ENDURATEX™ EP & ENDURATEX XL SYNTHETIC BLEND GEAR OILS

Introduction
Petro-Canada Lubricants’ ENDURATEX™ EP Gear Oils are premium quality, extreme-pressure lubricants designed for use in enclosed industrial gear drives operating under normal, heavy or shock-loaded conditions. They are also recommended for lubricating plain or anti-friction bearings running under heavy or shock-loaded conditions.

ENDURATEX EP Gear Oils are specially formulated to deliver sustained long-life, anti-wear and extreme pressure protection to industrial gear drives and bearings. These oils are available in nine ISO viscosity grades and two multigrades.

Features and Benefits

• Exceptional long life
  - Reduces operating and maintenance costs
  - Longer oil life helps extend time between oil changes
  - Withstands high operating temperatures for longer periods
  - Reduces build-up of harmful sludge and varnish deposits for reduced wear and longer oil life

• Excellent film strength and extreme pressure properties for ENDURATEX EP equipment protection
  - Prevents seizure, scuffing or spalling of gear teeth and bearing surfaces under shock-loaded conditions
  - Reduces gear and bearing wear
  - Reduces maintenance costs and extends equipment life

• Protects against rust and corrosion
  - Prevents iron parts from rusting
  - Protects copper-containing bearings, bushings, etc., from corrosive attack
  - Extends equipment life

• Water separability
  - Prevents emulsion formation
  - Allows water to be drained off before oil is re-circulated
  - Eliminates corrosive damage to metal parts when water present

• Low foaming tendency
  - Ensures a continuous lubricant film present at all times
  - Prevents overflow from gear-boxes and oil reservoirs
  - Reduces the possibility of cavitation damage to oil circulating pumps where installed
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Applications
Petro-Canada Lubricants’ ENDURATEX EP Gear Oils are versatile, high quality lubricants recommended for use in all types of enclosed industrial gear drives where an extreme pressure gear oil is specified. They are also recommended for lubricating all types of heavy or shock-loaded bearings.

In addition, the low viscosity grades of ENDURATEX EP are effective wire-rope lubricants.

ENDURATEX EP Oils offer excellent gear and bearing protection and long service life in a wide range of gear designs. These include:
- Spur, Internal, Planetary, Rack & Pinion, Bevel, Spiral-Bevel, Helical, Herringbone
ENDURATEX EP Gear Oils are approved by many manufacturers of industrial gear drives including:

- ENDURATEX EP 68 has Metso Paper approval and is recommended for pulp and paper companies using thermo-mechanical pulping processes (TMP).

ENDURATEX EP Gear Oils are also suitable for use in applications by the following manufacturers: Gremy-Lightnin, Hansen Transmissions, Kraus-Maffei and David Brown, as well as in situations requiring DIN 51517 Part 3, ISO 12925 – Type 1 CKC or AGMA 9005-F16 specifications.

**ENDURATEX XL SYNTHETIC BLENDS**

ENDURATEX XL Synthetic Blend are multigrade EP gear oils designed with all the same benefits but with the additional advantage of eliminating seasonal change-outs available in 68/150 and 68/220 grades. 68/150 delivers excellent low temperature properties versus leading all season competitive products for easier cold start-ups and better equipment protection. 68/220 supports winter requirements (68 grade) and summer requirements (220 grade). 68/220 is especially recommended for gearboxes exposed to temperature extremes and has sufficient low temperature fluidity to perform well in exposed locations - giving you extended drain intervals and minimized downtime.

**Enclosed Gear Lubrication**

With enclosed gear drives, best results are obtained by maintaining the correct oil level, i.e. the lowest teeth should be half submerged when at rest.

The American Gear Manufacturers’ Association (AGMA) has published several gear lubricant standards for industrial machinery. ENDURATEX EP Oils are recommended for use, where the AGMA specifies the following Antiscuff type oils:

<table>
<thead>
<tr>
<th>FORMER AGMA NUMBERS</th>
<th>VISC. RANGE cSt @ 40°C/104°F</th>
<th>ENDURATEX EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>61.2 - 74.8</td>
<td>68</td>
</tr>
<tr>
<td>3</td>
<td>90 - 110</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>135 - 165</td>
<td>150</td>
</tr>
<tr>
<td>5</td>
<td>198 - 242</td>
<td>220</td>
</tr>
<tr>
<td>6</td>
<td>288 - 352</td>
<td>320</td>
</tr>
<tr>
<td>7</td>
<td>414-506</td>
<td>460</td>
</tr>
<tr>
<td>8</td>
<td>612-748</td>
<td>680</td>
</tr>
<tr>
<td>8A</td>
<td>900-1100</td>
<td>1000</td>
</tr>
</tbody>
</table>

For applications where no specific AGMA recommendation exists, the appropriate ENDURATEX EP viscosity grade can be determined from the following tables:

**SPUR, BEVEL & HELICAL GEAR LUBRICATION**

<table>
<thead>
<tr>
<th>TYPE OF UNIT/SIZE</th>
<th>ENDURATEX EP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-10°C to +15°C</td>
</tr>
<tr>
<td></td>
<td>14°F to 62°F</td>
</tr>
<tr>
<td>Single/Double Reduction Units</td>
<td></td>
</tr>
<tr>
<td>Parallel shaft separation:</td>
<td></td>
</tr>
<tr>
<td>- up to 20 cm (8&quot;)</td>
<td>68</td>
</tr>
<tr>
<td>- 20 to 50 cm (8” - 20&quot;)</td>
<td>100</td>
</tr>
<tr>
<td>- over 50 cm (20&quot;)</td>
<td>150</td>
</tr>
<tr>
<td>Triple Reduction Units</td>
<td></td>
</tr>
<tr>
<td>Shaft separation:</td>
<td></td>
</tr>
<tr>
<td>- over 50 cm (20&quot;)</td>
<td>220</td>
</tr>
<tr>
<td>Planetary Gears</td>
<td></td>
</tr>
<tr>
<td>Outside housing diameter</td>
<td></td>
</tr>
<tr>
<td>- up to 40 cm (16&quot;)</td>
<td>68</td>
</tr>
<tr>
<td>- over 40 cm (16&quot;)</td>
<td>150</td>
</tr>
<tr>
<td>Bevel, Spiral Bevel</td>
<td></td>
</tr>
<tr>
<td>Cone distance</td>
<td></td>
</tr>
<tr>
<td>- up to 30 cm (12&quot;)</td>
<td>68</td>
</tr>
<tr>
<td>- over 30 cm (12&quot;)</td>
<td>150</td>
</tr>
<tr>
<td>- High speed, above 3600 rpm</td>
<td>68</td>
</tr>
<tr>
<td>Gearmotors</td>
<td></td>
</tr>
<tr>
<td>- all sizes</td>
<td>68</td>
</tr>
</tbody>
</table>

Where all-season protection is required for wide temperature ranges, ENDURATEX XL Synthetic Blend EP multigrades are recommended.

Temperature ranges noted are for normal gearbox operating temperatures and do not represent the operating limits of the product.

For gearboxes operating outside the listed temperature ranges, please contact Petro-Canada Technical Services for an appropriate recommendation.
## Typical Performance Data

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>ENDURATEX EP Oils</th>
<th>XL SYNTHETIC BLEND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td>Former AGMA Number</td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Density, kg/L @ 15°C/59°F</td>
<td>ASTM D4052</td>
<td>0.847</td>
<td>0.864</td>
</tr>
<tr>
<td>Colour</td>
<td>ASTM D1500</td>
<td>&lt;1.0</td>
<td>&lt;1.0</td>
</tr>
<tr>
<td>Viscosity, cSt @ 40°C</td>
<td>ASTM D445</td>
<td>32.0</td>
<td>68.0</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>ASTM D445</td>
<td>6.0</td>
<td>9.1</td>
</tr>
<tr>
<td>Pour Point, °C/F</td>
<td>ASTM D5950</td>
<td>-51/60</td>
<td>-39/38</td>
</tr>
<tr>
<td>Brookfield Viscosity, 150,000 cP</td>
<td>ASTM D2782</td>
<td>27/60</td>
<td>30/65</td>
</tr>
<tr>
<td>Timken EP Test, kg / lb</td>
<td>ASTM D2782</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Four-Ball Weld Load, kg</td>
<td>ASTM D4172</td>
<td>0.31</td>
<td>0.30</td>
</tr>
<tr>
<td>Four-Ball Scar Diameter, mm, 1 hour, 20 kg / 44 lb, 54°C / 129°F, 1800 rpm</td>
<td>ASTM D2782</td>
<td>45</td>
<td>49</td>
</tr>
<tr>
<td>Load Wear Index</td>
<td>ASTM D2783</td>
<td>12+</td>
<td>12+</td>
</tr>
<tr>
<td>Demulsibility Test</td>
<td>ASTM D2711</td>
<td>85.0</td>
<td>86.3</td>
</tr>
<tr>
<td>Copper Strip Corrosion Test, 3 hours @ 100°C / 212°F</td>
<td>ASTM D130</td>
<td>1a</td>
<td>1a</td>
</tr>
</tbody>
</table>

The values quoted above are typical of normal production. They do not constitute a specification.
To order product or to learn more about how Petro-Canada Lubricants can help your business visit: lubricants.petro-canada.com
or contact us at: lubecsr@petrocanadalsp.com