
<td>Flash point °C</td>
<td>130</td>
</tr>
</tbody>
</table>
QUENCHING OIL

DESCRIPTION

Quench Oil is a standard speed quenching oil which is based on a mineral oil of low viscosity.

APPLICATION

It is recommended that a consistent temperature be maintained to ensure uniform quenching characteristics. In case where standard speed, general purpose quenching oil is required. When quenching alloys that have well hardening ability, good results with minimum distortion is achieved.

BENEFITS

- The low viscosity mineral oil ensures good quenching characteristics for thorough hardness.
- Economical to use due to low drag-out.
- Quench consistency is maintained by ease of circulation and therefore risk of fire is also reduced.

MINIMIZE VOLATILITY

- High flash point reduces fire risk and ensures improved working conditions by reducing losses due to evaporation and fuming.
- Good oxidation stability reduces acid build-up which decreases the possibility of staining.
- Also increases the useful life of oil by reducing sludge build-up and thickening of oil.

PRECAUTION

- Avoid water entry.
- Allow for thermal expansion when filling quench tank with fresh cold oil.

KEY PROPERTIES

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density @ 20 °C KG L</td>
<td>0,864</td>
</tr>
<tr>
<td>Viscosity @ 40 °C</td>
<td>32</td>
</tr>
<tr>
<td>Viscosity @ 100 °C</td>
<td>4,9</td>
</tr>
<tr>
<td>Flash Point °C (Min)</td>
<td>220</td>
</tr>
<tr>
<td>Pour Point °C (Max)</td>
<td>-12</td>
</tr>
<tr>
<td>Fire Point °C</td>
<td>248</td>
</tr>
<tr>
<td>IBP, °C</td>
<td>325</td>
</tr>
</tbody>
</table>
# ROCKDRILL

## 100, 150, 220 & 320

## DESCRIPTION

This Rock Drill Oil is a mineral oil blended from carefully selected Virgin base oils in combination with selected anti-wear, anti-rust, anti-oxidant and tackiness additives.

## BENEFITS

- Tenacious oil film provides for superior anti-wear performance.
- Anti-wear additives prevent excessive wear particularly inside pumps and motors, meaning less maintenance.
- Anti-oxidant additives ensure long oil life.
- Anti-foam additives assist in minimizing foam formation in the oil tank and consequently pressure loss.
- Selected base oils ensure good water separation properties.

## APPLICATION

Ecotech Rock Drill Oils are suitable for most types of Rock Drill and Pneumatic machinery. They are ideal for use in mines because of its anti-fog characteristics and severe duty applications.

## KEY PROPERTIES

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th>100</th>
<th>150</th>
<th>220</th>
<th>320</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity @ 40 °C</td>
<td>100</td>
<td>150</td>
<td>220</td>
<td>320</td>
</tr>
<tr>
<td>Viscosity @ 100 °C</td>
<td>12</td>
<td>16</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Pour Point °C (Max)</td>
<td>-15</td>
<td>-12</td>
<td>-9</td>
<td>-3</td>
</tr>
<tr>
<td>Flash Point °C (Min)</td>
<td>230</td>
<td>250</td>
<td>270</td>
<td>270</td>
</tr>
</tbody>
</table>
ATF DX II
Automatic Transmission Fluid Dextron II

DESCRIPTION

ATF is an automatic transmission fluid for use where manufacturers calls for a Dextron II fluid. It is blended from virgin base oils, which have been fortified with ant-wear, anti-oxidant, anti-foam, anti-corrosion and viscosity index improvers together with friction modifiers. This blend component gives high levels of performance and long service life.

APPLICATION

Automotive heavy-duty automatic transmissions, Power shift transmissions, Power steering, Hydraulic systems.

PERFORMANCE LEVELS:

MEETS OR EXCEEDS:

- Dextron II D
- Allison C-4
- Mercedes Benz Sheet 236.1 and 236.5
- ZF Sheet TE-ML 02F,03D,04D,14A,17C
- VOLTH G 607
- Ford’s MERCON ATF specifications
- Caterpillar TO-0 requirements
- Denison HF-0

BENEFITS:

- Excellent anti wear properties ensure longer equipment life
- Protection against deposit formation
- Correct frictional characteristics

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity Cst, 40 °C</td>
<td>33-36</td>
</tr>
<tr>
<td>Viscosity Cst @ 100°C</td>
<td>6 -7.2</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>140</td>
</tr>
<tr>
<td>Pour Point °C (MAX)</td>
<td>-42</td>
</tr>
<tr>
<td>Flash Point (COC)°C</td>
<td>193</td>
</tr>
</tbody>
</table>
ATF DX III SYNTHETIC

DESCRIPTION

This is a superior quality automatic transmission fluid fully synthetic DEXRON III. Based on AFRIQ XHVI synthetic base fluid, it is the ultimate performance automatic transmission fluid allowing extended drain intervals even under the most severe conditions.

APPLICATION

- Automotive automatic transmissions
- Automotive hydraulic systems
- Power steering
- Certain manual transmissions

PERFORMANCE FEATURES

- Excellent shift feeling
- Extremely low temperature fluidity
- Shear stable
- Wear protection
- Maximum oil drain interval potential
- High temperature oxidation stability

PERFORMANCE SPECIFICATIONS

MEETS OR EXCEEDS:

- GENERAL MOTORS GM DEXRON III
- FORD MERCON
- NEW MERCON
- CAT TO-2
- ALLISON C4
- MAN 339 TYPE Z-1 AND V-1
- MAN 339 TYPE Z-2 AND V-2
- MB 236.1 AND MB 236.5
- ZF TE ML 02F, 03D, 04D, 09B, 11B, 14A AND 17C
- VOITH 55.6335

TYPICAL PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Kinematic Viscosity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>@ 40 °C</td>
<td>33.2</td>
</tr>
<tr>
<td>@ 100 °C</td>
<td>7.2</td>
</tr>
<tr>
<td>Viscosity Index (IP226)</td>
<td>189</td>
</tr>
<tr>
<td>Density @ 15 °C (IP365)</td>
<td>0.847</td>
</tr>
<tr>
<td>Flash Point (PMCC), ° C (IP34)</td>
<td>165</td>
</tr>
<tr>
<td>POUR POINT ° C (IP15)</td>
<td>-48</td>
</tr>
</tbody>
</table>
TRANSMISSION FLUID
TRANSFLUID TO-4 SAE 10,30,40,50

DESCRIPTION

These premium quality TO-4 Fluids have been formulated specially for transmissions and drive trains of equipment requiring lubricants having high levels of oxidation stability, the ability to reduce gear wear plus improved friction properties and elastomer compatibility.

APPLICATION

Although these oils have been classified in terms of SAE Engine Oil viscosity ratings, they have mainly been formulated for transmissions and drive trains. This, with the development of more specialized drive trains, coupled with the legislation being imposed on diesel engine exhaust emissions in the USA and Europe, the need for specialized lubricants has superseded the convenience of multi-purpose lubricants.

PERFORMANCE LEVEL

Meets the following performance levels:

- Caterpillar to-4, Allison C-4 AND KOMATSU MICRO CLUTCH.
- They can also been used successfully in transmissions requiring the following levels of performance
- ZF-TE-ML 01,03 AND EATON FULLER
- Passing results are obtained in MAC Transmissions CRCL-60-1 and API MT-1 Specifications.
- This oil demonstrates API CF and CF2 performance which is useful in the event of misuse in diesel engines

BENEFITS

- Improved oxidation stability for power shift transmissions
- Reduces gear wear
- Superior frictional properties for drive trains.
- Better elastomer compatibility
- Reduce brake noise

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>SAE NO.</th>
<th>10</th>
<th>30</th>
<th>40</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity Cst @ 40°C</td>
<td>36</td>
<td>94</td>
<td>144</td>
<td>236</td>
</tr>
<tr>
<td>Viscosity Cst @ 100°C</td>
<td>6</td>
<td>10.9</td>
<td>14.5</td>
<td>19.5</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>103</td>
<td>99</td>
<td>100</td>
<td>95</td>
</tr>
<tr>
<td>Flash Point°C</td>
<td>200</td>
<td>205</td>
<td>232</td>
<td>232</td>
</tr>
<tr>
<td>Pour Point°C</td>
<td>-.35</td>
<td>-.30</td>
<td>-.27</td>
<td>-.12</td>
</tr>
<tr>
<td>Density @ 20°C</td>
<td>0.881</td>
<td>0.899</td>
<td>0.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>
ANTIFREEZE
CONCENTRATE 95%

DESCRIPTION:
Antifreeze / summer coolant is a blend of M.E.G and wide range of corrosion inhibitors, for maximum protection mixed with 50% of water, it will lubricate the water pump, provides protection against extreme temperatures. Can be used in cooling system of petrol and diesel engines, particularly those incorporating aluminum alloys up to -36°C

APPLICATION:
- Automotive
- Construction
- Earthmoving, quarrying and mining
- Agricultural Equipment

BENEFITS:
- Silicate free type inhibitor system provides exceptional protection.
- Protects all engines, cooling systems, and metals such as iron, steel, aluminium, copper and solder alloys against corrosion.

PERFORMANCE LEVELS
MEETS OR EXCEEDS:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB 325.0</td>
<td>ASTM D330</td>
</tr>
<tr>
<td>SABS 1251</td>
<td>SAE J1034</td>
</tr>
</tbody>
</table>

RECOMMENDED MIXTURE RATIOS:

<table>
<thead>
<tr>
<th>Dilution</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>-12</td>
</tr>
<tr>
<td>33%</td>
<td>-18</td>
</tr>
<tr>
<td>50%</td>
<td>-36.5</td>
</tr>
</tbody>
</table>

TYPICAL PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour ASTM</td>
<td>Blue</td>
</tr>
<tr>
<td>Density, KG/L @ 20°C</td>
<td>1.133</td>
</tr>
<tr>
<td>Equilibrium Boiling Pt. (undiluted)°C</td>
<td>170</td>
</tr>
<tr>
<td>Freezing Pt (50 Vol% Solution)°C</td>
<td>-36.5</td>
</tr>
<tr>
<td>Reserve Alkalinity ml 0.1N HCL</td>
<td>7</td>
</tr>
<tr>
<td>Ph., 50 Vol% Solution</td>
<td>15</td>
</tr>
</tbody>
</table>
ANTI-FREEZE
ALL SEASON 50%

DESCRIPTION

Antifreeze / Summer coolant is a blend of M.E.G and a wide range of corrosion inhibitors for maximum protection mixed with 50% of water, it will lubricate the water pump, providing protection against extreme temperatures. Afriq Antifreeze can be used in cooling system of petrol and diesel engines, particularly those incorporating aluminium alloys up to – 36 °C.

METHOD

Do not dilute, use as is for maximum protection.

APPLICATION

Construction, Earthmoving, Quarrying, Mining and Agricultural equipment. Green in Colour.

PERFORMANCE STANDARDS
MEET OR EXCEEDS:

- THERMO KING
- NAVISOR
- FREIGHT LINER
- CATERPILLAR EC-1
- DAF
- FORD/JAGUAR
- SCANIA
- ISUZU
- CRYSLER
- MB 325.3
- VW AND AUDI
- DETROIT DIESEL
- VOLVO TRUCKS
- LEYLAND
- ROVER (LAND ROVER)
ANTI-FREEZE
RADIATOR COOLANT
(Antifreeze 33%)

DESCRIPTION
Antifreeze contains a balanced mixture of corrosive inhibitors in liquid form and is green in colour.

METHOD OF USE
This is a 33 % Antifreeze and must be used as is. Empty and flush the cooling system thoroughly before commencing treatment, to remove as much old rust as possible. If the system is exceptionally rusty it is advisable to repeat the procedure after the first week or two of treatment.

APPLICATION
Antifreeze is particularly effective in preventing corrosion in engine cooling systems. It will protect ferrous metals, copper and copper alloys. It will not affect rubber gaskets or hoses. Antifreeze is effective in hot and cold water, and is fully compatible with glycol / water mixtures. It also contains an anti-rust agent to prevent deposition on hot surfaces and keep water-ways in radiators clear.

BENEFITS
- Protects metals in engine cooling systems from corrosive attack.
- Extends engine life by ensuring efficient cooling.
- Keep engine from heat-absorbing sludge’s and scales.
- Does not affect rubber gaskets or hoses.
SUPER LONGLIFE PREMIX COOLANT

DESCRIPTION

Super Long-life Premix Coolant is a premium performance, environmentally sensitive pre-diluted coolant, anti-freeze and corrosion inhibitor, based on extended life organic acid Carboxylate Technology plus an additional nitrite corrosion inhibitor in ethylene glycol. Provides long term protection of the cooling systems of heavy and light duty diesel engines and also gasoline engines. Specifically designed for use where the engine manufacturer requires nitrite inhibited product (e.g. Caterpillar).

RECOMMENDED FOR

- High temperature aluminum engine blocks.
- Passenger car gasoline and diesel engines.
- Light duty commercial vehicle gasoline and diesel engines.
- Heavy duty diesel engines fitted with “wet” or “dry” liners, in both on and off highway service.

Recommended maximum service intervals are:

- Passenger car & light truck commercial vehicles 250,000 km or 5 years
- Heavy duty diesel, on-road 800 000 km or 8 years
- Heavy duty diesel, off-road 15,000 hours or 8 years

CHANGEOVER PROCEDURE

- Check that the cooling system is clean in good condition.
- Carry out any repairs that are necessary.
- Drain the cooling system including radiator, engine clock, heater core, oil coolers and after cooler, remove drain plugs and hoses as necessary to achieve this.
- Flush the system using the manufacturer’s instructions, if none are available follow the procedure below.
- Close all drains, reconnect hoses, fill with clean soft water, run the engine to operating temperature with the heater on.
- Shut down; allow to cool, drain the system again.
- Repeat this until the cooling system is clean and free from contaminants, previous coolant and any rust or scale.
- If a filter is present replace it with a new filter that does not contain Supplemental Coolant Additives.

PERFORMANCE CHARACTERISTICS

Super long-life Premix Coolant meets and or exceeds the requirements of most European and International Standards including:

- ASTM D3306
- ASTM D4985
- SAE J 1034
- BS 6580 (1992)
- AFNOR NF R15-601*
- FFV HEFT R443
- CUNA NC 956-16
- UNE 26361-88
- JIS K 2234*
- NATO S 759
It also meets the performance requirements of the following OEM specifications:

- CHRYSLER MS 9176
- CUMMINS 85T8-2 & 90T8-4
- FORD ESE M97 B49-A, WSS-M97 B44-D & ESD M97 B49-A
- GM 1899 M, US 6277 M & OPEL GM QL 130100
- JOHN DEERE H 24 B1 & C1
- LEYLAND TRUCKS LTS 22 AF 10
- MACK 014GS 17004
- MAN 248, 324 (SNF) & B&W D 36 5600
- MERCEDES MB 325.3
- RENAULT 41-01-001
- VAG TL 774F
- VOLVO

**BENEFITS**

**Saves time and money:**
One coolant does it all. Very low depletion rate and complete cooling system protection of the organic acid inhibitor removes the need for supplementary additives for cavitation erosion protection, and reduces the need to regularly test inhibitor level and add extra additive to maintain the inhibitor concentration.

**Reduced maintenance costs:**
Unique Carboxylate Technology inhibitor system prevents wet liner cavitation erosion and provides exceptional protection to aluminum surfaces under heat transfer conditions. Fewer abrasive dissolved solids means fewer water pump seal failures.

**Extended service life:**
Very low depletion rate of the organic acid inhibitor ensures long term corrosion protection under all operating conditions.
XTREME WATER - BASE DEGREASER

DESCRIPTION

Homogeneous water based degreasing fluid.

PRODUCT USE

Used for degreasing painted and unpainted surfaces of mechanical and automotive components soiled with dirty oil and grease as well as industrial food industry cleaning. Also for domestic purpose in and around the house, floors, walls, tiles etc.

PRODUCT FEATURES

- Fast Cleaning
- Safe on metals
- Economical
- Free rinsing
- Non Flammable
- Bio-Degradable

DIRECTION SPECIFICATION

Apply neat with brush or spray and allow soaking into grime or agitating and then washing off with water. The length of soaking time depends on the depth to be penetrated. It can also be used in high-pressure cleaners.

<table>
<thead>
<tr>
<th>PRODUCTION SPECIFICATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Transparent</td>
</tr>
<tr>
<td>Ingredients</td>
<td>Synthetic detergents and phosphates</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Non Flammable</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.05 at 20 C</td>
</tr>
<tr>
<td>Odour</td>
<td>Neutral</td>
</tr>
<tr>
<td>Ph</td>
<td>12</td>
</tr>
</tbody>
</table>
ENGINE CLEANER
SOLVENT BASE

DESCRIPTION
Homogeneous Emulsifiable General Purpose Low Flash Degreaser Fluid.

PRODUCT USE
Used for degreasing painted and unpainted surfaces of mechanical and automotive components soiled with dirty oil and grease.

PRODUCT FEATURES
- Fast cleaning: High Solvency on Greasy Deposits
- Safe on metals
- Economical
- Free Rinsing
- Non-Flammable

DIRECTIONS FOR USE
Apply neat with brush or spray and allow soaking into grime or agitate and then wash off with water. The length of soaking time depends on the depth to be penetrated.

PRODUCTION SPECIFICATION

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Blue Coloured</td>
</tr>
<tr>
<td>Ingredients</td>
<td>Blend of Organic Solvents and Emulsifiers</td>
</tr>
<tr>
<td>Flash Point</td>
<td>85 °C (Typical)</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.800 @ 20 °C (Typical)</td>
</tr>
<tr>
<td>Odour</td>
<td>Mildly Paraffinic</td>
</tr>
<tr>
<td>Ph</td>
<td>7 Approx</td>
</tr>
</tbody>
</table>
BRAKE FLUID
DOT 4

DESCRIPTION

This an automotive brake fluid designed for use in a wide range of conventional hydraulic brake and clutch systems.

APPLICATION

Recommended for motor vehicle hydraulic brake systems (disc and drum brakes) and hydraulic clutch systems in passenger cars, commercial road transport, agricultural tractors, off-road vehicles and motorcycles. Absolute cleanliness is essential in the application and storage of brake fluid.

Precaution must be taken to avoid contamination of any kind.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>TYPICAL PHYSICAL CHARACTERISTICS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ER Boiling point (Dry)</td>
<td>275</td>
</tr>
<tr>
<td>ER Boiling point (Wet)</td>
<td>175</td>
</tr>
<tr>
<td>PH</td>
<td>8.6</td>
</tr>
<tr>
<td>Colour</td>
<td>Yellow</td>
</tr>
<tr>
<td>Viscosity @ 100°C</td>
<td>2</td>
</tr>
</tbody>
</table>
WHEELBEARING GREASE

DESCRIPTION

HD Wheel Bearing Grease is inorganic clay-based greases blended with high viscosity oils selected for its chemical stability and low volatility. They contain anti-oxidants, anticorrosion and additives. It has excellent physical and chemical stability and gives a long service period at continuous working temperatures of up to 180 °C.

APPLICATION

- HD Wheel Bearing Grease is designed to operate at temperatures higher than those of conventional soap based greases.
- They are recommended for use in electric motor and fan bearings, speed and anti-friction bearings, underground mining equipment and other high temperature applications such as plastic injection moulding machines. It is specially designed for high temperature.
- Applications such as bearings on cement kiln driers, brick kiln cars.
- Ingot buggies in steel works and also on slides, guides and plain bearings.

BENEFITS

- Long service life at high temperatures
- Low leakage rates in service
- Good pumpability
- Resists water washout
- Reduce wear

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickening agent</td>
<td>Inorganic Clay Bentonite</td>
</tr>
<tr>
<td>NLGI Classification</td>
<td>2</td>
</tr>
<tr>
<td>Worked Penetration @ 25 °C</td>
<td>265/295</td>
</tr>
<tr>
<td>Drop Point °C</td>
<td>Non-Melt</td>
</tr>
<tr>
<td>Oil Viscosity @ 40 °C</td>
<td>90</td>
</tr>
<tr>
<td>Timken O.K Load kg Min</td>
<td>12</td>
</tr>
<tr>
<td>Recommended Temp. Range °C Max</td>
<td>180</td>
</tr>
<tr>
<td>Colour, Visual</td>
<td>Orange/Red</td>
</tr>
</tbody>
</table>
C.V. JOINT GREASE

DESCRIPTION

Spec Oil C.V. Joint Grease is a high-quality multipurpose lithium-based blended from Solvent-Refined Oils and incorporates Multifunctional extreme pressure additive, corrosion and oxidation inhibitors and molybdenum disulphide. Additional extreme pressure properties and achieved by the use of molybdenum disulphide.

APPLICATION

C.V. Joint Grease is recommended for the majority of automotive lubricating applications such as universal joints, ball joints, pivot pins and chassis. These greases are often used for the lubrication of inaccessible parts which are included to be forgotten during servicing. It is also recommended for fifth wheel applications.

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickening Agent</td>
<td>Lithium</td>
</tr>
<tr>
<td>NLGI Classification</td>
<td>2</td>
</tr>
<tr>
<td>Worked Penetration @ 25 °C</td>
<td>265-295</td>
</tr>
<tr>
<td>Drop Point °C</td>
<td>170</td>
</tr>
<tr>
<td>Oil Viscosity @ 25 °C</td>
<td>200</td>
</tr>
<tr>
<td>Timken O.K Load kg.</td>
<td>25</td>
</tr>
<tr>
<td>Recommended Temp. Range</td>
<td>-30 to 130 °C</td>
</tr>
<tr>
<td>Molybdenum Disulphide</td>
<td>3 %</td>
</tr>
</tbody>
</table>
RED RUBBER GREASE

DESCRIPTION

Red Rubber grease is a soft red special grease for very specific applications. It cannot be used in normal grease applications. The base oil is thickened Bentonit soap. Red Rubber grease assures excellent compatibility and is non-injurious with natural and SBR Rubber, while providing good mechanical stability and water resistance. A well-formulated additive package provides wear and rust protection, plus oxidation stability.

APPLICATION

- Red Rubber grease is designed especially for the application and lubrication of systems and components incorporating rubber components where mineral based grease cannot be used due to incompatibility with greases containing mineral oils.
- Typical applications are such as the “Dry Zones” of vehicle hydraulic brake systems prone to corrosion, as well as the component assembly of vehicle hydraulic brake systems, which require the performance of brake fluid compatible grease.
- Red Rubber grease can also be used in applications where the lubrication of natural or SBR Rubber components is required.
- Red Rubber grease is not compatible with mineral oils or other greases and must not be mixed or contaminated.

PERFORMANCE QUALITIES

TYPICAL TESTS

The properties shown in the following table are average values only and are not intended to be limiting. Minor variations which do not affect product performance are to be expected in normal production.

KEY PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Soft Red grease, free from Abrasives</td>
</tr>
<tr>
<td>Colour stability</td>
<td>Dye to retain colour after corrosion test</td>
</tr>
<tr>
<td>Drop Point °C (IP 132)</td>
<td>160 MIN</td>
</tr>
<tr>
<td>Penetration worked @ 25 °C/10mm (IP 50)</td>
<td>245 – 275</td>
</tr>
<tr>
<td>R1801 Rubber Swell (72 + 2h @ 70 + 2 °C) % vol</td>
<td>1.0 – 6.0</td>
</tr>
<tr>
<td>N17 Rubber Swell (72 + 2h @ 70 + 2 °C) % vol</td>
<td>10 to + 10</td>
</tr>
<tr>
<td>Corrosion Test: Aluminium Alloy (mg/cm2)</td>
<td>0.1 MAX</td>
</tr>
<tr>
<td>Steel (mg/cm2)</td>
<td>0.2 MAX</td>
</tr>
<tr>
<td>Copper (mc/cm2)</td>
<td>0.5 MAX</td>
</tr>
<tr>
<td>Cast Iron corrosion protection</td>
<td>No Attack</td>
</tr>
<tr>
<td>Stability (72 + 2h @ 70 + 2 °C)</td>
<td>Soft-No Gumming</td>
</tr>
<tr>
<td>Base</td>
<td>Benton / Castor</td>
</tr>
</tbody>
</table>
COMPLEX EP 2 PLAIN

DESCRIPTION

ECOTECH Lithium Complex Plain Grease is a multipurpose, lead free lithium complex grease offering excellent high temperature performance properties and long life capabilities. The product also offers good corrosion inhibition, low water washout characteristics and combined with excellent mechanical stability and load carrying capacity, this makes it the ideal multipurpose grease. It consistently provides superior high temperature performance properties and is suitable for use over a wide operating range of –15 °C to 160 °C and is suitable for all grease applications but is particularly recommended for grease lubricated bearings at low and high speeds as well as for electric motors and anti-friction bearings.

APPLICATION

ECOTECH Lithium Complex Plain Grease is designed for use under hostile operating conditions in all types of bearings especially electric motor bearings and similar services. It is suitable for use where operating temperatures are continuously between -15 to 160 °C and for short term exposure up to 200 °C (eg. At 200 °C re-lubrication intervals should not exceed 7 days).

BENEFITS

- Good resistance to water wash-out
- Good protection against rust and corrosion
- Long service life
- Good load carrying ability

<table>
<thead>
<tr>
<th>TYPICAL CHARACTERISTICS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Soap Base</td>
<td>Lithium Complex</td>
</tr>
<tr>
<td>NLGI Classification</td>
<td>2</td>
</tr>
<tr>
<td>Colour</td>
<td>Brown/Green</td>
</tr>
<tr>
<td>Worked Penetration @ 25 °C</td>
<td>265/295</td>
</tr>
<tr>
<td>Drop Point °C</td>
<td>260</td>
</tr>
<tr>
<td>Oil Viscosity @ 40 °C / cst</td>
<td>120</td>
</tr>
<tr>
<td>Timken O.K Load kg.</td>
<td>18</td>
</tr>
<tr>
<td>Recommended Temp. Range</td>
<td>-15 to 160 °C</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>107</td>
</tr>
</tbody>
</table>
LITHIUM COMPLEX SUPER

DESCRIPTION

Lithium Complex Super Grease is a multipurpose, lead free lithium complex grease offering excellent high temperature performance properties and long life capabilities. The product also offers good corrosion inhibition, low water washout characteristics and combined with excellent mechanical stability and load carrying capacity, this makes it the ideal multipurpose grease. It consistently provides superior high temperature performance properties and is suitable for use over a wide operating range of –15 °C to 160 °C and is suitable for all grease applications but is particularly recommended for grease lubricated bearings at low and high speeds as well as for electric motors and anti-friction bearings.

APPLICATION

- Lithium Complex Super Grease is designed for use under hostile operating conditions in all types of bearings especially electric motor bearings and similar services.
- Suitable for use where operating temperatures are continuously between -15 to 160 °C and for short term exposure up to 200 °C (eg. At 200 °C re-lubrication intervals should not exceed 7 days).

BENEFITS

- Good resistance to water wash-out
- Good protection against rust and corrosion
- Long service life
- Good load carrying ability

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Soap Base</th>
<th>Lithium Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLGI Classification</td>
<td>2</td>
</tr>
<tr>
<td>Colour</td>
<td>Brown/Green</td>
</tr>
<tr>
<td>Worked Penetration @ 25 °C</td>
<td>265/295</td>
</tr>
<tr>
<td>Drop Point °C</td>
<td>260</td>
</tr>
<tr>
<td>Oil Viscosity @ 40 °C / cst</td>
<td>120</td>
</tr>
<tr>
<td>Timken O.K Load kg.</td>
<td>18</td>
</tr>
<tr>
<td>Recommended Temp. Range</td>
<td>-15 to 160 °C</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>107</td>
</tr>
<tr>
<td>Molybdenum Disulphide</td>
<td>3</td>
</tr>
</tbody>
</table>
EP 0 L GREASE

DESCRIPTION

EP 0 L Grease is lithium-soap thickened, lead free EP Grease formulated to meet the exacting of machinery working in humid, salt-laden atmospheres which are highly conductive to corrosion. They are fully formulated to convey high quality performance over a wide temperature range.

EP 0 L Grease can be used in the plain and rolling bearings of a wide range of industrial, automotive, agricultural and marine machinery and equipment operating between -10 °C to 120 °C.

EP 0 L Grease is particularly recommended for applications that require a high level of rust protection and a high resistance to water washout in addition to good EP performance. Afriq EP 0 L Grease is pumpable in grease-dispensing systems. The flow properties of the EP 000 ensure their stability for grease lubrication systems and remote lubrication points using small bore tubing.

APPLICATION

Recommended for use in places where conventional gear oils are leaking out of the gear cases on virtually all types of underground mining machinery. Specific applications include head gearboxes, cutter heads, escalating arms, pots or gathering head drives, pump cases etc. It can also be used in many other industrial applications where conventional oils cannot be retained in gear cases, chain cases etc. It demonstrates easy pumping through long lines of automatic greasing systems at temperatures down to -10 °C and has no undesirable effects on conventional seal materials, brass or bronze bushing etc.

BENEFITS

☐ High level of rust protection
☐ High resistance to water wash out
☐ Wide range of applications (Product Rationalization)
☐ Effective leakage control
☐ Superior leakage control under heavy or shock loading
☐ Long service life
☐ Good anti wear protection

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>NLGI Classification</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickener Type</td>
<td>Lithium 12 Hydroxystearate</td>
</tr>
<tr>
<td>Drop Point °C min</td>
<td>180</td>
</tr>
<tr>
<td>Oil Viscosity, cst @ 40 °C</td>
<td>460</td>
</tr>
<tr>
<td>Colour, Visual</td>
<td>Brown</td>
</tr>
<tr>
<td>Worked Penetration @ 25 °C</td>
<td>335/385</td>
</tr>
<tr>
<td>Operating Temperature, °C, max</td>
<td>120</td>
</tr>
</tbody>
</table>
ENGINE OIL AND LUBRICANTS

Whether you are driving Petrol or Diesel engine vehicles, ECOTECH LUBRICANTS has the right lubricants to keep your engine in top shape. It pays to use the most dependable, highest quality oils, lubricants and coolants to keep your vehicle on the road.

Engine Oils

Ecotech Lubricants has a long list of high-quality engine oils that support the performance requirements of your vehicle manufacturer's specifications.

Transmission Lubricants

Modern transmissions are complex and expensive. Ecotech Lubricants has the right transmission lubricant for you, including new synthetic blends for longer life. Take a look at our complete offering of choices for vehicle transmission lubricants.

Differential Lubricants

If you are looking for a differential lubricant that will out-perform conventional gear lubricants to promote longer gear life and better equipment operating economy, we have what you need.

Greases

No vehicle can survive long without a grease designed specifically for its needs. Ecotech Lubricants offers a full line of superior-performance products that support the performance of OEM requirements, as well as extending component life which can result in reducing equipment ownership costs.

Coolants

Ecotech Lubricants antifreeze/coolant products offer superior coolant system protection by preventing scaling, foaming, and corrosion while at the same time offering excellent liner pitting protection. In addition, they offer maintenance cost reduction opportunities by minimizing coolant related water pump seal leakage, improved solder and aluminum protection, and ease of use. These products also benefit the user by reducing operating and maintenance cost through superior product performance.

Tech Talk

The Ecotech Lubricants Technical Department provides helpful articles on various topics affecting your industry.

The ABC's of DEF

Diesel exhaust fluid is almost certainly in your future – and not just because you run heavy- or medium-duty trucks that may need it to meet emissions regulations. If you drive a diesel vehicle in your personal life, DEF may be in your car today. DEF is the enabler that makes virtually zero Nox (nitrogen oxide) emissions from a diesel engine's tailpipe, whether it's in a car or a truck.
• **Cooling Systems: Designs Change, Maintenance stays the same**

For radiators, paying attention to basics pays dividends. Most fleet managers probably know that initial exhaust gas recirculation designs produced a drastic increase in engine heat rejection, and that 2007 brought a further significant increase. Re-breathing warm exhaust increases engine compression temperature, which means significantly more heat passing through the pistons, liners and cylinder head, and into the coolant and oil.

• **Grease Purging - Procedure for Purging/Flushing When Changing Grease Brands or Types**

Please make sure the customer is aware of the following procedures when changing grease types or manufacturers. If there is any doubt, purge the greased joint completely and over-grease the joints for the next 2 service intervals.

**Industrial - Greases**

Ecotech Lubricants offers a comprehensive line of heavy-duty maintenance lubricants for nearly all industrial applications, including synthetic and petroleum based products (many with OEM approvals) for applications ranging from moderate to extreme. Among these products are many newly developed biodegradable and environmentally friendly greases. With ten plants globally, Ecotech Lubricants ensures local supply and service of products.

Among Ecotech Lubricants line of greases there is certain to be a product for every industry, including automotive, mining, construction, trucking, steel mill, bearing manufacturers, general industrial and maintenance, food processing and pharmaceutical.
SUPPLIER PRINCIPLES

In accordance with our Ecotech Lubricants General Business Principles and Code of Conduct, we seek to work with contractors and suppliers who contribute to sustainable development and are economically, environmentally and socially responsible.

We will develop and strengthen relationships with contractors and suppliers who are committed to the principles set out below or to similar standards through their own activities and the management of their own suppliers and sub-contractors.

Contractors and suppliers should provide workers with a dedicated whistle-blowing mechanism where grievances related to below topics can be logged confidentially.

1. Business Integrity
Contractors and suppliers comply with all applicable laws and regulations.

Contractors and suppliers should not tolerate, permit or engage in bribery, corruption or unethical practices.

Contractors and suppliers support fair competition. Conflicts of interest are avoided.

2. Health, Safety, Security and Environment
Contractors and suppliers have a systematic approach to HSSE management, designed to ensure compliance with all applicable laws and regulations and to achieve continuous performance improvement.

Contractors and suppliers:
- are committed to protect the environment in compliance with all applicable environmental laws and regulations.
- Use energy and natural resources efficiently.
- Continually look for ways to minimize waste, emissions and discharge of their operations, products and services.

3. Social Performance
Contractors and suppliers respect their neighbors and contribute to the societies in which they operate.

4. Labour and Human Rights
Contractors and suppliers conduct their activities in a manner that respects human rights as set out in the UN Universal Declaration of Human Rights and the core conventions of the International Labour Organization (ILO) such as:

Contractors and suppliers:
- should not use child labour.
- should not use forced, prison or compulsory labour.
- comply with all applicable laws and regulations on freedom of association and collective bargaining.
- should not tolerate discrimination, harassment or retaliation and should provide a safe, secure and healthy workplace.
- should provide wages and benefits that meet or exceed the national legal standards and should comply with all applicable laws and regulations on working hours.
GLOSSARY OF PETROCHEMICAL TERMS

Acid Number: A measure of the amount of potassium hydroxide (KOH) needed to neutralize all or part of the acidity of a petroleum product. Also specified as neutralization number (NN) or value (NV) and total acid number (TAN)

Additive: A chemical substance which, when blended with a petroleum product, has the effect of improving one or more of its properties or performance characteristics.

Aliphatic Hydrocarbon: Hydrocarbons in which the carbon atoms are arranged in open chains which may be straight or branched.

Aniline Point: The minimum temperature for complete miscibility of equal volumes of aniline and the sample under test. Products with high aromatic or naphthenic contents have lower aniline points than products with high paraffinic content.

Anti-knock: Resistance of a gasoline (petrol) to detonation in a combustion chamber.

API Gravity: A special function of relative density represented by: API Gravity, degrees = 141.5/rel.density at 15.6°C – 131.5

API Service Classification: A system of letter designations agreed by API, SAE and ASTM to define broad classes of engine service. Also used for service classification of automotive gear lubricants.

Aromatic: A hydrocarbon derived from, or characterized by, the presence of a benzene ring, or a polymeric (multiple) ring structure.

Ash: Non-combustible residue of lubricating oil or fuel.; lubricating oil detergent additives containing metallic derivatives are a common source of ash (see also sulphated ash).

Bactericide: An additive to inhibit bacterial growth in aqueous component or phase of fluids, preventing bacterial degradation of the fluid and the resulting foul odours.

Base Number: The amount of acid required to neutralize all or part of a lubricant’s basicity, expressed as potassium hydroxide (KOH) equivalents.

Bitumen: A non-crystalline solid or viscous mixture of complex hydrocarbons that possesses characteristic agglomerating properties, softens gradually when heated, is substantially soluble in tri-chloroethylene, and is obtained from crude petroleum by refining processes.

Blown Bitumen: A bitumen for uses other than road making prepared by blowing air through a base feed-stock under controlled conditions.

Bore Polishing: Excessive smoothing out of the surface finish of the cylinder bore in an engine to a mirror-like appearance, resulting in depreciation of ring sealing and oil consumption performance.

Carbon Residue: Standard tests which measure the amount of carbon left behind after combustion under controlled conditions. Two methods are available, the Conradson and the Ramsbottom Carbon Residue tests.

Centipoise: A centipoises (cP) is 1/100 of a poise (P) which is the fundamental unit of dynamic viscosity in the CGS system of units. In the SI unit of systems, the fundamental unit of dynamic viscosity is the pascal second (Pa·s), where 1 Pa is equivalent to 10P.

Centistokes: The centistoke (cSt) is 1/100 of a stoke (St) which is the fundamental unit of kinematic viscosity in the CGS system of units. In the SI system of units, the fundamental unit of kinematic viscosity is the millimeter squared per second (mm²/s), which is equivalent to the centistokes.

Cetane Number: A measure of the ignition quality of a diesel fuel, expressed as a percentage of cetane that must be mixed with methyl naphthalene to produce the same ignition performance as the diesel fuel being rated.

Cleveland Open Cup (COC): A test for determining the open flash point and fire point of all petroleum products except fuel oil and products with open flash points below 79°C.

Cloud Point: The temperature at which a noticeable cloud of crystals or other solid materials appears when a sample is cooled under prescribed conditions.

Compounded Oil: A mineral oil to which has been added vegetable oil, animal oil or a similar chemical substance to impart special properties.

Co-gellant: A substance which acts in conjunction with a conventional soap to thicken a grease.

Complex Grease: A composition in which the thickener is a combination of a conventional metallic soap (salt of a metallic element and a fatty acid having a particular type of structure) and a complexing agent. The complexing agent may be either organic, and may or may not involve another metallic constituent.

Copper Strip Corrosion: A method of testing petroleum products for their corrosive effect on copper and its alloys. Also used as a method of indicating the amount of free or un-reacted sulphur in a product.

Crude Wax: Also called petroleum wax or slack wax, crude wax is an unrefined mixture of high melting hydrocarbons, of the normal straight chain type, still containing a fairly high percentage of oil.

Cutback Bitumen: A bitumen in which the viscosity has been reduced by the addition of volatile diluents such as a white spirits or kerosene.

Demulsibility: The ability of an oil to separate from or shed water as determined by a standard test method. Demulsibility is an important consideration in lubricant maintenance in many circulating lubrication systems.

Detergency: The property of a lubricating oil to reduce or prevent deposits formed under high temperature conditions or as a result of the action on the oil of acidic contaminants.
**Di-electric Strength:** A measure of the insulating value of an electrical insulating medium. The value depends on the extent of the test method used.

**Dispersant:** An engine oil additive that helps prevent the formation of sludge, varnish and other engine deposits by keeping particles suspended in colloidal state (suspension of finely divided particles).

**Distillate:** The liquid obtained by condensing the vapour given off by a boiling liquid.

**Dropping Point:** The lowest temperature at which a grease is sufficiently fluid to drip as determined by a standard test method; hence an indication of whether a grease will flow from a bearing at operating temperatures.

**Emulsifier:** An additive that promotes the formation of a stable mixture, or emulsion, of oil and water.

**Emulsion:** Intimate mixture of two or more materials which are immiscible or partially miscible with each other. In most emulsions one material is aqueous and the other is an oil.

**Extreme Pressure Additive:** A chemical compound imparting extreme pressure characteristics to a lubricant with the objective of reducing wear under conditions where rubbing or sliding accompanies high contact pressures, as in heavily loaded gears, particularly of the hypoid type.

**Film Strength:** The ability of a film of lubricant to resist rupture due to load, speed and temperature (also called lubricity).

**Flash Point:** The lowest temperature under closely specified conditions at which a combustible material will give off sufficient vapour to form a flammable mixture with air in a standardized vessel. Flash point tests are used to assess the volatility of petroleum products.

**Floc Point:** The temperature at which a flocculant collection of wax crystals first appear when a solution of Freon in oil is cooled under prescribed conditions.

**Foaming:** The occurrence of a frothy mixture of air and a petroleum product (lubricant, fuel oil) that can reduce the effectiveness of the product and cause sluggish hydraulic operation, air binding of oil pumps and overflow of tanks or sumps.

**Four Ball Method:** Either of two lubricant test procedures – the four ball wear method and the four ball extreme pressure method. The test methods evaluate the anti-wear properties of lubricants under different test conditions.

**Gas Oil (Diesel):** A distillate, intermediate in character between kerosene and the light lubricating oils. It is used as a heating oil and as a fuel in diesel engines.

**Gasoline (Petrol):** A light petroleum product with a boiling range between the approximate limits of 30°C and 200°C. Used as a fuel in spark-ignition engines. It is also known as Mogas.

**Graphite:** A soft form of elemental carbon, grey to black in colour. It occurs naturally or is synthesized from coal or other carbon sources; widely used as a lubricant alone or added to conventional lubricants.

**Grease:** A lubricating oil thickened with a metallic soap or a specially treated clay to yield a lubricant in solid form. The action of the thickening agent may be likened to that of a sponge which holds the lubricating agent in its interstices.

**Hydro-cracking:** A refining process in which a heavy oil fraction or wax is treated with hydrogen over a catalyst under relatively high pressure and temperature to give products of lower molecular mass.

**Hydro-desulphurisation:** The removal of sulpher from sulphur containing hydrocarbon molecules in petroleum distillates and residues by the action of hydrogen under elevated temperature and pressure over a catalyst.

**Hydro-finishing:** Catalytic hydro-finishing has replaced the acid treating of LVI and MVI base oils to a large extent. Improved colour, oxidation and colour stability and a reduction in polycyclic aromatic content are achieved by the process which involves the contacting of hydrogen over a catalyst at elevated temperatures and pressure. Also applied to paraffin and micro-crystalline waxes.

**Hydrotreating:** This is a term for a process by which product streams may be purified and otherwise be brought up to marketing specifications as to odour, colour, stability, etc. Hydrotreating, for the removal of sulphur, is the major treating process in refineries. Cracked streams could be saturated and stabilized by converting olefins, albeit under more severe treating conditions. The process involves hydrogen under suitable temperature, pressure and a catalyst.

**Hydrotlic Stability:** The ability of additives and certain synthetic lubricants to resist chemical decomposition in the presence of water.

**ISO Viscosity Grade:** The ISO viscosity classification system, is an international system approved by the International Standards Organization, for classifying industrial lubricants according to viscosity. Each ISO viscosity grade number designation corresponds to the mid-point of a viscosity range expressed in mm²/s at 40°C. This system is detailed in the ISO Specification 3448.

**Knock:** The noise associated with premature ignition of the fuel in spark-ignition engines. It is also known as Mogas.

**Kerosene:** Any petroleum product with a boiling range between the approximate limits of 140°C and 270°C. which satisfies specific quality requirements.

**Lead Naphthenate:** The lead soap of naphthenic acid that is soluble in mineral oils, used mainly to impart extreme pressure properties to lubricating oils and greases.

**Liquefied Petroleum Gas (LPG):** Of the gaseous hydrocarbons, propanes and butanes can be liquefied under relatively low pressure and at ambient temperature. Mixtures of these are known as LPG.

**Load Carrying Capacity:** A qualitative term used to describe the ability of a lubricant to resist film rupture and protect against wear and surface destruction under conditions of high speeds, loads and temperatures, and combinations thereof.

**Load Wear Index (formally called Mean Hertz Load):** An index of the ability of a lubricant to prevent wear under applied loads as determined by the Four-Ball EP tester.

**Metal Deactivator:** An organic type of additive having the property of suppressing the catalytic action of metal and traces of metallic materials exposed to petroleum products. The most important catalytic action is the promotion of oxidation.
Molybdenum Disulphide: A chemical compound of molybdenum and sulphur which has excellent properties as a solid lubricant due to the molecular structure of the particles.

**Motor Octane Number (MON):** The octane number of a motor gasoline determined in a special laboratory test engine under high “engine-severity” conditions, giving a measure of the high-speed knock properties of the fuel.

**Multigrade Oil:** Engine oil that meets the requirements of more than one SAE viscosity grade classification and may therefore be suitable for use over a wider temperature range than a single grade oil. Multigrade oils have 2 viscosity numbers indicating their low temperature and high temperature classification.

**Multipurpose Grease:** A lubricating grease suitable for a variety of applications such as chassis, wheel bearings, universal joints and water pumps on automotive equipment; usually lithium- based.

**Naphthenic:** Having the characteristics of naphthenes, saturated hydrocarbons whose molecules contain at least one closed ring of carbon atoms.

**Octane Number:** A term numerically indicating the relative anti-knock value of a gasoline. The octane number of a gasoline depends on its hydrocarbon composition, and is improved by the addition of anti-knock compounds.

**Neutralization Value:** An indication of the acidity of an oil; the number is the mass in milligrams of base expressed as potassium hydroxide (KOH) required to neutralize one gram of oil,

**Oxidation Inhibitor:** A substance added in small quantities to a petroleum product to increase its oxidation resistance, thereby lengthening its service or storage life; also called an anti-oxidant.

**Oxidation Stability:** The resistance of a petroleum product to oxidation, hence a measure of its potential service or storage life. The available tests all simulate service conditions on an accelerated basis.

**Paraffinic:** Having the characteristics of paraffins, i.e., saturated hydrocarbons of open chain structure.

**Paraffin Wax:** Hydrocarbons of solid consistency having a relatively pronounced crystalline structure, extracted from certain petroleum distillates. Refined paraffin wax has a very low oil content, is white in colour, with some degree of translucency, almost tasteless and odourless and slightly greasy to the touch.

**Penetration:** A measure of the hardness and consistency of bitumen and lubricating greases in terms of the distance in 1/10th of a millimeter by which a weighted special needle or cone will penetrate the sample in five seconds, the temperature, unless otherwise stated being 25°C.

**Pensky-Martens Closed Cup (PMCC):** The apparatus for determining the closed flash point of fuel oils, lubricating oils and other petroleum products.

**Petrolatum:** A semi-solid substance obtained from petroleum and consisting essentially of micro-crystalline waxes in specially refined oil. Also called petroleum jelly.

**Pour Point Depressant:** An additive which lowers the pour point of petroleum products by reducing the tendency of waxes present to coagulate into a solid mass.

**Pour Point:** The lowest temperature at which a liquid petroleum product will flow when it is cooled under the conditions of the standard test method.

**Reid Vapour Pressure (RVP):** Usually used in reference to gasoline, it is the vapour pressure of a sample at 37.8°C, determined by a prescribed method.

**Research Octane Number (RON):** The octane number of a motor gasoline determined in a special laboratory test engine under mild “engine-severity” conditions, giving a measure of the low-speed knock properties of a gasoline.

**Residual Fuel:** A fuel composed mainly of un-evaporated materials after the atmospheric distillation of crude oil.

**Ring Sticking:** The “freezing” of a piston ring in its groove, in a piston engine or reciprocating compressor, due to heavy deposits in the piston ring zone.

**SAE Number:** An arbitrary number indicating the viscosity range of crankcase, transmission, or rear axle lubricants, according to systems designed by the SAE (Society of Automotive Engineers).

**Shear Stability:** The ability of a lubricant such as a grease or VI improved oil to withstand mechanical shearing without being degraded in consistency or viscosity.

**Smoke Point:** The maximum height of flame measured in millimeters at which a kerosene will burn without smoking, when tested under specified conditions.

**Soap:** A general term for the salt of a metal and a fatty acid. The soaps of lithium, calcium, barium and aluminium are the principle thickeners used in grease making.

**Softening Point:** The temperature at which bitumen reaches an arbitrary degree of softness, usually determined by the ring and ball test method.

**Solvent Dewaxing:** A refining process by means of which wax is removed from lubricating base oil. The waxy oil is mixed with a solvent mixture (usually methyl-ethyl-ketone and toluene) and heated to ensure complete solution. The mixture is chilled and the precipitated wax removed by a rotary filter, before the solvents are stripped from both oil and wax fractions and re-used.

**Solvent Refining:** A refining technique to improve the quality of base oils using selective extraction of undesirable components by means of a solvent, usually furfural.

**Slack Wax:** The waxy by-product removed in the solvent dewaxing process.
**Sludge:** The soft deposits, usually dark coloured, formed in lubrication systems, mainly consisting of oxidized lubricating oil components, water and in internal combustion engines, carbonaceous residues from fuel combustion.

**Spindle Oil:** A low viscosity oil intended for the lubrication of high speed spindles such as those used in textile mills.

**Straight Mineral Oils:** Oils which do not contain compounds or additives.

**Sulphated Ash:** The residue that remains after a sample of oil and sulphuric acid has been ashed to constant mass under prescribed conditions. It is used as a measure of the amount of metallo-organic additives present in new oils. In used oils, the determination may be affected by the presence of incombustible contaminants, dust and wear metals.

**Sulphurised Oil:** An oil in which elemental sulphur is either loosely combined with the oil, or is combined with a fatty oil and added to the base oil. Used in applications where reactive sulphur is desired to provide extreme pressure characteristics, such as in gear oils and cutting oils.

**Thermal Stability:** The property of a fuel or lubricant which indicates its ability to resist cracking and decomposition on prolonged exposure to elevated temperatures.

**Thickener:** A solid matrix which is uniformly dispersed to form the structure of a lubricating grease in which the liquid fluid is held.

**Timken OK Load:** The maximum load a lubricant will withstand without failure due to breakdown of the lubricant film, as determined on the Timken EP Tester.

**Total Base Number:** The quantity of acid expressed in terms of the equivalent number of milligrams of potassium hydroxide (KOH) that is required to neutralize all basic constituents present in 1g of sample.

**Vapour Pressure:** The lowest pressure at which a liquid contained in a closed vessel at a given temperature, can remain in the liquid state without evaporation, i.e. the pressure exerted when the substance is in equilibrium with its own vapour. Vapour pressure is a function of the substance and of temperature.

**Viscosity:** In the common engineering sense, viscosity is the resistance to flow or “thickness” of a liquid. The viscosity of liquids decrease with an increase in temperature, hence the temperature at which a viscosity is measured must always be specified.

Some commonly used viscosity units include:

- **Centipoise (cP):** Derived unit of dynamic viscosity where 1cP = 1mPas
- **Centistoke (cSt):** Derived unit of kinematic viscosity where 1cSt = 1mm²/s
- **Engler Degrees (°E):** Empirical unit popular in parts of Europe and normally measured at 50°C
- **Redwood Seconds:** Historically used in the UK and measured at 70, 140 and 200°F
- **Saybold Universal Seconds (SUS):** Popular in the USA and measured at 100, 130 or 210°F
- **Kinematic (mm²/s):** Sub-multiple of SI unit

**Viscosity Index (VI):** An arbitrary number, usually between 0 and 200, which is a measure of the temperature dependence of an oil’s viscosity.

Low viscosity index (LVI) oils reduce viscosity rapidly as temperature increases. These oils have typical VIs in the range 0-30.

Medium viscosity index (MVI) oils reduce viscosity less than LVI oils as temperature increases and have typical VIs in the range 30-85.

High viscosity index (HVI) oils have VIs in the range 85-110 and have the best viscosity/temperature coefficients of conventional base oils. Modern refining techniques such as selective hydrocracking can produce base oils with natural VIs in excess of 140.

**Viscosity Index Improver:** A lubricant additive, usually a high molecular mass polymer, that reduces the tendency of an oil’s viscosity to change with temperature.

**White Oils:** Oils produced by more drastic refining to remove nitrogen and sulphur, unsaturated compounds and aromatic material.

**White Spirits:** The functions intermediate between gasoline and kerosene with a boiling range of approximately 150°C - 200°C. Mainly used in paints and dry cleaning.

**Worked Penetration:** The penetration of a sample of lubricating grease immediately after it has been brought to 25°C and “worked” 60 strokes in the ASTM grease worker.
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