Leaders In Marine Bio-Lubes

Marine Lubricants

www.vickers-oil.com
Application Overview

For more information please contact our Technical Service Department on +44 (0)113 386 7654 or Email: techserv@vickers-oil.com

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Explore our range of innovative, high performance and environmentally conscious lubricants, delivered with an unparalleled level of personal service.
Vickers Oils: Yesterday, Today and into the Future...

Our business is truly global: we have customers in over 60 countries and have established regional stock points worldwide.
Vickers Oils can trace its history back to 1828 and to this day remains a private, independent company led by the fifth generation of the family to work in the company. We enjoy a worldwide reputation as a reliable and innovative supplier of high performance, speciality marine lubricants, which are supported by our dedicated customer service team, offering our customers ‘one to one’ technical support.

Vickers Oils started in Leeds, UK and we are still based here. But today our business is truly global, and we have customers in over 60 countries and regional stock points worldwide.

In 1887 Vickers Oils began to market its own “Non-corrosive Engine Oil” (NEO), following studies of hot bearings on the main engines of ships in the Red Sea and Suez Canal. Vickers Oils understood that mineral oils offered significant advantages for the lubrication of engines compared to the olive, castor and rape oils that were conventionally used.

When Mr. Benjamin Threlfall Vickers was aboard the Goole and Hull Towing Company’s Tug No 10, the Chief Engineer did something very different; he tipped waste engine oil down the “tail shaft”, to provide lubrication. A new use for NEO had been discovered. It became a sterntube lubricant.

In 1900 Vickers Oils marketed a sterntube seal in conjunction with NEOX emulsifiable lubricant for the sterntube. NEOX has now been registered as a trademark for over 100 years. During the 1960s Vickers developed the well-known HYDROX range of sterntube oils for use with lip seals and circulatory oilfeed systems.

Following nine years of development and sea trials, in 2002 Vickers Oils launched the world’s first biodegradable sterntube oil, HYDROX BIO 68, which quickly became the industry standard. In 2011 Vickers Oils supplied the Federal Kumano with HYDROX BIO for use in the vessels’ sterntube, thus becoming the 1000th vessel to use Vickers Oils Bio-Lubes.

Now, after serving the marine industry with mineral based lubricants for more than one hundred years, our main focus for the future is the continued development of our award winning Bio-Lubes range.

Vickers Oils down the years
Why Choose Bio-Lubes?

Recent research suggests that between 37 million and 61 million litres of operational discharge pass into ports and harbours around the world each year.
In 2002 Vickers Oils became the first company to make biodegradable lubricants commercially available to the global marine market.

This ground-breaking introduction of biodegradable lubricants marked the beginning of our commitment to help companies involved in waterborne transportation to meet the challenge of reducing their environmental footprint.

With recent research (Etkin, Environmental Research Consulting, New York) suggesting that between 37 million and 61 million litres of “operational lubricant discharge” pass into ports and harbours around the world each year, the scale of the problem of ocean pollution is brought into even greater focus.

In addition to improving environmental credentials, the opportunity to reduce operating costs is just as important to the marine industry as any other business. The use of biodegradable lubricants, or Bio-Lubes, is one way that vessel operators can achieve real cost saving benefits through superior performance, whilst minimising the impact of lubricants that leak into the planet’s oceans. The applications for our Marine Bio-Lubes include CPP’s, stabilisers, stern tubes and thrusters below the water line; and cranes, davits, hatch covers, ramps, shell doors and winches above the water line.

Our customers are choosing to use Vickers Oils’ Marine Bio-Lubes because:

- They can give better performance than conventional lubricants, resulting in longer fluid life and less machinery downtime.
- They can provide evidence of continuous improvement for ISO 14001 and other environmental management programmes.
- They provide a means of enhancing corporate reputation and demonstrating Corporate Social Responsibility.
- Their use has been regarded as a mitigating factor by enforcement authorities in some cases of accidental leakage, resulting in lower penalties.

We are justifiably proud of our global reputation for supplying innovative marine lubricants, continuing to lead the way in the development of marine Bio-Lubes and providing our customers with the high levels of service and solutions they need.
## Biodegradable Sterntube Lubricants

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Typical Viscosity (cst @40°C)</th>
<th>Viscosity Index</th>
<th>Density (kg/ltr @15°C)</th>
<th>Pour Point IP15 (°C)</th>
<th>Anti corrosion SKF Water Emcor Test</th>
<th>Biodegradable and Non-Toxic</th>
<th>Emulsifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROX BIO 68</td>
<td>Emulsifiable, biodegradable sterntube lubricant for regular use and lubrication of some stabiliser models.</td>
<td>68</td>
<td>215</td>
<td>0.92</td>
<td>&lt; –24</td>
<td>Passes</td>
<td>Yes</td>
<td>✔</td>
</tr>
<tr>
<td>HYDROX BIO 100</td>
<td></td>
<td>100</td>
<td>205</td>
<td>0.92</td>
<td>–24</td>
<td>Passes</td>
<td>Yes</td>
<td>✔</td>
</tr>
<tr>
<td>HYDROX BIO 220</td>
<td>Emulsifiable, biodegradable sterntube lubricant for use in the event of outboard leakage.</td>
<td>220</td>
<td>196</td>
<td>0.93</td>
<td>&lt; –12</td>
<td>Passes</td>
<td>Yes</td>
<td>✔</td>
</tr>
</tbody>
</table>
When water ingress occurs in stern tubes, HYDROX BIO lubricants will absorb any sea or fresh water entering the sterntube to form a fluid and stable emulsion, thereby reducing the risk of free water being present. The emulsion is stable and continues to provide the required lubrication and corrosion protection. Conventional oils do not emulsify in the same way and tend to separate, exposing components to free water and potential wear damage.

HYDROX BIO lubricants (ISO VG 68, 100 and 220) are biodegradable lubricants developed primarily for use in sterntube applications where elastomeric lip seals and circulatory oil feed systems are fitted. The products provide:

- Superior level of lubrication even when water ingress occurs
- Excellent wear protection
- Excellent corrosion protection
- Compatibility with metals commonly used
- Biodegradability
- Renewability

HYDROX BIO lubricants achieve a biodegradability of greater than 60% in the 28 day OECD 301B and OECD 306 tests and are considered non-toxic in the marine environment based on the following results:

Fish LC50 exceeds 1000mg/l;
Daphnia EC50 exceeds 1000mg/l;
Algae EC50 exceeds 1000mg/l.

HYDROX BIO lubricants (both neat oil; and also emulsion including 20% water contamination) have been successfully tested by Class and their stability, lubricating and corrosion protection performance have been verified (Lloyds Register Product Verification Certificate No. PVS02 00001/A3).

HYDROX BIO 68 and BIO 100

HYDROX BIO 68 and HYDROX BIO 100 are the viscosity grades generally recommended by the bearing and seal manufacturers for regular running in the sterntube. They can also be used for certain stabiliser systems.

HYDROX BIO 220

HYDROX BIO 220 has become widely accepted as the lubricant of choice should vessels require emergency assistance in reducing leakage from the sterntube past a damaged or worn aft seal. It outperforms other competing biodegradable leak reducing lubricants.

In the majority of cases a significant reduction in leakage rate can be achieved, typically up to 70%. The lubricant offers the greatest benefit when used to completely fill the sterntube system.
## Mineral Based Sterntube Lubricants

### At a glance

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Typical Viscosity (cst at 40°C)</th>
<th>Viscosity Index</th>
<th>Density (kg/litre at 15°C)</th>
<th>Pour Point IP15 (°C)</th>
<th>Anti-corrosion SKF Water Emcor Test</th>
<th>Emulsifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROX 550</td>
<td>Emulsifiable, mineral oil based sterntube lubricant for regular use and lubrication of some stabiliser models.</td>
<td>73</td>
<td>103</td>
<td>0.89</td>
<td>&lt; –24</td>
<td>Passes</td>
<td>✔</td>
</tr>
<tr>
<td>HYDROX 21</td>
<td>Emulsifiable, mineral oil based sterntube lubricant for use in the event of outboard leakage. Lubrication of some stabiliser fin shafts.</td>
<td>275</td>
<td>99</td>
<td>0.90</td>
<td>&lt; –9</td>
<td>Passes</td>
<td>✔</td>
</tr>
<tr>
<td>NEOX 8000</td>
<td>Mineral oil based sterntube lubricant for use when compression or older face seals are fitted in a non-circulatory oil feed system.</td>
<td>370</td>
<td>N/A</td>
<td>0.90</td>
<td>5</td>
<td>Passes</td>
<td>✔</td>
</tr>
<tr>
<td>NEOX D</td>
<td>Mineral oil based sterntube lubricant with grease-like consistency at ambient, for use in some compression seals and certain stabiliser bearings.</td>
<td>370</td>
<td>N/A</td>
<td>0.92</td>
<td>29</td>
<td>Passes</td>
<td>✔</td>
</tr>
</tbody>
</table>
This range of mineral based lubricants provides an excellent level of lubrication in both neat and emulsion forms. The lubricant will absorb any sea or fresh water which may enter the sterntube to form a relatively fluid emulsion which remains stable and therefore reduces the risk of free water being present in the sterntube. Conventional oils do not emulsify in the same way and tend to separate, exposing components to free water and potential wear damage.

HYDROX lubricants will absorb up to 20% water (Classification Society guidance and/or sterntube seal manufacturers’ limits may be lower). When worked with the water, the lubricant will form an emulsion that maintains a very high level of lubrication and corrosion protection. The emulsions, once formed, have excellent stability; therefore free water is not released. This ensures corrosion protection is maintained even during prolonged standing and that a lubricating film is present between the propeller shaft and the bottom of the bearing at the critical time of start-up.

HYDROX lubricants are compatible with the elastomers used for lip seal systems and are approved by the major lip and face stern seal manufacturers.

HYDROX 21
HYDROX 21 is recommended for use particularly where problems of oil leakage past the aft seals is being experienced.

In the majority of cases a significant reduction in leakage rate can be achieved, typically up to 70%. The lubricant offers the greatest benefit when used to completely fill the sterntube system.

HYDROX 21 is compatible with most engine oils commonly used in the sterntube and can therefore be introduced by top-up procedure to the existing sterntube oil. A minimum of 50% is recommended as the initial charge.

NEOX 8000
NEOX 8000 is a high viscosity emulsifiable sterntube lubricant.

The use of NEOX 8000 will often minimise the rate of any oil leakage past a damaged or worn aft compression seal and can also be used with some older face seals. It is not recommended for use with elastomer lip stern seals.

NEOX D
NEOX D is a high viscosity emulsifiable sterntube lubricant. It is a grease-like lubricant at ambient temperatures and is applied using a grease applicator.

It is sometimes used with compression seals and is recommended for the lubrication of trunnion bearings on some Brown Brothers retractable fin stabilisers. It is not recommended for use with elastomer lip stern seals.
# Biodegradable Hydraulic Fluids

## At a glance

<table>
<thead>
<tr>
<th>Product</th>
<th>Attribute</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECOSURE HSE 32</td>
<td>Pump Lubrication</td>
<td>DIN 51389/2 Vickers 104C Pump Test</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eaton Vickers 35VQ Pump Test</td>
<td>Pass</td>
</tr>
<tr>
<td>ECOSURE HSE 46</td>
<td>Anti-wear</td>
<td>FZG</td>
<td>Load Stage 12</td>
</tr>
<tr>
<td>ECOSURE HSE 68</td>
<td>Corrosion Protection</td>
<td>ASTM D-130 Copper Corrosion</td>
<td>Pass</td>
</tr>
<tr>
<td>ECOSURE HSE 100</td>
<td>Seal Compatibility</td>
<td>Nitrile, Viton, Teflon, Nylon, PTFE</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>Demulsification</td>
<td>ASTM 1401 Demulse (Fresh &amp; Salt water)</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>Cleanliness</td>
<td>NAS 1638/ ISO 4406</td>
<td>Supplied to NAS 8 or ISO 19/17/14</td>
</tr>
</tbody>
</table>

**Product Attributes:**
- Pump Lubrication
- Anti-wear
- Corrosion Protection
- Seal Compatibility
- Demulsification
- Cleanliness

**Test Results:**
- Pass
- Load Stage 12
ECOSURE HSE is a range of biodegradable, high performance and anti-wear hydraulic fluids. Available in ISO 32, 46, 68 and 100 viscosities, these HEES fluids are based on fully saturated synthetic esters and use state-of-the-art ashless, zinc-free technology.

ECOSURE HSE can be used in hydraulic applications in sensitive environments, especially marine, where there is the potential for fluid loss to occur and are typically used in CPPs, water tight doors, ramps, platforms, davits, cranes, winches, capstans and some designs of stabilisers.

The ECOSURE HSE range has an excellent viscosity temperature profile and unlike many high VI mineral hydraulic fluids, ECOSURE HSE does not use viscosity index improvers, so will not shear down in use.

ECOSURE HSE will outperform competing biodegradable hydraulic fluids in oxidation tests which indicate fluid life. They typically exceed 4000 hours in the ASTM D-943 DRY TOST and over 800 minutes in the ASTM D-2272 RPVOT tests giving performance superior to many mineral oil based fluids.

The pour point of the ECOSURE HSE range is below -35°C.

All of these fluids will biodegrade, with a biodegradability of greater than 60% in the 28 day OECD 301B test, and are considered practically non-toxic in the marine environment based on the following results:

- Fish LC50 exceeds 100mg/l;
- Daphnia EC50 exceeds 100mg/l;
- Algae EC50 = 200mg/l.

ECOSURE HSE products offer improved operation and lower environmental risk leading to overall cost savings, as shown in the following table:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended fluid life</td>
<td>Fewer fluid changes, less equipment downtime and lower overall cost of ownership.</td>
</tr>
<tr>
<td>Improved lubricity</td>
<td>Less wear and longer pump life.</td>
</tr>
<tr>
<td>Wider operating temperatures</td>
<td>Protects equipment from -35°C to over +100°C.</td>
</tr>
<tr>
<td>Good oxidative stability</td>
<td>Less sludge and system failures, longer fluid life and less fluid thickening.</td>
</tr>
<tr>
<td>Good thermal stability</td>
<td>Less fluid thickening and system failures due to lower levels of corrosive decomposed additives.</td>
</tr>
<tr>
<td>Superior demulsification</td>
<td>Excellent water separation allowing easy removal of water and reduced pump wear.</td>
</tr>
<tr>
<td>Good VI</td>
<td>Fluid remains within the desired viscosity over a broader temperature range.</td>
</tr>
<tr>
<td>Good shear stability</td>
<td>Less viscosity loss, fewer fluid changes and prolonged pump life.</td>
</tr>
<tr>
<td>Good seal compatibility</td>
<td>Less leakage and less equipment downtime.</td>
</tr>
<tr>
<td>Good long term filterability</td>
<td>Less filter blockage and less equipment downtime.</td>
</tr>
<tr>
<td>Biodegradable</td>
<td>Lower environmental risk.</td>
</tr>
</tbody>
</table>

![FLUID LIFETIME](image)

![SHEAR STABILITY](image)
### Thruster Lubricants

#### At a glance

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Typical Viscosity (cst@40°C)</th>
<th>Viscosity Index</th>
<th>Density (kg/ltr@15°C)</th>
<th>Pour Point IP15 (°C)</th>
<th>FZG Extreme Pressure Test for Gear Oils</th>
<th>Biodegradable</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOGAR XP 68</td>
<td>Biodegradable gear oil for use in sensitive environments where fluid loss may occur.</td>
<td>68</td>
<td>145</td>
<td>0.91</td>
<td>&lt; -30</td>
<td>Load stage 14</td>
<td>✔</td>
</tr>
<tr>
<td>BIOGAR XP 100</td>
<td></td>
<td>100</td>
<td>140</td>
<td>0.92</td>
<td>&lt; -30</td>
<td>Exceeds load stage 14</td>
<td>✔</td>
</tr>
<tr>
<td>BIOGAR XP 150</td>
<td></td>
<td>150</td>
<td>137</td>
<td>0.92</td>
<td>-30</td>
<td>Exceeds load stage 14</td>
<td>✔</td>
</tr>
<tr>
<td>HYDROX 8 EP</td>
<td>Mineral oil based lubricant for use in auxiliary or main propulsion thruster units.</td>
<td>100</td>
<td>105</td>
<td>0.90</td>
<td>&lt; -20</td>
<td>Exceeds load stage 12</td>
<td>×</td>
</tr>
<tr>
<td>HYDROX EP 150</td>
<td></td>
<td>150</td>
<td>102</td>
<td>0.90</td>
<td>&lt; -20</td>
<td>Exceeds load stage 12</td>
<td>×</td>
</tr>
</tbody>
</table>
**BIOGEAR XP**

BIOGEAR XP is a range of biodegradable, high performance, extreme pressure (EP) gear oils with excellent anti-wear and micropitting performance. BIOGEAR XP is designed for use in sensitive environments where there is a potential for fluid loss to occur, for example from thrusters and some CPP designs.

The BIOGEAR XP range (ISO VG 68, 100 and 150) is based on fully saturated synthetic esters with a high degree of renewability and provides:

- Equipment protection over a wide operating temperature (-30°C to +100°C)
- Superior oxidation protection under severe conditions
- Excellent water separation
- Extended fluid life
- High EP protection
- High resistance to micro-pitting
- Compatibility with most common sealing materials including Nitrile and Viton

BIOGEAR XP is miscible with common mineral based gear oils, but, in common with good practice, old oils should be drained completely to avoid any risk of additive incompatibility and ensure that the full benefits and performance are achieved. Water content should not exceed 0.1% and any free water must be separated off on a regular basis. Unlike the HYDROX range, these oils do not emulsify water.

BIOGEAR XP achieves a biodegradability of greater than 60% in the 28 day OECD 301B test. These products are considered practically non-toxic in the marine environment based on the following results:

Fish LC₅₀ exceeds 100mg/l;  
Daphnia EC₅₀ exceeds 100mg/l;  
Algae EC₅₀ exceeds 100mg/l.

**HYDROX EP**

HYDROX 8 EP and EP 150 are extreme pressure (EP) gear lubricants based on mineral oils which have been designed primarily for the lubrication of thrusters.

HYDROX 8 EP and EP 150 provide a very high standard of anti-wear performance suitable for the lubrication of heavily loaded gears, giving high resistance to micropitting and scuffing. They have been formulated to be suitable in applications where a combined gear lubricant/hydraulic function is required. They also form stable emulsion with any water that may enter the unit and so provide protection against corrosion.

HYDROX EP lubricants (both neat oil, and also emulsion form) have been successfully tested by Class and their stability, lubricating and corrosion protection performance have been verified (Lloyds Register Product Verification Certificate No. PVS02 00001/A3). In accordance with best practise and some OEM guidelines we would, however, always recommend monitoring water content and taking remedial action once the water content exceeds specific OEM limitations for regular running.

The lubricants have been formulated to have good compatibility with the elastomers used for seals fitted in the marine equipment. They have been tested and approved for use by the major seal manufacturers.

Both HYDROX 8 EP and HYDROX EP 150 are compatible with many other EP type lubricants and therefore can usually be added without special precautions.
# Greases

## At a glance

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Density (kg/ltr@15°C)</th>
<th>Pour Point IP15 (°C)</th>
<th>Flashpoint SETA (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOGREASE EP2</td>
<td>Biodegradable NLGI 2 lithium/calcium based grease used for the lubrication of bearings and as a protective coating for exposed equipment.</td>
<td>0.91</td>
<td>N/A</td>
<td>&gt; 170</td>
</tr>
<tr>
<td>9263 WRD</td>
<td>Mineral oil based wire rope dressing.</td>
<td>0.90</td>
<td>~5</td>
<td>&gt; 230</td>
</tr>
<tr>
<td>NEOX DT</td>
<td>Mineral oil based soft grease used for the lubrication of bearings and gears, and as a protective coating for exposed equipment.</td>
<td>0.90</td>
<td>50</td>
<td>&gt; 205</td>
</tr>
<tr>
<td>NEOX DTX</td>
<td>Mineral oil based soft grease used for the lubrication of bearings and gears, and as a protective coating for exposed equipment. <em>Not suitable for high temperature applications.</em></td>
<td>0.90</td>
<td>50</td>
<td>&gt; 205</td>
</tr>
</tbody>
</table>
BIOGREASE EP2

BIOGREASE EP2 is a Lithium/Calcium thickened lubricating grease based on renewable, biodegradable, fully saturated esters. It is designed for use in sensitive marine environments, has a biodegradability of greater than 60% in the 28 days OECD 301B test and is proven to be practically non-toxic to marine organisms.

BIOGREASE EP2 can be used in a variety of marine applications which demand a NLGI 2 grease and works effectively at temperatures ranging from -25°C to +125°C. The EP additives provide excellent load carrying properties.

With good resistance to the washing of rain and seawater, BIOGREASE EP2 provides effective corrosion protection.

9263 WRD

9263 WRD is a wire rope dressing which has been formulated to be fluid enough to be applied by brush, spray or mechanical means. For a superior wire rope penetration the use of a pressurised applicator is recommended.

The key benefit of 9263 WRD is that it has specific de-watering characteristics such that any water present on the surface of the metals is displaced leaving a thin continuous film of lubricant, which has excellent anti-corrosion properties.

NEOX DT and NEOX DTX

NEOX DT and NEOX DTX are lubricants with the consistency of a soft grease. These products can be used for the lubrication of bearings and gears, and as a protective dressing for equipment where sea water, fresh water or condensation moisture may contaminate the system. Both lubricants are recommended for use on grease lubricated sternstubes, wire ropes and rigging, container lashings / shackle threads, hatch cover bearings and runners, deck winches and slipway rails.

NEOX DT and NEOX DTX provide a very high standard of lubrication and corrosion protection. When worked with any water that contaminates the lubricant, the water will be absorbed to form a thick, viscous emulsion. The emulsion itself contains both lubrication and anti-corrosion properties.

The lubricants and their emulsions adhere well to metal, providing excellent resistance to the washing action of sea or rain water. Unlike many conventional types of grease, NEOX DT and DTX range do not harden excessively or crack when subjected to cold, wet conditions.
Condition Monitoring Service

For more information please contact our Technical Service Department on +44 (0)113 386 7654 or Email: techserv@vickers-oil.com
Our Condition Monitoring Service has been developed to allow owners and managers to have complete peace of mind with regard to the use of Vickers Oils lubricants in their vessels.

It is backed by a full service team to answer queries regarding test results and their interpretation. The service is offered based upon a tailored agreement covering each individual vessel participating in the service.

**UNIQUE**

The key feature of our service is that the resultant reports offer judgements on machinery health and not just lubricant condition. These judgements state, where appropriate, that the machinery is suitable for further service and does not require remedial action. This would be the case even, for example, when HYDROX samples contain up to 10 times more water than if conventional oil was in use.

**SURVEY EXTENSIONS**

Regular use of our Condition Monitoring Service can actually support applications for extension to the classification survey of a ship’s sterntube assembly. For example, the CM notation scheme operated by Lloyd’s Register can allow sterntube inspection to be deferred where sufficient documented evidence is available to support such a deferral. In such cases significant cost savings can be enjoyed by the client.

Reports can be made available to Classification Society Surveyors of whatever Class and will normally exceed their requirement regarding both the test suite and quality of reporting.

Our service is compliant with the ISM Code “Maintenance of the Ship and Equipment” and provides evidence of preventative maintenance in respect of Clause 10 of the ISM code.

*Our reports offer unambiguous insights into the health of both machinery and lubricant in the sterntube*
Leaders In Marine Bio-Lubes

Explore our range of innovative, high performance and environmentally conscious lubricants, delivered with an unparalleled level of personal service.

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FM 1851 EMS 40717

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