

4.1 Lube Oil

4.2 Fuel

4.3 Coolant

Operation/Maintenance BFM 1015

Operating Media: Lube Oil



4.1.1 Quality Grade

The lube oil quality grade is defined by specifications. The following lube oil specifications are approved:

API Classification

American Petroleum Institute

- Turbocharged engines: CF-4 CG-4 CH-4

ACEA Classification

European Engine Oil Sequences.

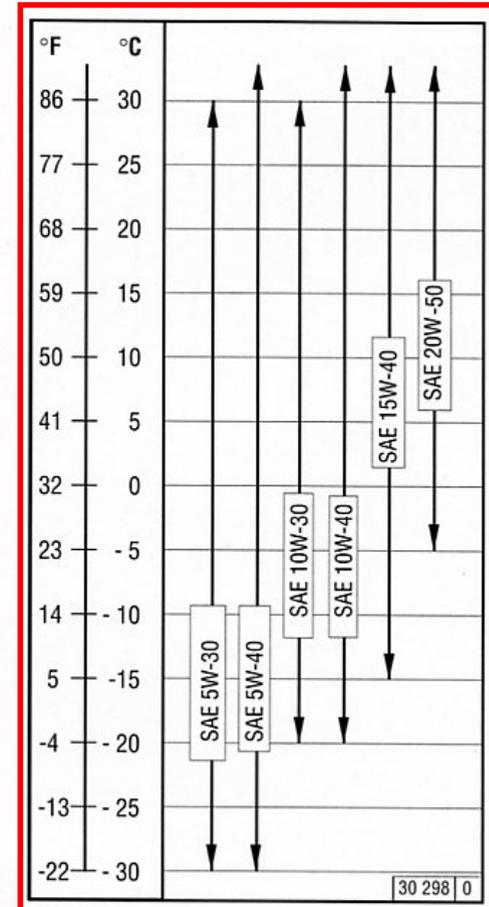
- Turbocharged engines: E1- E3-96 + E4-98

4.1.2 Viscosity

The lube oil viscosity of the SAE grade is selected according to the viscosity diagram alongside.

The ambient temperature is decisive for the correct choice. Should the temperatures temporarily fall below the limits of the SAE grade selected, this will merely affect the starting performance, but will not cause any engine damage. The application limits should not be exceeded over lengthy periods of time in order to keep wear down to a minimum.

For all-year application you should use multi-grade oils.



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Operating Media: Fuel



4.2.1 Quality Grade

Use commercial brands of diesel fuel with a sulfur content of less than 0.5%. If the sulfur content is higher than 0.5%, oil change intervals should be reduced, see 6.1.1.

The following specifications / standards are approved:

- CEN EN 590 or DIN/EN 590
- DIN 51 601 (Feb.1986)
- BS 2869 (1988): A1 and A2
- ASTM D975-88: 1-D and 2-D
- NATO Code F-54 and F-75

The exhaust emission levels determined during certification always refer to the reference fuel specified by the supervising authorities for such certification.

4.2.2 Winter-Grade Fuel

At low temperatures, waxing may occur and clog the fuel system, causing operational trouble. In case of sub-zero (+32 °F) ambient temperatures it is recommended to use winter-grade diesel fuel (down to $-15\text{ °C} = +5\text{ °F}$). Normally, such fuel is offered at the filling stations in good time before the cold season starts. Diesel fuel containing additives („Super Diesel“) is frequently also on sale for use at temperatures down to $-20\text{ °C} (-4\text{ °F})$.

- At temperatures below $-15\text{ °C} (+5\text{ °F})$ or $-20\text{ °C} (-4\text{ °F})$, kerosene should be added to the diesel fuel. The relevant percentages are given in the diagram at the right.

If summer-grade diesel fuel has to be used at temperatures below zero (+32 °F), up to 60% kerosene may be added (see diagram at the right).

In most cases, adequate resistance to cold is also attained by adding a flow improver (fuel additive). Ask your service representative for this.

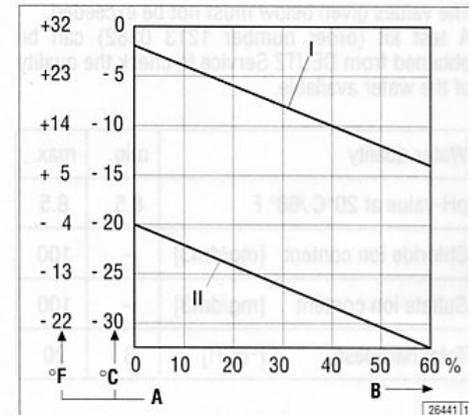


Illustration legend:	
I	Summer diesel fuel
II	Winter diesel fuel
A	Ambient temperature
B	Percentage of kerosene added



Mix in tank only! Fill in the appropriate amount of kerosene first, then add the diesel fuel.

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Operating Media: Coolant



4.3.1 Water Quality for Coolant Preparation

The values given below must not be exceeded. A test kit (order number 1213 0382) can be obtained from DEUTZ Service to check the quality of the water available.

Water quality	min.	max.
pH-value at 20°C /68° F	6.5	8.5
Chloride ion content [mg/dm ³]	–	100
Sulfate ion content [mg/dm ³]	–	100
Total hardness [°dGH]	3	20

4.3.2 Coolant Preparation

The preparation and monitoring of coolant in liquid-cooled engines is especially important because corrosion, cavitation and freezing can lead to engine damage.

The coolant is prepared by admixing a cooling system protective liquid with the cooling water.

The cooling system must be monitored regularly (see 5.1). The water level and the cooling system protective liquid concentration should both be checked.

The cooling system protective liquid concentration can be checked with a commercially available tester (e.g. gefo glycomat®).

4.3.3 Cooling System Protective Liquid

DEUTZ cooling system protective agents can be obtained under order number 01011490 (5 litres) or 1221 1500 (210 litres). These are nitrite-, amine- and phosphate-free and provide effective protection against corrosion, cavitation and freezing.

If the above-mentioned cooling system agents are not available, the following products can be used in exceptional cases.

Manufacturer	Product description
AVIA	AVIA Antifreeze Extra
BASF	Glysantin G 48
DEA	DEA radiator antifreeze
SHELL	SHELL GlycoShell

The concentration of the cooling system protective liquid in the coolant may not fall below/exceed the following limits:

Cooling system protective liquid	Water
max. 45 Vol.%	55%
min. 35 Vol.%	65%

For the quantity, see table overpage and information in section 9.1.

Other cooling system protective liquids, e.g. chemical corrosion inhibitors, can, in exceptional circumstances, be used in the coolant, in consultation with DEUTZ Service. Order the cooling system protective liquid from: **DEUTZ Service**



When **nitrite-based** cooling system protective liquids are mixed with **amine-based** liquids, harmful nitrosamines are formed.



Cooling system protective liquids must be disposed of in accordance with environmental regulations.

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Operating Media: Coolant



Cooling System Protection									
Protective agent [% by vol.]	Protection against freezing to [°C]	Cooling system capacity *) [Liters]							
		18	20	22	25	27	30	32	35
		Protective agent [Liters]							
35	-22	6,3	7,0	7,7	8,75	9,5	10,5	11,2	12,3
40	-28	7,2	8,0	8,8	10	10,8	12	12,8	14
45	-35	8,1	9,0	9,9	11,3	12,2	13,5	14,4	15,8
50	-45	9,0	10	11	12,5	13,5	15	16	17,5

*) For coolant capacity of your engine, see Section 9.1.
Note: Consult head-office regarding figures in the grey field.