

Service, Wärtsilä Finland Oy

Engine section	Engine type	Ref.	Date	Issue	Document No.	Page
02 Lubricating oil	W32	WFI-S	25.10.2005	01	3202N045GB	1(2)+7

Lubricating oils for WÄRTSILÄ® 32 engines


General	The enclosed specification contains oil requirements and quality for WÄRTSILÄ® 32 engines.
Letter distribution	Wärtsilä Service Network and owners/operators of engines concerned.
Letter validity	Until further notice. This document replaces document 3202Q017, issue 01, dated 10.2.1998.
Enclosure	Requirements and oil quality 4V92A0645 rev. j, 7 pages.

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Subtitle	Product	Made	05.09.97		Page	Document No	Rev
Instruction	Wärtsilä 32	Appd.	05.09.97		1 (7)	4V92A0645	j
Revised date: 18.07.2005	Changed by:	Approved by:			D-message No.: 64385		

1.2.5 REQUIREMENTS AND OIL QUALITY

SYSTEM OIL REQUIREMENTS AND QUALITY FOR WÄRTSILÄ 32 ENGINES

Viscosity

Viscosity class SAE 40

Viscosity Index (VI)

Min. 95

Alkalinity (BN)

The required lubricating oil alkalinity is tied to the fuel specified for the engine, which is shown in the table below.

FUEL STANDARDS AND LUBRICATING OIL REQUIREMENTS			
Category	Fuel standard		Lube oil BN
A	ASTM D 975-01, BS MA 100: 1996 CIMAC 2003 ISO 8217: 1996(E)	GRADE NO. 1-D, 2-D DMX, DMA DX, DA ISO-F-DMX, DMA	10 - 30
B	BS MA 100: 1996 CIMAC 2003 ISO 8217: 1996(E)	DMB DB ISO-F-DMB	15 - 30
C	ASTM D 975-01, ASTM D 396-04, BS MA 100: 1996 CIMAC 2003 ISO 8217: 1996(E)	GRADE NO. 4-D GRADE NO. 5-6 DMC, RMA10-RMK55 DC, A30-K700 ISO-F-DMC, RMA10-RMK55	30 - 55
D	CRUDE OIL (CRO)		30 - 55

It is recommended to use in the first place BN 50-55 lubricants when operating on heavy fuel. This recommendation is valid especially for engines having wet lubricating oil sump and using heavy fuel with sulphur content above 2.0 % mass. BN 40 lubricants can be used when operating on heavy fuel as well if experience shows that the lubricating oil BN equilibrium remains at an acceptable level.

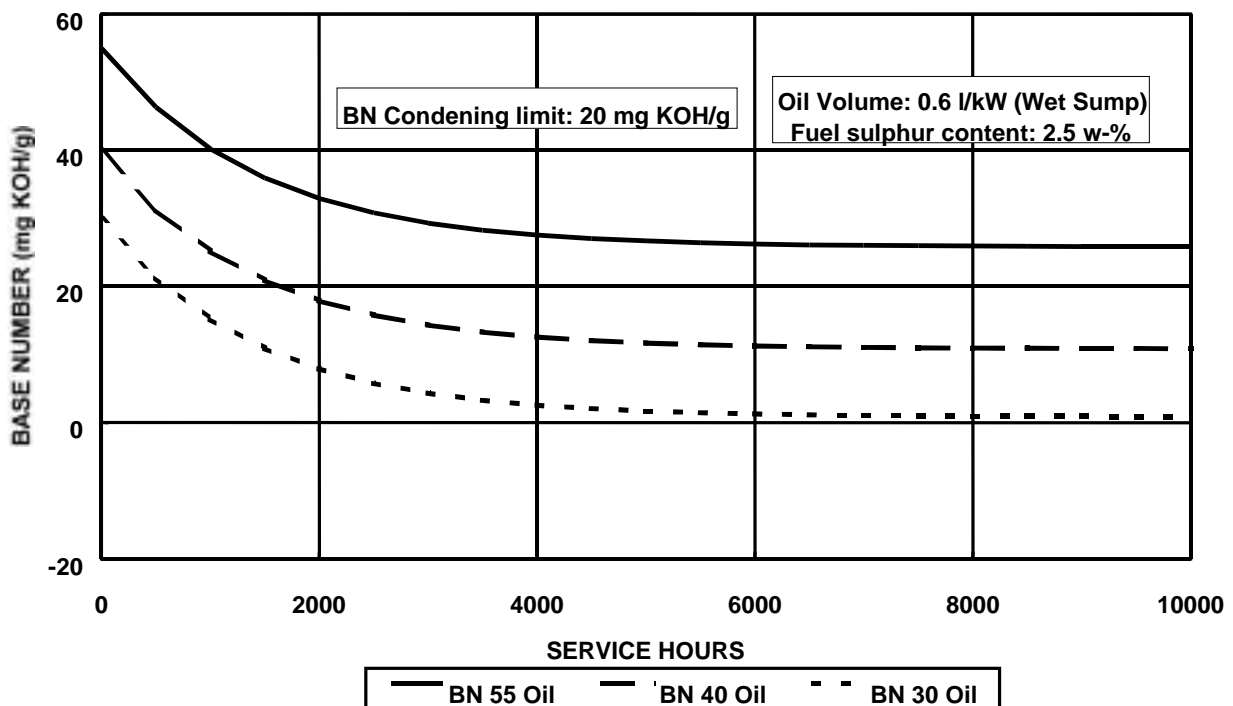
BN 30 lubricants are recommended to be used only in special cases, such as installations equipped with an SCR catalyst. Lower BN products eventually have a positive influence on cleanliness of the SCR catalyst. With BN 30 oils lubricating oil change intervals may be rather short, but lower total operating costs may be achieved because of better plant availability provided that the maintenance intervals of the SCR catalyst can be increased.

BN 30 oils are also a recommended alternative when operating on crude oil having low sulphur content. Though crude oils many times have low sulphur content, they can contain other acid compounds and thus an adequate alkali reserve is important. With crude oils having higher sulphur content BN 40 – 55 lubricating oils should be used.

If both distillate fuel and residual fuel are used periodically as fuel, lubricating oil quality has to be chosen according to instructions being valid for residual fuel operation, i.e. BN 30 is the minimum. Optimum BN in this kind of operation depends on the length of operating periods on both fuel qualities as well as of sulphur content of fuels in question. Thus in particular cases BN 40 or even higher BN lubricating oils should be used.

The intervals between lubricating oil changes may be extended by adding oil daily to keep the oil level constantly close to the maximum level.

An example of BN depletion curve with different BN lubricating oils is shown below.



Additives

The oils should contain additives that give good oxidation stability, corrosion protection, load carrying capacity, neutralisation of acid combustion and oxidation residues and should prevent deposit formation on internal engine parts (piston cooling gallery, piston ring zone and bearing surfaces in particular).

Foaming characteristics

Fresh lubricating oil should meet the following limits for foaming tendency and stability, according to the ASTM D 892-92 test method:

Sequence I:	100/0 ml
Sequence II:	100/0 ml
Sequence III:	100/0 ml

Base oils

Use of virgin base stocks only is allowed, i.e. recycled or re-refined base oils are not allowed.

CONDEMNING LIMITS FOR USED LUBRICATING OIL

When estimating the condition of used lubricating oil, the following properties along with the corresponding limit values must be noted. If the limits are exceeded, measures must be taken. Compare also with guidance values for fresh lubricating of the brand used.

Property	Unit	Limit	Test method
Viscosity	cSt at 40 °C	max. 25% decrease max. 45% increase	ASTM D 445
Viscosity	cSt at 100 °C	max. 20% decrease max. 25% increase	ASTM D 445
Water	% V/V	max. 0.30	ASTM D 95 or D 1744
Base Number	mg KOH/g	min. 20 in HFO operation, max. 50% depletion in LFO operation	ASTM D 2896
Insolubles	% m/m in n-Pentane	max. 2.0	ASTM D 893b
Flash Point, PMCC	°C	min. 170	ASTM D 93
Flash Point, COC	°C	min. 190	ASTM D 92

CHANGE OF LUBRICATING OIL BRAND

In order to minimize the risk of lubricating oil foaming, deposit formation, blocking of lubricating oil filters, damage of engine components, etc., the following procedure should be followed when lubricating oil brand is changed from one to another:

- If possible, change the lubricating oil brand in connection with an engine (piston) overhaul
- Drain old lubricating oil from the lubricating oil system
- Clean the lubricating oil system in case of an excessive amount of deposits on the surfaces of engine components, like crankcase, camshaft compartment, etc.
- Fill the lubricating oil system with fresh lubricating oil

If the procedure described above is not followed, responsibility of possible damage and malfunctions caused by lubricating oil change should always be agreed between the oil company and customer.

APPROVED LUBRICATING OIL QUALITIES FOR WÄRTSILÄ 32 ENGINES

Should unapproved lubricating oils be used during the engine warranty period, and there exist no agreement with the engine manufacturer about testing, the engine guarantee does not hold.

GAS OIL AND MARINE DIESEL OIL OPERATION

If gas oil or marine diesel oil is used as fuel, lubricating oils with a BN of 10-25 are recommended to be used. Also BN 30 lubricating oils included in Table 3 can be used in gas oil and marine diesel oil fuelled engines.

Table 1.

Approved system oils - fuel categories A and B, recommended in the first place in gas oil or marine diesel oil installations:

SUPPLIER	BRAND NAME	VISCOSITY	BN	FUEL CATEG.
BP	Energol HPDX 40	SAE 40	12	A
Castrol	HLX 40	SAE 40	12	A
	MHP 154	SAE 40	15	A,B
	Seamax Extra 40	SAE 40	15	A,B
Chevron (Texaco + Caltex + FAMM)	Delo 1000 Marine 40	SAE 40	12	A
	Delo 2000 Marine 40	SAE 40	20	A,B
	Taro 12 XD 40	SAE 40	12	A
	Taro 20 DP 40	SAE 40	20	A,B
ExxonMobil	Mobilgard ADL 40	SAE 40	15	A,B
	Mobilgard 412	SAE 40	15	A,B
	Mobilgard 1 SHC	SAE 40	15	A,B
Indian Oil Corporation	Servo Marine 1040	SAE 40	10	A
	Servo Marine 2040	SAE 40	20	A,B
Petrobras	Marbrax CCD-410-AP	SAE 40	12	A
	Marbrax CCD-415	SAE 40	15	A,B
	Marbrax CCD-420	SAE 40	20	A,B
Shell	Gadina Oil 40	SAE 40	12	A
Statoil	MarWay 1040	SAE 40	10.6	A
Total / Lubmarine	Disola M 4015	SAE 40	14	A
	Disola M 4020	SAE 40	20	A,B

HEAVY FUEL AND CRUDE OIL OPERATION

Today's modern trunk piston diesel engines are stressing the lubricating oils heavily due to a.o. low specific lubricating oil consumption. Also ingress of residual fuel combustion products into the lubricating oil can cause deposit formation on the surface of certain engine components resulting in severe operating problems. Due to this many lubricating oil suppliers have developed new lubricating oil formulations with better fuel and lubricating oil compatibility.

Table 2.

Approved system oils - fuel categories C and D, recommended in the first place when operating on heavy fuel and or on crude oil having high sulphur content in order to reach full service intervals. BN 50-55 lubricating oils are preferred in the first place.



SUPPLIER	BRAND NAME	VISCOSITY	BN	FUEL CATEG.
BP	Energol IC-HFX 404	SAE 40	40	C,D
	Energol IC-HFX 504	SAE 40	50	C,D
Castrol	TLX Plus 404	SAE 40	40	C,D
	TLX Plus 504	SAE 40	50	C,D
	TLX Plus 554	SAE 40	55	C,D
Cepsa	Troncoil 4040 PLUS	SAE 40	40	C,D
	Troncoil 5040 PLUS	SAE 40	50	C,D
	Ertoil Koral 4040 SHF	SAE 40	40	C,D
	Ertoil Koral 5040 SHF	SAE 40	50	C,D
Chevron (Texaco + Caltex + FAMM)	Taro 40 XL 40	SAE 40	40	C,D
	Taro 50 XL 40	SAE 40	50	C,D
	Delo 3400 Marine 40	SAE 40	40	C,D
	Delo 3550 Marine 40	SAE 40	55	C,D
Chinese Petroleum Corporation	Marilube Oil W 404	SAE 40	40	C,D
	Marilube Oil W 504	SAE 40	50	C,D
ENI S.p.A.	Cladium 400 S SAE 40	SAE 40	40	C,D
	Cladium 500 S SAE 40	SAE 40	50	C,D
	Cladium 550 S SAE 40	SAE 40	55	C,D
ExxonMobil	Exxmar 40 TP 40	SAE 40	40	C,D
	Exxmar 50 TP 40	SAE 40	50	C,D
	Mobilgard M 440	SAE 40	40	C,D
	Mobilgard M50	SAE 40	50	C,D
Fuchs	Titan PSW 40 SAE 40	SAE 40	40	C,D
	Titan PSW 55 SAE 40	SAE 40	55	C,D
Indian Oil Corporation	Servo Marine K-4040	SAE 40	40	C,D
	Servo Marine K-5040	SAE 40	50	C,D
	Servo Marine K-5540	SAE 40	55	C,D
Pertamina	Martron 440	SAE 40	40	C,D
	Martron 450	SAE 40	50	C,D
	Salyx 440	SAE 40	40	C,D
	Salyx 450	SAE 40	50	C,D
Petrobras	Marbrax CCD-440	SAE 40	40	C,D
	Marbrax CCD-450	SAE 40	50	C,D
Petron	Petromar XC 4040	SAE 40	40	C,D
	Petromar XC 5540	SAE 40	55	C,D
Repsol YPF	Neptuno W NT 4000 SAE 40	SAE 40	40	C,D
	Neptuno W NT 5500 SAE 40	SAE 40	55	C,D
Shell	Argina X 40	SAE 40	40	C,D
	Argina XL 40	SAE 40	50	C,D
Total / Lubmarine	Aurelia XL 4040	SAE 40	40	C,D
	Aurelia XL 4055	SAE 40	55	C,D

Table 3.

Approved system oils - fuel categories A, B, C and D. Lubricating oils with BN 30 included in Table 3 are designed to be used when operating on crude oil with low sulphur content (< 1 % m/m) and in special cases when operating on heavy fuel, e.g. in installations equipped with an SCR catalyst.

SUPPLIER	BRAND NAME	VISCOSITY	BN	FUEL CATEG.
BP	Energol IC-HFX 304	SAE 40	30	A,B,C,D
Castrol	TLX Plus 304	SAE 40	30	A,B,C,D
Cepsa	Troncoil 3040 PLUS	SAE 40	30	A,B,C,D
	Ertoil Korol 3040 SHF	SAE 40	30	A,B,C,D
Chevron (Texaco + Caltex + FAMM)	Taro 30 DP 40	SAE 40	30	A,B,C,D
	Delo 3000 Marine 40	SAE 40	30	A,B,C,D
Chinese Petroleum Corporation	Marilube Oil W 304	SAE 40	30	A,B,C,D
ENI S.p.A.	Cladium 300 S SAE 40	SAE 40	30	A,B,C,D
ExxonMobil	Exxmar 30 TP 40	SAE 40	30	A,B,C,D
	Mobilgard M 430	SAE 40	30	A,B,C,D
Indian Oil Corporation	Servo Marine K-3040	SAE 40	30	A,B,C,D
Pertamina	Martron 430	SAE 40	30	A,B,C,D
	Salyx 430	SAE 40	30	A,B,C,D
Petrobras	Marbrax CCD-430	SAE 40	30	A,B,C,D
Petron	Petromar XC 3040	SAE 40	30	A,B,C,D
Shell	Argina T 40	SAE 40	30	A,B,C,D
Total / Lubmarine	Aurelia XL 4030	SAE 40	30	A,B,C,D

Before using a lubricating oil not listed in Tables 1-3, the engine manufacturer must be contacted. Lubricating oils that are not approved have to be tested according to engine manufacturer's procedures.

APPROVED LUBRICATING OILS FOR ENGINE TURNING DEVICE

It is recommended to use EP-gear oils, viscosity 400-500 cSt at 40 °C = ISO VG 460 as lubricating oils for turning device.



LUBRICATING OILS FOR ENGINE TURNING DEVICE				
SUPPLIER	BRAND NAME	VISCOSITY cSt at 40 °C	VISCOSITY cSt at 100 °C	VISCOSITY INDEX (VI)
BP	Energol GR-XP 460	425	27.0	88
Castrol	Alpha SP 460	460	30.5	95
Chevron (Texaco + Caltex + FMM)	Meropa 460	460	31.6	100
ENI S.p.A.	Blasia 320	300	23.0	95
ExxonMobil	Spartan EP 460	460	30.8	96
	Mobilgear 634	437	27.8	96
Shell	Omala Oil 460	460	30.8	97
Total / Lubmarine	Epona Z 460	470	30.3	93

LUBRICATING OILS FOR GOVERNOR / ACTUATOR

An oil of viscosity class SAE 30 or SAE 40 is suitable and usually the same oil can be used as in the engine. Turbocharger oil can also be used in the governor. In low ambient conditions it may be necessary to use a multigrade oil (e.g. SAE 5W-40) to get a good control during start-up. Oil change interval: 2000 service hours.