DEUTZ AG
Deutz-Mülheimer Straße 147-149
51057 Köln

Technical Circular

0199 - 99 - 2105 en

4th Exchange

Product :

DEUTZ Gas Engines

Date : 11.05.2001

This Circular supersedes TC :0199-99-2105/3 of 05.06.2000

TR

Copies to : 0080

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Note : The part numbers indicated in this document serve technical explanation purposes. Exclusively the spare parts documentation is binding for the definition of spare parts.

DEUTZ gas engines - Lube oil

The 4th exchange will be issued because of

- cancelation of lube oil group with sulfate ash content > 0,5% to ≤ 0.75 %
- TBN value min. 4.5 mgKOH/g for all gas engines
- definition of special gases
- updating of lube oil table
- supplementation of engine series 1015 GC

The technical advancement of DEUTZ gas engines featuring high efficiencies and low exhaust emissions requires special, particularly adapted lube oils with a low ash content. For use in DEUTZ gas engines we recommend **DEUTZ OIL TG-40 LA.** This oil is adapted to the needs of gas engines and has given excellent in-service results in heavy-duty engine operation. If this oil is not available, lube oils listed in enclosure 1 can be used alternatively. Gas engines operating on special gases (e.g. dumping grounds, sewage plants) with increased contaminations (limits referred to 100% CH4)

Chlorine (Cl)	>	30 mg/m^3
Fluorine (F)	>	15 mg/m^3
Total chlorine + fluorine (Cl+F)	>	30 mg/m^3
Sulfur (S)	>	300 mg/m^3

require specific lube oils according to enclosure 2.

For the time being, the 1015 GC engines may only be operated with natural gas.

Lube oil service life

The lube oil service life is dependent on:

- Gas quality
- Lube oil grade
- Ambient conditions
- Engine mode of operation

It is therefore necessary to determine for each engine plant the lube oil change intervals by used-oil analysis.

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With landfill gas, the 1st analysis should be carried out after 100 running hours and with the other types of gas after 300 running hours. Further analysis intervals and the required lube oil change should be agreed between operator and laboratory on the basis of the following limits.

Lube oil analysis limits						Type of gas *	Remarks Measuring method
Viscosity at 100°C	min. 12 mm^2/sec (cSt)					E, K, D, DG	DIN 51366, ASTM D 445 DIN EN ISO 3104
	max. <20% above new oil max. 18 mm^2/sec					E, K, D, DG	DIN 51366
Water content	max. 0,2%					E, K, D, DG	DIN 51777, ASTM D 1744
Flash point	min. 180°C					DG	DIN ISO 2592 DIN EN 22719
Total base number	> 40% of new oil min. 2,0 mgKOH/g					E, K, D, DG	ISO 3771
TAN	£ corresponding TBN					D	ASTM 664
SAN	0 mgKOH/g					E, K, D, DG	ASTM 664
i pH	³ 4,5					D	DEUTZ
Oxide 5,8 µm	20 A/cm					E, K	DIN 51 451
Nitr. 6,1 µm	20 A/cm					E, K	DIN 51 451
Wearing metals:		Engine 1015	(232/234) (816) 616	(604) (604B/C) 620	(440/441) (510) 632		DIN 51391 ASTM D 5185
Aluminium	max. mg/kg	20	10	10	5	E, K, D, DG	If 2 or more wearing metals exceed 10 mg/kg the following sampling interval should be halved. If the increased wear values are confirmed, please consult DEUTZ customer service.
Chromium	max. mg/kg	10	10	10	5	E, K, D, DG	
Copper	max. mg/kg	20	25	15	10	E, K, D, DG	
Iron	max. mg/kg	50	30	20	20	E, K, D, DG	
Lead	max. mg/kg	30	20	20	10	E, K, D, DG	
Tin	max. mg/kg	8	8	5	5	E, K, D, DG	
Silicium	max. mg/kg out of dust **	15	15	15	15	E, K, D, DG	DIN 51391, ASTM D 5185

* Type of gas: E = natural gas, K = sewage gas, D = landfill gas, DG = diesel gas.

** In the case of engines running on sewage and landfill gas, the oil load can also be caused by siloxanes. The wear elements must be carefully observed. Microfiltering may be required within the scope of the analysis for final clarification. Si limit is reached if wearing metals increase, max. 300 mg/kg.

Following 3 analysis series the analysis can be limited to the oil sample taken during the lube oil change, provided the operating conditions remain the same.

Lube oil change

The lube oil is changed after

- Analysis
- Coolant ingrees into the lube oil
- Servicing work of maintenance level E60 (see Operation Manual)
- Repair work exceeding the scope of maintenance level E50 (see Operation Manual)
- at least once per year

The lube oil change intervals shall be redetermined in case the mode of operation is changed, following servicing work E60 or repair work corresponding to E60.

The lube oil sample shall be taken

- with the engine running by means of quick coupler directly from the lube oil circuit, or

- directly after the engine has come to standstill from the oil pan.

Fill the cubic centimeters initially taken back into the engine. Therafter fill the clean test bottle.

Lube oil filter change

The lube oil filter cartridges shall be changed

- together with the first lube oil change,
- thereafter after every 1,500 to 3,000 operating hours (see maintenance chart in operation manual), after every 500 operating hours at gas engine 1015,
- at least once per year.

If water is analysed in the lube oil or SAN is measured in the lube oil or servicing work according to maintenance level E60 or repair work corresponding to E60 are carried out, the filter cartridges shall be changed during the next lube oil change.

DEUTZ AG
Service-Engineering

i.V. Sonntag
- Sonntag -

i.A. Asselborn
- Asselborn -

Enclosure: Lube Oil Tables

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Lube Oil Table
DEUTZ Gas Engine

Enclosure 1 to
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Lube oils for gas engines operating with all gases with low contaminations

Producer	Type of lube oil	Viscositäts-class SAE	Basis oil	Sulphate ash wight.%	Total base number (TBN) mgKOH/g	Viscosity at 40°C	Viscosity at 100°C
DEUTZ	**DEUTZ Öl TG-40 LA**	**40**	**Mineral**	**0,43**	**5,7**	**156,0**	**14,5**
Agip Deutschland	GEUM BG	40	Mineral	0,5	6,0	153,0	15,2
ARAL AG	Degasol LA	40	Mineral	0,48	4,5	137,0	13,7
BP AG	Energol IC-DG 40SX Energol IC-DG 40S Energas S Energas BG 3 Energas NG 5 Energas LD	40 40 15W-40 40 40 40	Mineral Mineral Synthetic Mineral Mineral Mineral	0,49 0,48 0,48 0,5 0,49 0,5	5,3 4,5 6,5 7,4 5,3 6,2	124,0 137,0 94,0 119,0 122,0 130,0	13,3 13,7 13,0 13,0 13,1 13,5
CEPSA	TRONCOIL GAS	40	Mineral	0,35	4,6	133,8	13,8
ESSO AG	ESTOR PC 40	40	Mineral	0,48	7,0	132,0	13,6
FUCHS DEA	FUCHS TITAN GM LA DEA Ectan LA 40	40 40	Mineral Mineral	0,43 0,43	5,7 5,7	156,0 156,0	14,5 14,5
Kuwait Petroleum	Q 8 Mahler MA	40	Mineral	0,5	5,5	141,2	13,9
Mobil Oil AG	Pegasus 1 Pegasus 605 Pegasus 705 Pegasus 805	15W-40 40 40 40	Synthetic Mineral Mineral Mineral	0,48 0,5 0,49 0,5	6,5 7,4 5,3 6,2	94,0 119,0 122,0 130,0	13,0 13,0 13,1 13,5
Petro-Canada	Sentinel 445	40	Hydro. Tr	0,4	4,7	127,0	13,2
Shell	Mysella LA	40	Mineral	0,45	5,0	138,0	13,8
TOTAL FINA ELF	ELF NATERIA MHW 40 ELF NATRIA MH 40 FINA GASMOTORENÖL 505	40 40 40	Mineral Mineral Mineral	0,35 0,45 0,48	4,6 5,2 5,5	133,8 139,0 155,0	13,8 13,9 15,1
TEXACO	GEOTEX LA GEOTEX PX	40 40	Mineral Mol. conv	0,45 0,5	5,5 5,4	129,4 88,0	13,3 13,2
VEBA OEL	Expertec GM-T5 Movara GM-T5	40 40	Synthetic Mineral	0,4 0,48	6,3 4,5	171,3 137,0	13,8 13,7

Lube Oil Table
DEUTZ Gas Engine

Enclosure 2 to
TR 0199-99-2105 en
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Lube oils for gas engines operating with gases with high contaminations

Producer	Type of lube oil	Viscositäts-class SAE	Basis oil	Sulphate ash wight.%	Total base number (TBN) mgKOH/g	Viscosity	
						at 40°C	at 100°C
BP AG	Energas BG 11	40	Mineral	0,96	9,5	131,0	13,5
Mobil	Pegasus 610	40	Mineral	0,96	9,5	131,0	13,5