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Lubricating oils for WÄRTSILÄ® Vasa 22ABC, 22HF, 22MD and 22/26 engines

General	The enclosed specification contains oil requirements and quality for WÄRTSILÄ® Vasa 22ABC, 22HF, 22MD and 22/26 engines.
Letter distribution	Wärtsilä Service Network and owners/operators of engines concerned.
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Enclosure	Requirements and oil quality DAAE050357 rev. a, 9 pages.




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		© Wärtsilä Corporation Finland Services		REQUIREMENTS & OIL QUALITY			
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Instruction	Vasa 22, 22/26	Appd.	25.05.07		1 (9)	DAAE050357	a
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REQUIREMENTS AND OIL QUALITY

SYSTEM OIL REQUIREMENTS AND QUALITY FOR WÄRTSILÄ® VASA 22ABC, 22HF/MD and 22/26 ENGINES

Viscosity

Viscosity class SAE 30 or 40. In case of using SAE 40 oil the lube oil temperature may increase due to limited cooling capacity of the lube oil cooler.

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: 2005(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: 2005(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: 2005(E)	GRADE NO. 4-D GRADE NO. 5-6 DMC, RMA10-RMK55 DC, A30-K700 ISO-F-DMC, RMA10-RMK55	30 – 55

- In case a low sulphur (S max. 0.2 % m/m) distillate fuel is used, it's recommended to use a lubricating oil with BN of 10 – 15.
- In the engines equipped with the anti-polishing rings, it is recommended in the first place to use BN 50 – 55 lubricants when operating on heavy fuel. This recommendation is especially valid for the engines using heavy fuel with sulphur content above 2.0 % m/m.
- In the engines not equipped with the anti-polishing rings, it is recommended to use BN 30 – 40 lubricants when operating on heavy fuel. The optimum BN depends on the sulphur content of heavy fuel and lubricating oil consumption of the engine in question in each specific case.

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.

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



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® VASA 22ABC, 22HF/MD and 22/26 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.
Adnoc-Fod	Marine Engine Oil X324	SAE 30	24	A,B
	Marine Engine Oil X424	SAE 40	24	A,B
BP	Energol HPDX 30	SAE 30	12	A
	Energol HPDX 40	SAE 40	12	A
	Energol DS3-153	SAE 30	15	A
	Energol DS3-154	SAE 40	15	A
Castrol	HLX 30	SAE 30	12	A
	HLX 40	SAE 40	12	A
	MLC 30	SAE 30	12	A
	MLC 40	SAE 40	12	A
	MHP 153	SAE 30	15	A,B
	MHP 154	SAE 40	15	A,B
	Seamax Extra 30	SAE 30	15	A,B
	Seamax Extra 40	SAE 40	15	A,B
Chevron (Texaco + Caltex + FAMM)	Delo 1000 Marine 30	SAE 30	12	A
	Delo 1000 Marine 40	SAE 40	12	A
	Delo 2000 Marine 30	SAE 30	20	A,B
	Delo 2000 Marine 40	SAE 40	20	A,B
	Taro 12 XD 30	SAE 30	12	A
	Taro 12 XD 40	SAE 40	12	A
	Taro 16 XD 30	SAE 30	16	A,B
	Taro 16 XD 40	SAE 40	16	A,B
	Taro 20 DP 30	SAE 30	20	A,B
	Taro 20 DP 40	SAE 40	20	A,B



SUPPLIER	BRAND NAME	VISCOSITY	BN	FUEL CATEG.
ExxonMobil	Exxmar 12 TP 30	SAE 30	12	A
	Exxmar 12 TP 40	SAE 40	12	A
	Exxmar 24 TP 30	SAE 30	24	A,B
	Exxmar 24 TP 40	SAE 40	24	A,B
	Delvac 1630	SAE 30	12	A
	Delvac 1640	SAE 40	12	A
	Mobilgard ADL 30	SAE 30	15	A,B
	Mobilgard ADL 40	SAE 40	15	A,B
	Mobilgard 312	SAE 40	15	A,B
	Mobilgard 412	SAE 30	15	A,B
Mobilgard 1 SHC	SAE 40	15	A,B	
Indian Oil Corporation	Servo Marine 1030	SAE 30	10	A
	Servo Marine 1040	SAE 40	10	A
	Servo Marine 2030	SAE 30	20	A,B
	Servo Marine 2040	SAE 40	20	A,B
Kuwait Petroleum	Q8 Mozart HPM 30	SAE 30	12	A
	Q8 Mozart HPM 40	SAE 40	12	A
Nippon Oil Corporation	SL 230	SAE 30	22	A
	SL 240	SAE 40	22	A
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
	Marbrax CCD-410	SAE 40	12	A
Saudi Arabian Lubricating oil Company (Petrolube)	Petromin Petromar 2-30	SAE 30	30	A,B
	Petromin Petromar 2-40	SAE 40	30	A,B
	Petromin Petromar 3-30	SAE 30	40	A,B
	Petromin Petromar 3-40	SAE 40	40	A,B
Shell	Gadina Oil 30	SAE 30	12	A
	Gadina Oil 40	SAE 40	12	A
Statoil	MarWay 1030	SAE 30	10.6	A
	MarWay 1040	SAE 40	10.6	A
Total / Lubmarine	Disola M 3015	SAE 30	14	A
	Disola M 4015	SAE 40	14	A
	Disola M 3020	SAE 30	20	A,B
	Disola M 4020	SAE 40	20	A,B



HEAVY FUEL OIL OPERATION

- Engines not equipped with anti-polishing rings can use lubricating oils with BN 30 – 40.
- In engines equipped with anti-polishing rings it is recommended to use lubricating oils with BN 50-55 due to lower specific lube oil consumption.

Table 2.

Approved system oils - fuel category C, is recommended in the first place when operating on heavy fuel oil having high sulphur content in order to reach full service intervals.

SUPPLIER	BRAND NAME	VISCOSITY	BN	FUEL CATEG.
BP	Energol IC-HFX 303	SAE 30	30	A,B,C
	Energol IC-HFX 304	SAE 40	30	A,B,C
	Energol IC-HFX 403	SAE 30	40	C
	Energol IC-HFX 404	SAE 40	40	C
	Energol IC-HFX 504	SAE 40	50	C
Castrol	TLX Plus 303	SAE 30	30	A,B,C
	TLX Plus 304	SAE 40	30	A,B,C
	TLX Plus 403	SAE 30	40	C
	TLX Plus 404	SAE 40	40	C
	TLX Plus 504	SAE 40	50	C
	TLX Plus 554	SAE 40	55	C
Cepsa	Troncoil 3040 PLUS	SAE 40	30	A,B,C
	Troncoil 4040 PLUS	SAE 40	40	C
	Troncoil 5040 PLUS	SAE 40	50	C
	Ertoil Koral 3040 SHF	SAE 40	30	A,B,C
	Ertoil Koral 4040 SHF	SAE 40	40	C
	Ertoil Koral 5040 SHF	SAE 40	50	C
Chevron (Texaco + Caltex + FAMM)	Taro 30 DP 30	SAE 30	30	A,B,C
	Taro 30 DP 40	SAE 40	30	A,B,C
	Taro 40 XL 40	SAE 40	40	C
	Taro 50 XL 40	SAE 40	50	C
	Delo 3000 Marine 30	SAE 30	30	A,B,C
	Delo 3000 Marine 40	SAE 40	30	A,B,C
	Delo 3400 Marine 30	SAE 30	40	C
	Delo 3400 Marine 40	SAE 40	40	C
	Delo 3550 Marine 40	SAE 40	55	C
Chinese Petroleum Corporation	Marilube Oil W 304	SAE 40	30	A,B,C
	Marilube Oil W 404	SAE 40	40	C
	Marilube Oil W 504	SAE 40	50	C



SUPPLIER	BRAND NAME	VISCOSITY	BN	FUEL CATEG.
ENI S.p.A.	Cladium 300 S SAE 30	SAE 30	30	A,B,C
	Cladium 300 S SAE 40	SAE 40	30	A,B,C
	Cladium 400 S SAE 30	SAE 30	40	C
	Cladium 400 S SAE 40	SAE 40	40	C
	Cladium 500 S SAE 30	SAE 30	50	C
	Cladium 500 S SAE 40	SAE 40	50	C
	Cladium 550 S SAE 30	SAE 30	55	C
	Cladium 550 S SAE 40	SAE 40	55	C
ExxonMobil	Exxmar 30 TP 30	SAE 30	30	A,B,C
	Exxmar 30 TP 40	SAE 40	30	A,B,C
	Exxmar 40 TP 30	SAE 30	40	C
	Exxmar 40 TP 40	SAE 40	40	C
	Exxmar 50 TP 40	SAE 40	50	C
	Mobilgard M 330	SAE 30	30	A,B,C
	Mobilgard M 340	SAE 30	40	C
	Mobilgard M 430	SAE 40	30	A,B,C
	Mobilgard M 440	SAE 40	40	C
	Mobilgard M50	SAE 40	50	C
FL Selenia S.p.A.	MAEO 4040	SAE 40	40	C
	MAEO 4050	SAE 40	50	C
Fuchs	Titan PSW 40 SAE 40	SAE 40	40	C
	Titan PSW 55 SAE 40	SAE 40	55	C
Indian Oil Corporation	Servo Marine 3030	SAE 30	30	A,B,C
	Servo Marine 3040	SAE 40	30	A,B,C
	Servo Marine 4030	SAE 30	40	C
	Servo Marine 4040	SAE 40	40	C
	Servo Marine 5040	SAE 40	50	C
	Servo Marine 5540	SAE 40	55	C
	Servo Marine K-3030	SAE 30	30	A,B,C
	Servo Marine K-3040	SAE 40	30	A,B,C
	Servo Marine K-4030	SAE 30	40	C
	Servo Marine K-4040	SAE 40	40	C
	Servo Marine K-5040	SAE 40	50	C
	Servo Marine K-5540	SAE 40	55	C
Morris Lubricants	Aquamor 130MD	SAE 40	30	A,B,C
	Aquamor 140MD	SAE 40	40	C
	Aquamor 150MD	SAE 40	50	C
Nippon Oil Corporation	Marine T303	SAE 30	30	A,B,C
	Marine T304	SAE 40	30	A,B,C
	Marine T404	SAE 40	40	C
	Marine T504	SAE 40	50	C



SUPPLIER	BRAND NAME	VISCOSITY	BN	FUEL CATEG.
Pertamina	Martron 430	SAE 40	30	A,B,C
	Martron 440	SAE 40	40	C
	Martron 450	SAE 40	50	C
	Salyx 430	SAE 40	30	A,B,C
	Salyx 440	SAE 40	40	C
	Salyx 450	SAE 40	50	C
Petrobras	Marbrax CCD-330	SAE 30	30	A,B,C
	Marbrax CCD-430	SAE 40	30	A,B,C
	Marbrax CCD-440	SAE 40	40	C
	Marbrax CCD-450	SAE 40	50	C
Petron	Petromar XC 3030	SAE 30	30	A,B,C
	Petromar XC 3040	SAE 40	30	A,B,C
	Petromar XC 4030	SAE 30	40	C
	Petromar XC 4040	SAE 40	40	C
	Petromar XC 5540	SAE 40	55	C
Repsol YPF	Neptuno W NT 4000 SAE 30	SAE 30	40	C
	Neptuno W NT 4000 SAE 40	SAE 40	40	C
	Neptuno W NT 5500 SAE 30	SAE 30	55	C
	Neptuno W NT 5500 SAE 40	SAE 40	55	C
Saudi Arabian Lubricating Oil Company (Petrolube)	Petromin Petropower 2-30	SAE 30	30	A,B,C
	Petromin Petropower 2-40	SAE 40	30	A,B,C
	Petromin Petropower 3-30	SAE 30	40	C
	Petromin Petropower 3-40	SAE 40	40	C
	Petromin Petropower 4-40	SAE 40	55	C
Shell	Argina T 30	SAE 30	30	A,B,C
	Argina T 40	SAE 40	30	A,B,C
	Argina X 40	SAE 40	40	C
	Argina XL 40	SAE 40	50	C
Total / Lubmarine	Aurelia XL 3030	SAE 30	30	A,B,C
	Aurelia XL 4030	SAE 40	30	A,B,C
	Aurelia XL 3040	SAE 30	40	C
	Aurelia XL 3055	SAE 30	55	C
	Aurelia XL 4040	SAE 40	40	C
	Aurelia XL 4055	SAE 40	55	C
	Aurelia TI 3030	SAE 30	30	A,B,C
	Aurelia TI 3040	SAE 30	40	C
	Aurelia TI 3055	SAE 30	55	C
	Aurelia TI 4030	SAE 40	30	A,B,C
	Aurelia TI 4040	SAE 40	40	C
	Aurelia TI 4055	SAE 40	55	C

**Table 3.**

Approved system oils - fuel categories A, B and C. Some lubricating oils with older type of detergent / dispersant chemistries are still available and are listed in Table 3. These brands are, however, likely to cause shorter service intervals.

LUBRICATING OILS WITH OLDER TYPE OF DETERGENT/DISPERSANT ADDITIVE CHEMISTRY				
SUPPLIER	BRAND NAME	VISCOSITY	BN	FUEL CATEG.
ADNOC-Fod	Marine Engine Oil X330	SAE 30	30	A,B,C
	Marine Engine Oil X430	SAE 40	30	A,B,C
ENI S.p.A.	Cladium 400 SAE 30	SAE 30	40	A,B,C
	Cladium 400 SAE 40	SAE 40	40	A,B,C
Neste	NST 30	SAE 30	30	A,B,C
	NST 40	SAE 40	30	A,B,C
Petrogal	GALP Marine MH 4040	SAE 40	40	A,B,C
Teboil	Ward L 30 T SAE 30	SAE 30	30	A,B,C
	Ward L 30 T SAE 40	SAE 40	30	A,B,C
	Ward L 40 T SAE 30	SAE 30	40	A,B,C
	Ward L 40 T SAE 40	SAE 40	40	A,B,C

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 ABB VTR-TURBOCHARGERS

SPECIAL LOW FRICTION SYNTHETIC OILS: CHANGE INTERVAL: 1500 hours (ABB's List 2b)				
MANUFACTURER	BRAND NAME	VISCOSITY cSt at 40 °C	VISCOSITY cSt at 100 °C	VI
Shell	Corena AP 68	68	8.5	94

SPECIAL LOW FRICTION SYNTHETIC OILS: CHANGE INTERVAL: 2500 hours (ABB's List 3b)				
MANUFACTURER	BRAND NAME	VISCOSITY cSt at 40 °C	VISCOSITY cSt at 100 °C	VI
BP	Enersyn TC-S 68	68	8.5	98
Chevron (Texaco + Caltex + FMM)	Cetus PAO 68	68	10.3	138
Castrol	Aircol SR 68	68	10.5	142
ENI S.p.A.	Dicrea SX 68	71.6	10.5	134
ExxonMobil	Compressor Oil RS 68	67	10	135
	Rarus SHC 1026	66.8	10.4	144
	SHC 626	69.9	10.9	147
Shell	Corena AS 68	67.8	10.1	145
Total / Lubmarine	Barelf SM 68	73.8	11.4	147



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 multi-grade oil (e.g. SAE 5W-40) to get a good control during start-up. Oil change interval: 2000 service hours.

LUBRICATING OILS FOR STARTING MOTOR

According to starting device manufacturer Gali International, S.A., the following lubricating oils are recommended to be used.

LUBRICATING OILS FOR GALI STARTING MOTOR, TYPE A25 (Normal ambient conditions)	
SUPPLIER	BRAND NAME
BP	Energol HLP-HH32
Chevron (Texaco + Caltex + FMM)	Rando HD 32
ExxonMobil	Mobil DTE 24 Esso Nuto H32
Klüber Lubrication	Lamora HLP 32 Klüberoil GEM 1-32
Shell	Tellus 32
Total / Lubmarine	Visga FP32

LUBRICATING OILS FOR GALI STARTING MOTOR, TYPE A25 (Cold / hot ambient conditions)	
SUPPLIER	BRAND NAME
Chevrons (Texaco + Caltex + FMM)	Rando HDZ 32
ExxonMobil	Mobil DTE 13M
Shell	Tellus T 32
Total / Lubmarine	Visga 32