

FGS Lubricants
Attn. Mrs. Silvia Schmid
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88662 Überlingen
Germany

Your Reference / Date
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Page / Seite: 1 / 2
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Dear Mrs. Schmid

Based on the test results we have decided to include the lubricant:

Grease for open Gears
LE 5182 PYROSHIELD

from the company:

Lubrication Engineers International A.G.
3 & 5 High Street
Theale
Reading RG7 5AH
United Kingdom

into our Wärtsilä specification of lubricants for this specific gear application.

We have carried out these tests on our very large 2-stroke diesel engines types RT-flex96C-B delivering up to a maximum of 80'080 kW / 108'920 bhp @ 102 rpm. These engine types are used for example as prime movers in the world's largest container vessels.

On these engines we have used the grease **LE 5182 PYROSHIELD** for the lubrication of its open gear drive between turning gear pinion and flywheel. This gear drive is used during maintenance work in order to put the crankshaft and the whole running gear (consisting of pistons, piston rods, crossheads and connecting rods) in any required position. Since our 2-stroke engines are directly coupled to the propeller, the whole shafting system [consisting of intermediate propeller shaft(s), propeller shaft and propeller as well as possible Power Take-Off Tunnel Gears] will be



automatically rotated too. Therefore a very large sum of masses has to be moved very slowly. As a consequence, very high tooth forces are created. These tooth flanks need to be lubricated sufficiently in order to be able to cope with these high driving torques & forces.

On the other hand this gear drive is out of operation during the times of normal engine running. During this major time quite large velocities are created by the normal running speed of the engine. Thereby the lubricant should not be thrown off from the tooth flanks due to the centrifugal forces. This is the reason why the lubricant has to be applied as a very thin layer only. Of course this also helps to reduce the necessary amount of lubricant.

The mentioned specification "Lubricants for Flywheel and Pinion on Wärtsilä and Sulzer engines" is usable as a guide line for our licensees and customers when ordering suitable lubricants.



Wärtsilä Engine Type
RT-flex96C-B,
max. 80'800kW @ 102rpm



Open Gear Drive
Turning Gear /
Flywheel



Application of
LE 5182 PYROSHIELD
on Tooth Flanks of Flywheel



Lubricated Pinion
Tooth Flanks

Wärtsilä

Liability:

The application must be in compliance with the Wärtsilä general requirements and recommendations as given in the manuals.

The supplying company undertakes all responsibility for the performance of the lubricant in service to the exclusion of any liability of Wärtsilä Switzerland Ltd.

Yours sincerely,
Wärtsilä Switzerland Ltd

Rolf Neuweiler
Powertrains / Gear Expert

Roelf Drijfholt
Fuels & Lubricants Expert





Lubricants for Flywheel and Pinion Gear Teeth of Wärtsilä and Sulzer Engines

RTA-type engines with water cooled pistons:

RTA84, RTA76, RTA68, RTA58

RTA and RT-flex type engines with oil cooled pistons:

RTA96C, RTA96C-B, RT-flex96C-B
 RTA84T, RTA84T-B, RTA84T-D, RT-flex84T-D
 RTA84C (UG), RTA84M
 RTA82T, RT-flex82T, RTA82C, RT-flex82C
 RTA72, RTA72U, RTA72U-B
 RTA68T-B, RT-flex68T-B, RTA68-D, RT-flex68-D
 RTA62, RTA62U, RTA62U-B
 RT-flex60C, RT-flex60C-B
 RTA58T, RTA58T-B, RT-flex58T-B
 RTA52, RTA52U, RTA52U-B
 RTA50, RTA50B, RT-flex50, RT-flex50-B
 RTA48, RTA48T, RTA48T-B
 RTA38

Supplier	Brand	Application picture	Remark
Lubrication Engineers Inc. 300 Bailey Avenue Fort Worth Texas 76107 USA Tel +1 817 834 6321 Fax +1 817 834 2431 http://www.le-inc.com http://www.le-international.com Email: info@le-international.com	LE 5182 PYROSHIELD		Apply the lubricant in a zigzag line (see picture) to provide a thin layer of lubricant over the entire gear tooth surfaces.
Klüber Lubrication München KG Geisenhausenerstrasse 7 81379 München Germany Tel +49 89 7876 -0 Fax +49 89 7876 – 333 http://www.klueber.com Email: info@klueber.com	Klüberfluid C-F 3 ULTRA		In order to reach a very thin & shiny layer of lubricant, we recommend to warm up the Klüberfluid to about 35°C in a small tin which is put into warm water.
Other Suppliers?	Other Brands?	Application picture?	Application comments?

Application Instruction:

Generally, the lubricant needs to be spread evenly in a **very thin layer** over the tooth flanks of turning gear pinion and flywheel in order to prevent it from being thrown off at full engine speed.

General Re-Lubrication Intervals:

According visual inspection results, when hardly any lubricant is left any more on the highest loaded tooth flank areas, i.e. before tooth flanks nearly run dry => Roughly every 2'000 running hours of the diesel engine, or more frequently, as required.

Liability:

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