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This Circular supersedes:
0199-99-2090/6



Lube oil for MWM diesel engines

The 7th exchange is made for the following reasons:

- Conversion of company name and corporate design

Scope of application:

This Technical Circular applies to the following medium and big engines engines:

D/TBD 234, TBD 616, TCD 2016, S/BAM 816, TBD 604, TBD 604B, TBD 620, TCD 2020, S/BVM 628, R/S/BVM 640, TBD 645

Please proceed analogously for engines no longer included in the build program. In case you need further clarification, please contact your nearest MWM Service.

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Enclosure 1 and 2, lube oil table

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Note:
The part numbers stated in this documentation are not subject to the modification service.
For identifying spare parts, the spare part documentation has to be referred to.

Copies to:
- TR
- According to SIT 7010



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Lube oil grade

For the engines of series D/TBD 234, TBD 616, TCD 2016, S/BAM 816, TBD 604, TBD 604B and TBD 620, TCD 2020 lube oils according to the existing specifications have been determined. In Enclosure 2, some reference oils are indicated, with which positive operating results have been achieved.

For the use in engines of series S/B/BVM 628, R/S/BVM 640 and TBD 645, Enclosure 1 comprises reference lube oils. Here, The assignment depends on the fuel type of the engine.

Lube oils not indicated but having the same capacity level as those mentioned in Enclosure 1 and 2 can be used upon agreement with the oil producer and – compulsory during the warranty period – with the approval of MWM.

The indicated lube oil grades are minimum requirements. Higher quality levels can be used.

The manufacturer is responsible for supplying lube oils of constant quality and with those additives which were the basis for the release.

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Engine series D/TBD 234, TBD 616, TCD 2016, S/BAM 816, TBD 604, TBD 604B, TBD 620, TCD 2020

The lube oils must at least meet the following lube oil specifications:

Engine			Lube oil specifications *2	
			ACEA	API
D/TBD 234			E2-96	CF
S/BAM 816			E3-96	CF-4
TBD 604			E4-99	CG-4
TBD 604B			E5-99	CH-4
TBD 616, TCD 2016	Engine speed higher 2100 min ⁻¹		Lube oil quality grade I	
	Engine speed max. 2100 min ⁻¹		Lube oil quality grade I	
TBD 620, TCD 2020				
Power group	Power range	eff. average pressure P _{me}		
Genset engines in cont. operation higher 4 000 oh/year	50 Hz: higher 100 kW/cyl.	higher 18,0 bar		Lube oil quality grade I
	60 Hz: higher 120 kW/cyl.	higher 18,0 bar		
Genset engines in peak load operation higher 1 000 oh/year	50 Hz: higher 110 kW/cyl.	higher 19,8 bar		
	60 Hz: higher 126 kW/cyl.	higher 19,0 bar		
Ship drive in rapid ferries and rapid commercial boats higher 3 000 oh/year	higher 124 kW/cyl., 1860 min ⁻¹	higher 18,0 bar		
	higher 120 kW/cyl., 1800 min ⁻¹	higher 18,0 bar		
	higher 110 kW/cyl., 1650 min ⁻¹	higher 18,0 bar		
Ship drive for non-commercial ships (official ships, yachts) higher 1 000 oh/year	higher 130 kW/cyl., 1860 min ⁻¹	higher 19,0 bar		
	higher 127 kW/cyl., 1800 min ⁻¹	higher 19,0 bar		
All other engines			Lube oil quality grade II	



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Lube oil quality grade	Lube oil specifications ^{*2}
I	ACEA E4-99
II	ACEA E3-96, E5-02 API CF-4, CG-4, CH-4

^{*2} It is sufficient, if one of the mentioned specifications is met.

Some reference lube oils of lube oil quality grades I and II can be taken from Enclosure 2.



In lube oil quality grade I, only fully or partly synthetic oils are permitted to be used.

Engine series S/BVM 628, R/S/BVM 640, TBD 645

For engines of series S/BVM 628, we recommend the use of fuels with a sulphur content of less than 0.2 % by weight to avoid the formation of glazing in the cylinder liners, preferably the use of lube oils of quality class API CG-4 or API CH-4.

For mixed fuels with sulphur contents higher 1.0%, we recommend for the first filling to use an oil with a TBN of 40 mg/KOH/g, for sulphur contents < 1.0%, a TBN of 30 mg/KOH/g.

To achieve the maximally possible economic operation, for refilling, an oil with lower or higher TBN is permitted to be used. The producers of mineral oil must be involved in this measure, who give their recommendations on the basis of regular analyses of the used oils. Moreover, the according limit values must be observed (see section "Engine series S/BVM 628, R/S/BVM 640, TBD 645").

According to our experience, when being refilled, the engine 645 rather needs an oil with a TBN of 40 mg/KOH/g, the engines 628 and 645, however, rather an oil with a TBN of 30 mg/KOH/g.

When using anti-corrosive oil (emergency genset), contact the parent company.

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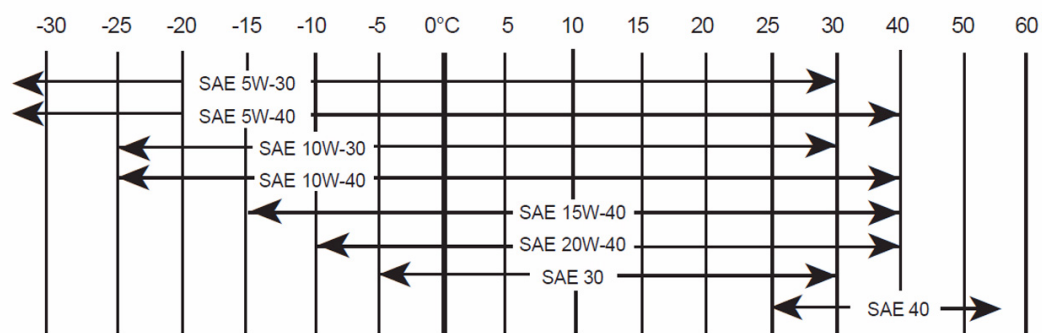
Lube oil viscosity

Selection of the lube oil viscosity shall be based on SAE-classification J 300 9/87 (Society of Automotive Engineers). Selection of the SAE-class does not give any indication of the oil grade.

Engine series D/TBD 234, TBD 616, TCD 2016, S/BAM 816, TBD 604, TBD 604B, TBD 620, TCD 2020

The ambient temperature is decisive for selection of the proper SAE-class. Multi-grade oils may be used for all-year application (summer and winter), e.g. SAE 15W-40.

Viscosity specification:



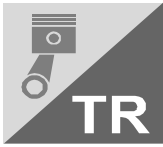
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Engine series S/BVM 628, R/S/BVM 640, TBD 645

Generally for these engines viscosity class SAE 40 is specified. All-temperature oils SAL 10W-40 or 15W-40 can also be used, provided these oils are indicated in the list of lube oils or are equivalent.

The BVM 628 engines in operation, which were previously operated with a lube oil viscosity of SAE 30 (previous version: oil cooler upstream of charge air cooler), may be operated with SAE 40 or SAE 10W-40 or SAE 15W-40 as from now on.



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Lube oil change intervals

The oil should be changed only with the engine warmed up to service temperature; the oil is then highly fluid and drains off much better.

Engine series D/TBD 234, TBD 616, TCD 2016, S/BAM 816, TBD 604, TBD 604B, TBD 620, TCD 2020

The first lube oil change after initial commissioning or re-commissioning following major repair work shall be effected after 50 running hours at the latest. Thereafter the following lube oil change intervals shall be adhered to:

Motor	Mounted centrifugal lube oil filter			
	without		with	
	Type of fuel			
	Distillate fuel	MDF mixed oil ISO 8217 DMB	Distillate fuel	MDF mixed oil ISO 8217 DMB
D 234	500 oh	250 oh		
TBD 234	250 oh	125 oh		
TBD 616, TCD 2016	250 oh	125 oh	500 oh	250 oh
S/BAM 816	250 oh		500 oh	
TBD 604/B	250 oh	125 oh	500 oh	250 oh
TBD 620, TCD 2020	250 oh	125 oh	500 oh	250 oh

Oil change once a year at a minimum.

The oil change interval may be extended depending on the engine operating mode and the lube oil grade. This must be determined by a series of used-oil analyses. The lube oil must be changed in any case if one of the following limit values is not reached or exceeded:

kinem. viscosity bei 100 °C (DIN 51 562)	
Lube oil SAE 30, SAE ... W - 30	min. 9,3 mm ² /s (cSt)
Lube oil SAE 40, SAE ... W - 40	min. 12,5 mm ² /s (cSt)
Viscosity increase	max. 25% of value when new
Flash point (DIN EN 22719)	min. 180°C
Total contamination (DIN 51365 = centrifuge)	max. 2.0% by mass
Water content (DIN 51777)	max. 0.2% by mass
Total base number (DIN ISO 3771)	min. 50% of value when new

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Engine series S/BVM 628, R/S/BVM 640, TBD 645

In the case of these engines, a lube oil change always takes place after a previous used oil analysis. Upon agreement with the mineral oil producer, the lube oil must be partly replaced or exchanged, if one of the limit values is exceeded or fallen below. For engines S/BVM 628 operated with distillate fuel (entire oil volume in the oil pan), we generally recommend a lube oil change after 5 000 oh, irrespective of the result of the used oil analysis.

If, upon operation with mixed fuel, the TBN-value should fall below the indicated minimum value, refilling is possible with a lube oil having a TBN-value of 40 mgKOH/g or 50 mgKOH/g (freshening up), see section "Engine series S/BVM 628, R/S/BVM 640, TBD 645".

Kinematic viscosity at 100°C (DIN 51 562)

Lube oil SAE 40 min. 12,5 mm²/s (cSt)

Viscosity increase max. 25 % of value when new

Flash point (DIN EN 22719) min. 180°C

Total contamination (DIN 51365 = centrifuge) max. 1,5 by mass %

Water content (DIN 51777) max. 0,2 by mass %

Total base number (DIN ISO 3771)

with distillate fuel min. 6 mgKOH/g

with mixed fuel with a sulphur content S max. 1% by wt. min. 12 mgKOH/g

with mixed fuel with a sulphur content S higher 1% by wt. min. 18 mgKOH/g

Used-oil analysis

The oil sample shall be representative of the entire oil filling and shall be taken in good time before the oil change becomes due (see operation manual). It is best to start a series of analyses during or shortly after commissioning so as to define a possible variation of the lube oil depending on the duration of engine operation.

The oil analysis must be made for engines S/BVM 628 and R/S/BVM 640 at least every 500 operating hours, for engines TBD 645 at least every 1000 operating hours.

The used-oil analysis can be carried out in the laboratories of the oil producers, institutes or at MWM.

The MWM test kit allows quick determination of the lube oil grade. This quick test permits a trend definition of the lube oil variation. The MWM test kit with part No. 1213 0382 is obtainable from your MWM SERVICE.



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Servicing of the engine-mounted lube oil filters

Lube oil filter servicing is to be carried out as follows (see also relevant operation manual):

D/TBD 234

Changing oil filter element 50 running hours after commissioning of new or overhauled engine, thereafter every 500 running hours, after 1 year at the latest.

TBD 616, TCD 2016

Changing oil filter element 50 running hours after commissioning of new or overhauled engine, thereafter every 500 running hours.

Cleaning centrifugal lube oil filter 50 running hours after commissioning of new or overhauled engine, thereafter every 250 running hours, after 1 year at the latest.

TBD 604, TBD 604B, TBD 620, TCD 2020

Cleaning strainer, Changing throw-away filter/element 50 running hours after commissioning of new or overhauled engine, thereafter every 500 running hours, at least after 1 year.

Cleaning centrifugal lube oil filter 50 running hours after commissioning of new or overhauled engine, thereafter every 250 running hours, at least after 1 year.

S/BAM 816

Cleaning strainer, Changing throw-away filter/element 50 running hours after commissioning of new or overhauled engine, thereafter every 500 running hours.

Cleaning centrifugal lube oil filter 50 running hours after commissioning of new or overhauled engine, thereafter every 250 running hours.

S/BVM 628

Lube oil filter combination:

- Operating edge-type filter daily
- Cleaning filter chamber alle 1 500 running hours
- Paper filter: Changing paper element 50 running hours after commissioning of new or overhauled engine, thereafter when the permissible differential pressure is exceeded, at the latest after every 3,000 running hours with distillate fuel oper. 1,500 running hours with intermediate fuel oper.

Cleaning the centrifugal lubricating oil filter 50 running hours after commissioning of new or overhauled engine, thereafter every 250 running hours.

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R/S/BVM 640, TBD 645

Cleaning the filter fillings (candles) 500 running hours after commissioning of new or overhauled engine, thereafter every 6000 running hours *.

* For engine BVM 640 in standby max. 300 op. hs./year after all 150 op. hs. at the latest 0,5 years.

The quoted service intervals are guide values. The service intervals may have to be reduced depending on the type of application and mode of operation of the engine.

Lube oil for seal oil system

For engines which are provided with a separate seal oil system (S/BVM 628, R/S/BVM 640) a lube oil with a low TBN should be used. Suitable lube oils may be taken from Enclosure 1. Lube oils conforming to comparable specifications not listed here are also permissible.


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Lube oil tables

For engines S/BVM 628, R/S/BVM 640, TBD 645

Lube oil table S/BVM 628, R/S/BVM 640, TBD 645
Enclosure 1 TR 0199 - 99 - 2090 7th Exchange 09/2002

Producer	Engine lube oil	
	Fuel type ^{*3} Distillate fuel and Mixed fuel (MDO; MDF) (Viscosity SAE 40 bzw. ...W-40)	TBN
Agip	Agip CLADIUM 120	12
Aral	Aral Turboral BM	15
BP	BP Energol HPDX 40	12
	BP Vanellus C3	10,5
Castrol	Castrol MHP 154	10,5
	Castrol CRD-DB 40	15,5
	Castrol Seamax Extra 40	10,6
Chevron	Delo 1000 MARINE 40	12
Texaco	Taro 16 XD 40	16
	Taro 16 XD 15W-40	16
ExxonMobil	ESSOLUBE XT 401 (SAE15W-40)	13,3
	EXXMAR CM Super 40	15
	Mobilgard ADL	16
	Mobilgard HSD	10,5
TOTALFINAELF	Antar Milantar MT	11
	Total Rubia TIR 4000	11
	Total Neptuna	11
	Fina Caprano TD	11
	Fina Disola M 4015	14
Fuchs Europe	Titan SDX	11
	Titan HD Superior	11
Shell	Shell Sirius FB 40	13
	Shell Gadinia AL 40	15

^{*3} Classification of the fuels as per TC 0199-99-2089

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Lube oil table S/BVM 628, R/S/BVM 640, TBD 645

Enclosure 1 TR 0199 - 99 - 2090 7th Exchange 09/2002

Producer	Engine lube oil	
	Fuel type ^{*3} Mixed fuel (Heavy fuel) (Viscosity SAE 40)	TBN
Agip	Agip CLADIUM 300	30
	Agip CLADIUM 400	40
BP	BP Energol IC-HFX 304	30
	BP Energol IC-HFX 404	40
	BP Energol IC-HFX 504	50
Castrol	CASTROL TLX 304	30
	CASTROL TLX 404	40
	CASTROL TLX 504	50
	CASTROL TLX 554	55
CEPSA	CEPSA Troncoil 3040 plus	30
	CEPSA Troncoil 4040 plus	40
	CEPSA Troncoil 5040 plus	50
Chevron Texaco	Delo 3000 MARINE 40	30
	Delo 3400 MARINE 40	40
	Taro 30 DP 40	30
	Taro 40 XL 40	40
	Taro 50 XL 40	50
ExxonMobil	EXXMAR 30 TP 40	30
	EXXMAR 40 TP 40	40
	Mobilgard 430	30
	Mobilgard M 430	30
	Mobilgard 440	40
	Mobilgard M 440	40
	Mobilgard 50 M	50
	Mobilgard M 50	50
	Mobilgard SP 55	55

^{*3} Classification of the fuels as per TC 0199-99-2089


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Lube oil table S/BVM 628, R/S/BVM 640, TBD 645
Enclosure 1 TR 0199 - 99 - 2090 7th Exchange 09/2002

Producer	Engine lube oil	
	Fuel type ^{*3} Mixed fuel (Heavy fuel) (Viscosity SAE 40)	TBN
TOTALFINAELF	Elf Aurelia 4030	30
	Elf Aurelia 4040	40
	Fina Aurelia 4030	30
	Fina Aurelia 4040	40
Fuchs Europe		
Repsol YPF	Repsol YPF Neptuno NT 3000	30
	Repsol YPF Neptuno NT 4000	40
Shell	Shell Argina T 40	30
	Shell Argina X 40	40

^{*3} Classification of the fuels as per TC 0199-99-2089

Lube oil table S/BVM 628, R/S/BVM 640, TBD 645
Enclosure 1 TR 0199 - 99 - 2090 7th Exchange 09/2002

Producer	Lube oil for seal oil system	
	(Viscosity SAE 30)	TBN
Agip	Agip ACER 100	--
	Agip CLADIUM 50	5
Aral		
BP	BP Energol OE - HT 30	6
Castrol	Castrol Marine CDX30	5
Chevron Texaco	VERITAS 800 MARINE 30	12
ExxonMobil	EXXMAR XA	6
	Mobilgard 300	6
TOTALFINAELF	FINA ALCANO 308	5
Fuchs Europe	Renolin MR 30	4
Shell	Shell Melina S 30	5

^{*3} Classification of the fuels as per TC 0199-99-2089

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For engines TBD 616, TCD 2016, TBD 620, TCD 2020

Lube oil table TBD 616, TCD 2016, TBD 620, TCD 2020

Enclosure 2 TR 0199 - 99 - 2090 7th Exchange 09/2002

Lube oil quality grade	Lube oil specifications ^{*4}	Recommended lube oils
I	ACEA E4-99	Shell Rimula Ultra ^{*5} Mobil Mobilgard 1 SHC ^{*5} Mobil Delvac 1 SHC
II	ACEA E3-96, E5-02 API CF-4, CG-4, CH-4	Shell Rimula Super Shell Sirius X BP Energol HPDX Mobil Delvac HP ChevronTexaco Ursa Super TD

^{*4} It is sufficient, if one of the indicated specifications is met.

^{*5} These oils are still being tested for engines TBD 616, TCD 2016. Contact parent company.



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