

Service Wärtsilä NSD Nederland B.V.

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SW 280 LUBRICATING OIL PRESCRIPTIONS

Our recommendations concerning lubricating oil are adjusted from time to time due to the developments of fuels as well as of lubricating oils and due to the field experience in general with our engines

Enclosed you will find the prescriptions we use for new engines being taken into operation. These prescriptions are without restriction also valid for engines which are already operative for many years.

The main alteration compared with former prescriptions for lubricating oil for the main system and for cylinder lubrication is:

The alkalinity of the lubricating oil should be matched to the sulphur content of the fuel according to the formula

Lube oil TBN = 5 + 6 times SULPHUR content (weight %) of the fuel
(formerly the formula TBN = 10 + 6 + S % was used)

For engines running with lubricating oils different from the present requirements it is recommended to change to an oil that meets the new requirements.

It is needless to say that when the behaviour of engine and lubricating oil are satisfactory at this moment such a change can be made whenever there is a good opportunity.

Moreover we advise you to consult your lubricating oil supplier

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Section 2C

LUBRICATION SYSTEM SW280
(Lubricating oil requirements)

Lubricating oil requirements

The lubricating oil for the SWD engines shall be selected according to the requirements given below.

Compliance of oils with these requirements means that these oils should feature a number of physical and chemical properties, generally required for satisfactory operation in medium speed diesel engines.

Since, however, SWD neither manufactures nor supplies the oil, SWD does not control or know the complete composition of a lubricating oil brand or type or batch and therefore cannot give a guarantee that a lubricating oil will behave satisfactorily under all operating conditions.

It is the duty of the engine user to carefully and regularly monitor the behaviour of the lubricating oil and the engine in order to ensure that engine and lubricating oil remain in a satisfactory condition.

This is particularly necessary when a new engine is put into operation or when a change is made from using a particular brand of oil to another in an engine already in operation or when oil is taken from a new or different batch that possibly may have a different composition.

On request SWD will to the best of their ability advise customers to obtain satisfactory performance of the lubricating oil in SWD engines.

1. Lubricating oils for crankcase (bearings, pistons, valve gear and gearwheels).

- Viscosity grade : SAE 40
- Flash point : above 493 K (220°C)
- Pour point : 261 K (-120°C) max.
- Alkalinity : to be chosen in relation with the sulphur percentage (weight) of the fuels (TBN, ASTM 2896) used. **)

*) In case of excessive low ambient temperature the pour point should be at least 9 K (9°C) below the lowest temperature at which the oil is expected to be used.

***) TBN (mg KOH/g lubricating oil) = 5 + 6 times sulphur percentage of the fuel.
Present and future residual fuels (heavy fuels) have sulphur contents varying up to 5% and distillate grade fuels up to 2%

Example: A residual grade fuel with a S % of 3 requires a TBN of $5 + 6 \times 3 = 23$.

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If distillate fuel with a sulphur content well below 1% is continuously used lubricating oil with TBN 5-10 can be applied.

The lubricating oil quality must meet the API Service CD or US-Army-MIL-L-2104 C specifications.

The lubricating oil must be suitable for continuous cleaning by a centrifugal separator (in bypass). the lubricating oil inlet temperature is to be controlled between 353 K (80°C) and 363 K (90°C).

For the purpose of cleaning the lubricating oil by means of the centrifugal separator it is required that the lubricating oil has a high demulsifying ability.

This is particularly important whenever there is a possibility of contamination by sea water.

2. Inlet valve seat lubrication (if applicable).

This system is fed from the engine lubrication system with same lubricating oil requirements as specified under 1.

3. Testing lubricating oil during operation.

Under normal operating conditions samples of lubricating oil should be taken from the system every 1000 hours.

On the basis of the results of the tests to be carried out by the oil supplier it can be determined whether the lubricating oil is suitable for further use.

It is also recommended to have metal analysis performed on these samples in order to watch over the wear development of various engine components.

A good habit is to test for water every week.

Besides the lubrication function the crankcase oil must also prevent oxidation products coming from fuel and lubricating oil to deposit on engine parts and to keep these oxidation products in a finely divided solution.

The oxidation products are partly removed from the lubricating oil through the lubricating oil filter.

This may ultimately require the replacement of the lubricating oil.

Replacement intervals depend on the operating conditions, the efficiency of the lubricating oil treatment and the quantity of oil in circulation.

4. Condemning limits for crankcase lubricating oil.

If analysis result exceed one of the following limits, the lubricating oil is no longer suitable for further use:

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- rate of change of viscosity -20/+20%
- flash point below 453 K (180°C)
- pentane insolubles above 2.5% or more than 0.5% above % in benzene
- benzene insolubles above 2 %
- water content above 0.2 %
- TBN below 60 % of original value

If one of these limits has been reached the lubricating oil charge should either be brought back to normal condition or renewed.

Intensified separation by shorter intervals between cleaning of the separator is a way to decrease water and insolubles to within specification.

Always consult the lubricating oil supplier.

It should be emphasized that the above limits are for guidance only.

Actual limits for satisfactory performance depend on engine duty, lubricating oil type and brand, fuel properties etc. Any sudden increase in sludge or lacquer formation in crankcase or cambox are signs of inferior lubricating oil quality.

5. Lubricating oil requirements for other lubricated engine components.

5.1 Starting motor (if applicable).

See the manual of the starting motor.

See section 2Z (SUBCONTRACTORS MANUALS)

5.2 Turning gear (if applicable).

For worm wheel and gears use a Mild EP oil with a viscosity of approx. 600 mm²/s (600 cSt) at 313 K (40 °C).

5.3 Turbocharger units.

See the manual for the turbocharger units.

See section 2Z (SUBCONTRACTORS MANUALS).

5.4 Hydraulic governor.

See the manual for the governor.

See section 2Z (SUBCONTRACTORS MANUALS).

5.5 Pneumatic control (if applicable).

See the manual for the control.

See section 2Z (SUBCONTRACTORS MANUALS).

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6. Hydraulic tools for the assembly/disassembly of engine components (if applicable).

These tools require an oxidation resistant oil with a viscosity of about 45 mm²/s (45 cSt) at 313 K (40°C).

7. The quantity of lubricating oil in the system.

In general the service time of a lubricating oil will be extended in proportion to a larger quantity of oil circulating in the system.

Other factors influencing the service time of the lubricating oil are: operating conditions, type of oil and lubricating oil treatment.

It is therefore important that the following values are met.

- On heavy fuel operation 1.4 L per kW installed output.
- On gasoil operation 0.7 L per KW installed output.
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Note:

If, in order to meet the requirements of a specification, the installation has been designed with lower values than those mentioned above the consequence will be a reduction in lubricating oil service life.

Thus for engines running on gasoil with a wet sump having a volume of 0.25 L/kW, the lubricating oil service life will be limited to 1000 hours.