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This circular replaces:
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Specification for lube oil

Valid for: **TCG 2016, TCG 3016, TCG 2020, TCG 3020, TCG 2032, TCG 2032B**

The 28th replacement was made due to:

- Revision
  - Chapter Lube oil analysis
  - Chapter Lube oil change, Section Lube oil change
  - Chapter Limits, table during operation
  - Chapter Interpretation of parameters of the lube oil analysis, Section i-pH
- Update of the approved lube oils

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Note:
There is no revision service for the parts numbers specified in this document. Only the spare parts documentation is binding for the identification of spare parts.

Copies to:
- TR
- According to SIT 7010

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Contents:

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General information

Risk of destruction of components

From non-approved lube oils

- Only use approved lube oils

The owner is solely responsible for observing the lube oil specification described.

The operator must be able to demonstrate their maintenance obligation by analyzing the lube oils in accordance with this lube oil specification.

The engine manufacturer accepts no liability for damage caused by the use of non-approved lube oils or by improper operation.

Lube oils for combustion engines are exposed to extreme mechanical and thermal stress. The lube oil should not evaporate at the high temperatures of the cylinder liners but should form a sufficiently tenacious, pressure-stable, well adhesive lube film. It should be thin enough in the cold state to enable starting of the cold engine. The sliding surfaces of the engine components should remain wet for restarting the engine when the engine is shut down.

The lube oils must generally have the following properties:

- stable lube film at all operating temperatures
- optimal viscosity at all operating temperatures
- high thermal stability
- high resistance to aging
- wear-preventing properties
- neutralizing properties against corrosive materials
- balanced ratio of ash-forming active ingredients
- high safety reserves for long lube oil change intervals

Economic operation is achieved by as long a lube oil change interval of the lube oil filling as possible. The emphasis is always on the avoidance of damage and achievement of the expected service lives of important engine components.

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Lube oil selection

Lube oils (sulfate ash content up to 0.6 wt. %)

The lube oils listed in the section **Approved lube oils (sulfate ash content up to 0.6 wt. %)** must be used for operating gas engines.

Lube oils (sulfate ash content 0.6 - 1.0 wt. %)

Other lube oils are approved specially for operation with fuel gases with a higher pollution load (see also Technical Bulletin (TR) 3017). These are listed in the section **Approved lube oils (sulfate ash content 0.6 - 1.0 wt. %)**.

According to the manufacturer's data sheet, these lube oils are recognizable by their high TBN and sulfate ash values and have a higher neutralization reserve against acids which are produced by the burning of pollutants in the fuel gas. These acids are produced, for example, from chlorine (Cl), fluoride (F) and sulfur (S). The neutralization of the acids protects the engine from corrosion.

Larger amounts of lube oil additives are necessary to ensure neutralization. However, this means the higher the neutralization potential of a lube oil, the higher the tendency for deposits to form during combustion.

If such lube oils are used in fuel gases which exhibit no continuously high pollutant loads (in accordance with the values permitted in Technical Bulletin (TR) 3017), the additives are not consumed because no, or only small amounts, of acids are produced which have to be neutralized.

Here, the advantages of these special lube oils become clear disadvantages.

- The unused additives form deposits in the combustion chamber and in the following system parts such as exhaust gas heat exchanger, silencer etc.
- These deposits can bond with elements in the fuel gas, e.g. silicon (Si), in the combustion chamber. These compounds are very hard and lead to abrasive wear on pistons, piston rings, cylinder liners, valves and valve seat rings.

We therefore recommend operating all engines with lube oils according to section **Approved lube oils (sulfate ash content up to 0.6%)** until a stable fuel gas generation has been achieved. During this time, the boundary conditions and effects of the used fuel gas on economical and reliable operation of the engine must be determined by lube oil and gas analyses.

If, at the end of the system start-up process, the concentration of pollutants in the fuel gas remains continuously high and no economical lube oil change intervals are reached as a result, it is possible to convert to lube oils in accordance with section **Approved lube oils (sulfate ash content 0.6 - 1.0 wt. %)** in agreement with the service partner responsible.

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Lube oil sampling

Careful preparation and execution of the lube oil sampling is a prerequisite for useful analysis values.

Ensure that the lube oil sample is not falsified by dirt or lube oil residue in the additives.

About 100 ml of lube oil is sufficient for a routine analysis.

The lube oil sample must be taken from the lube oil circuit whilst the engine is running and warm.

For further information on lube oil sampling, see

- Genset Operating Manual ⇒ Job cards
  - B 8-1-1 Sampling the lube oil

At least 100 ml of lube oil must be drained and properly disposed of before taking the sample. Then the necessary amount of lube oil for the lube oil sample must be taken.

Changes in the lube oil due to sampling and transport are to be avoided.

The samples must be clearly identified and the following minimum information contained:

- Operator
- Engine type
- Engine serial number
- Lube oil manufacturer
- Lube oil designation
- Sampling date
- Engine operating hours
- Lube oil operating hours
- Filling amount / lube oil consumption
- Total lube oil volume

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Lube oil analysis

The operator must guarantee that the analysis values necessary for choosing the lube oil change intervals are available on schedule.

The analysis lube must be presented to the operator as quickly as possible (maximum half of the lube oil analysis interval).

Perform the first lube oil analysis independently of the combustion gas quality after 100 operating hours. Subsequent lube oil analyses must be performed every 1,000 operating hours as a minimum.

A detailed lube oil analysis must ensure that the engine is operated with lube oil according to the specification in this technical bulletin. Lube oil analysis reports must be kept to provide proof of this proper operation of the engine.

In case of abnormal wear values within an analysis series, the analysis must be submitted to the service partner responsible for engines still under guarantee.

The trend analysis is most suitable for monitoring the analysis values over a longer period of time. The individual analysis values are recorded in tables or graphs in this case. This allows an assessment of the condition of the lube oil and engine (trend detection).

If you need any help in your search for an accredited lube oil laboratory, contact your service partner.

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Lube oil change

Lube oil change

The entire amount of lube oil must be replaced when performing a lube oil change. The remaining lube oil volume in the engine and add-on parts should be kept as low as possible.

The lube oil change is necessary when one of the following criteria is satisfied:

- when nearing the permissible limit value
- after coolant has entered the lube oil system
- after maintenance work according to the maintenance and service schedule E60 and E70
- after E60 or E70 service work
- at least once a year

Lube oil change intervals

In addition to the lube oil quality, the lube oil change intervals are dependent on:

- the fuel gas quality
- the ambient conditions
- the operating principle of the engine

As a rule, these influences lead to a change in the lube oil parameters.

It is therefore necessary to determine the lube oil change intervals by lube oil analyses for every system.

By selecting suitable time intervals for the lube oil analyses, the lube oil can be used until the limit values have been reached.

The lube oil change intervals must always be re-determined:

- when commissioning the system
- when changing the type of operation
- after maintenance work according to the maintenance and service schedule E60 and E70
- after E60 or E70 service work

Under unchanged operating conditions, the further lube oil analysis intervals and the necessary lube oil change must be agreed between the operator and the responsible service partner on the basis of this technical bulletin.

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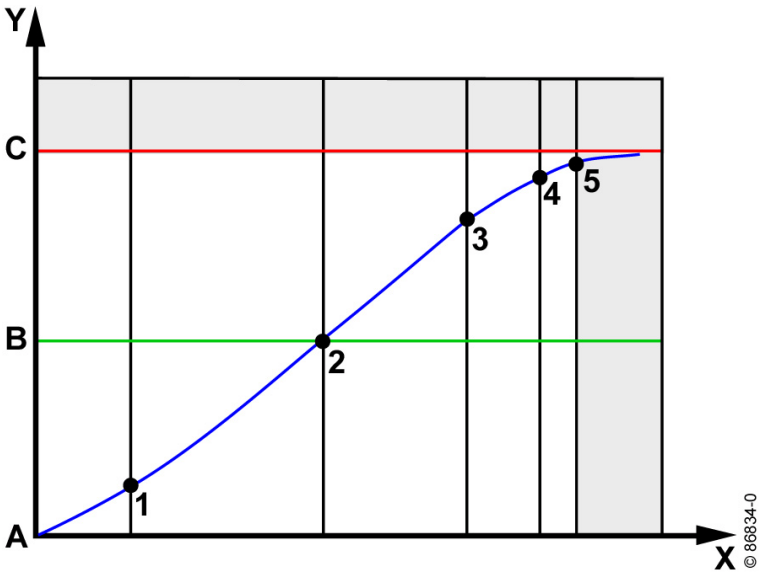
The lube oil change intervals must be determined as follows:

Example 1:



A 1

X axis:	Time interval
Y axis:	Numeric value of analysis result
A:	Initial value
B:	Half of limit value
C:	Limit value
Positions 1-5:	Time of lube oil analysis
Position 5:	Time of next lube oil change

- First lube oil filling
  - If the analysis values (position 1) are well below half the permissible limit values (B), the time interval before the next lube oil analysis (position 2) can be doubled.
  - If individual analysis values reach half the permissible limit value (B), the time interval before the next analysis (position 3) must be reduced.

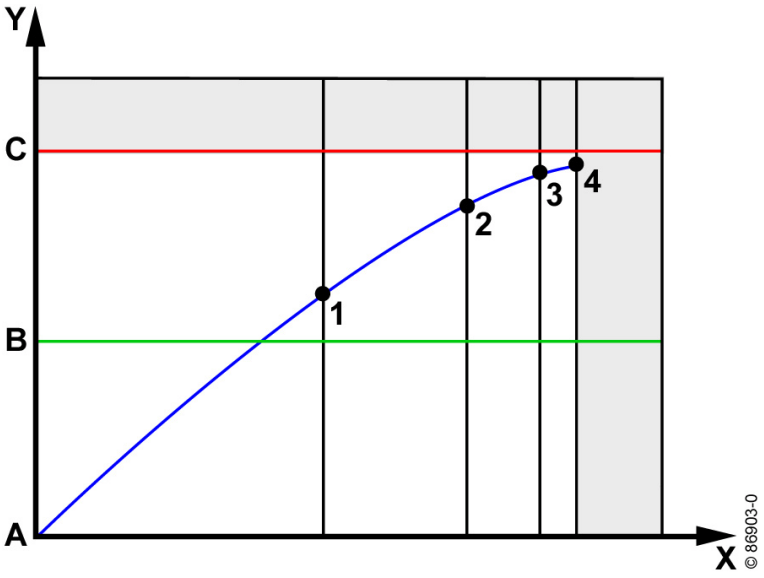
On approaching the permitted limit value (C), the time intervals from analysis to analysis (positions 4 and 5) must be halved respectively.

- Second and further lube oil fillings
  - After the initial determination of the lube oil change interval, the first lube oil analysis can be taken after a longer interval (position 3) for the second lube oil filling.

- Another lube oil analysis (position 4) is taken if comparable analysis results with the first lube oil filling are obtained.
- If, on the other hand, the same analysis values are reached, the same lube oil change interval as in the first lube oil filling can be determined.
- In case of unchanged operating conditions, the lube oil analyses for the following lube oil fillings can be taken at the same interval (position 4).

If the analysis results deviate from the previous results, the lube oil change intervals must be re-determined until repeatable results are achieved.

Example 2:



A 2

X axis:	Time interval
Y axis:	Numeric value of analysis result
A:	Initial value
B:	Half of limit value
C:	Limit value
Positions 1-4:	Time of lube oil analysis
Position 4:	Time of next lube oil change

- If the analysis values of the first lube oil sample are already close to the permitted limit values (position 1), the operating time until the next lube oil analysis must be reduced (position 2).
- If it is confirmed that the limit values are almost being reached, the last analysis period (position 3 to 4) must be halved.

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Lube oil change intervals for TCG 2016 without increased lube oil volume

Due to the time delay between taking the lube oil sample and the availability of the analysis results (due to mailing and processing times), the procedure that has already been described can only be applied to a limited extent for TCG 2016 without increased lube oil volume.

To prevent limit values from being exceeded in all cases during the analysis period, the following procedure must be applied:

- After 100 oh
  - First lube oil sample
- At 250 oh
  - Second lube oil sample, then renew lube oil

Depending on the results of the lube oil sampling, the change time can now be gradually increased by 50 operating hours for future intervals, if the limit values have not yet been exceeded at the point of the respective change time.

Analogous to this, the change interval must be shortened if the limit values are exceeded.

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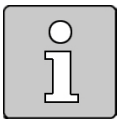
Lube oil filter change

All lube oil filters must always be replaced when performing a lube oil filter change.

The lube oil filter change is necessary:

- after 4000 operating hours at the latest - unless otherwise indicated in the maintenance plan
- at the first lube oil change after commissioning
- at the first lube oil change after maintenance work according to maintenance and service schedule E60 and E70, or after E60 or E70 repair work
- at least once a year
- if a SAN has been detected in the lube oil - see limit values
- after coolant has entered the lube oil system



After coolant has entered the lube oil system, all filter elements in the crankcase breather and the sub-stream lube oil filter (TCG 2032, TCG 2032B) must be replaced.

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Limit values

Risk of destruction of components

Due to failure to comply with the limit values

- If one of the following limit values is not complied with, the lube oil must be changed immediately.

During operation

Properties	Limit value	Test method
Increase in viscosity in comparison with the new condition at 100 °C	max. 3 mm^2/s (cSt)	
Viscosity at 100 °C	min. 12 mm^2/s (cSt) max. 18 mm^2/s (cSt)	DIN 51366, ASTM D445, DIN EN ISO 3104
Water content	max. 0.2 %	DIN 51777, ASTM D6304
Glycol content	max. 500 ppm	DIN 51375, ASTM D4291
Total base number TBN	min. 3.0 mg KOH/g	ISO 3771, DIN 51639, ASTM D2896
AN	not greater than the TBN	ASTM 664
SAN[1)]	max. 0.2 mg KOH/g	ASTM 664
i-pH-value	min. 4.5	ASTM D7946
Oxidation[2)]	max. 20 A/cm max. 25 UFM	DIN 51453 ASTM D7414
Nitration	max. 20 A/cm	DIN 51453
Silicon	max. 300 mg/kg	DIN 51399, ASTM D5185

[1)] The determination of the SAN is only necessary for Low gas quality fuel gases.

[2)] Cannot be consulted for used oil assessment with fully synthetic ester-based lube oil.

If a wear metal exceeds its permissible limit value, then the limit value for silicon decreases to max. 15 mg/kg (DIN 51399, ASTM D5185)

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When decommissioning

When decommissioning, the acidity of the lube oil can cause damage to parts carrying lube oil when not in use. The acidity is characterized by the alkaline reserve (TBN, Total Base Number) and the pH value.

To avoid damage when not in use, the values must not fall below the following limit values.

Properties	Limit value	Test method
Total base number TBN	min. 3.5 mg KOH/g	ISO 3771, ASTM D4739
i-pH-value	min. 5.0	ASTM D7946

If the analysis values are above the values indicated, the lube oil can remain in the genset during the shutdown phase and be used when recommissioning.

If measured values from the lube oil analysis fall below the limit values indicated above, the lube oil must be replaced.

Afterwards, the genset must be operated for at least 12 hours.

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Wear metals

The wear metals data provides an aid for engine assessment. In this way, changes in the engine conditions can be detected at an early stage.

For analysis, the temporal concentration progression of every individual wear metal must be monitored over several lube oil analyses (trend analyses).

The wear rate of every individual value, rather than its absolute value, is the decisive factor in this case.

If a wear metal exceeds 50 % of the analysis value listed below, the sampling time intervals must be halved.

If the increased wear values are confirmed, the responsible service partner must be consulted.

All measurements must be performed according to DIN 51396 (ICP OES / RFA).

Example:

Wear rates calculation

$$v_v = (c_1 - c_2) / (t_1 - t_2)$$

v_v = wear rate

c_1 = new concentration

c_2 = old concentration

t_1 = new operating hours

t_2 = old operating hours

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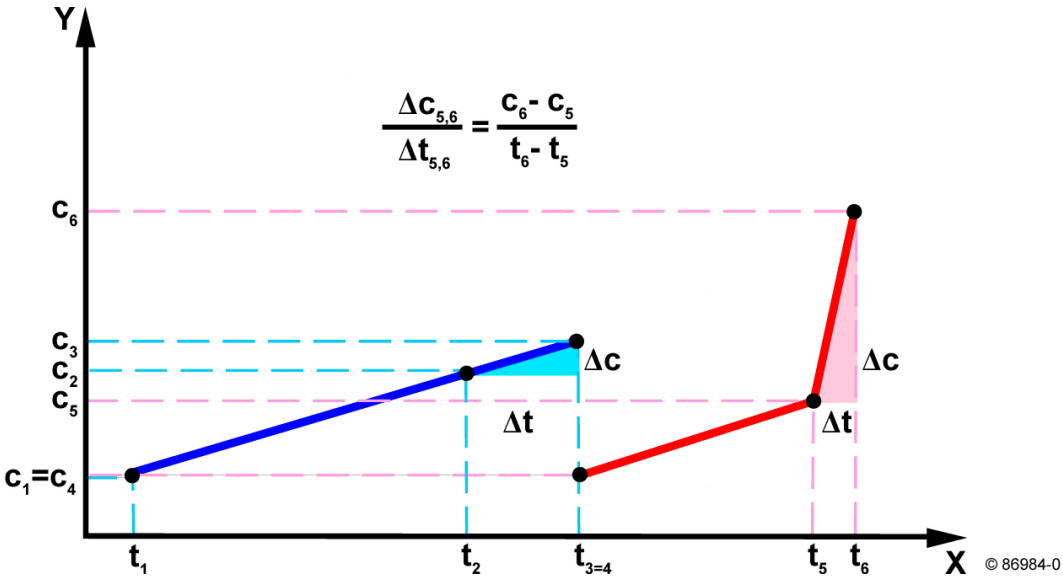
Six lube oil samples were analyzed for an engine. The lube oil was changed after the 3rd lube oil analysis $t_{3=4}$. From the penultimate lube oil analysis t_5 to the last t_6, the wear metal concentration c_6 increases considerably faster than expected from earlier lube oil analyses.

Since the last rate of increase (delta $c_{5.6}$ / delta $t_{5.6}$) is above 50 % of the limit value, the time interval up to the next lube oil analysis must be halved.



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X axis:	Time interval
Y axis:	Numeric value of analysis result
$t_{3=4}$	Time of lube oil change
$c_1=c_4$	Concentration in the new lube oil

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Limit values for wear rate

TCG 2016	
Aluminum	max. 1.0 mg/kg per 100 oh
Chrome	max. 0.5 mg/kg per 100 oh
Copper	max. 2.5 mg/kg per 100 oh
Iron	max. 3.0 mg/kg per 100 oh
Lead	max. 2.0 mg/kg per 100 oh
Tin	max. 1.0 mg/kg per 100 oh
TCG 3016	
Aluminum	max. 0.5 mg/kg per 100 oh
Chrome	max. 0.3 mg/kg per 100 oh
Copper	max. 1.0 mg/kg per 100 oh
Iron	max. 1.0 mg/kg per 100 oh
Lead	max. 1.0 mg/kg per 100 oh
Tin	max. 0.5 mg/kg per 100 oh
TCG 2020	
Aluminum	max. 1.0 mg/kg per 100 oh
Chrome	max. 0.5 mg/kg per 100 oh
Copper	max. 1.5 mg/kg per 100 oh
Iron	max. 2.0 mg/kg per 100 oh
Lead	max. 2.0 mg/kg per 100 oh
Tin	max. 0.5 mg/kg per 100 oh
TCG 3020	
Aluminum	max. 0.5 mg/kg per 100 oh
Chrome	max. 0.3 mg/kg per 100 oh
Copper	max. 1.0 mg/kg per 100 oh
Iron	max. 1.0 mg/kg per 100 oh
Lead	max. 1.0 mg/kg per 100 oh
Tin	max. 0.3 mg/kg per 100 oh
TCG 2032 / TCG 2032B	
Aluminum	max. 0.5 mg/kg per 100 oh
Chrome	max. 0.5 mg/kg per 100 oh
Copper	max. 1.0 mg/kg per 100 oh
Iron	max. 2.0 mg/kg per 100 oh
Lead	max. 1.0 mg/kg per 100 oh
Tin	max. 0.5 mg/kg per 100 oh

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Conversion table		
1 mg/kg	1 ppm	0.0001 %
10 mg/kg	10 ppm	0.001 %
100 mg/kg	100 ppm	0.01 %
1000 mg/kg	1000 ppm	0.1 %
10000 mg/kg	10000 ppm	1.0 %

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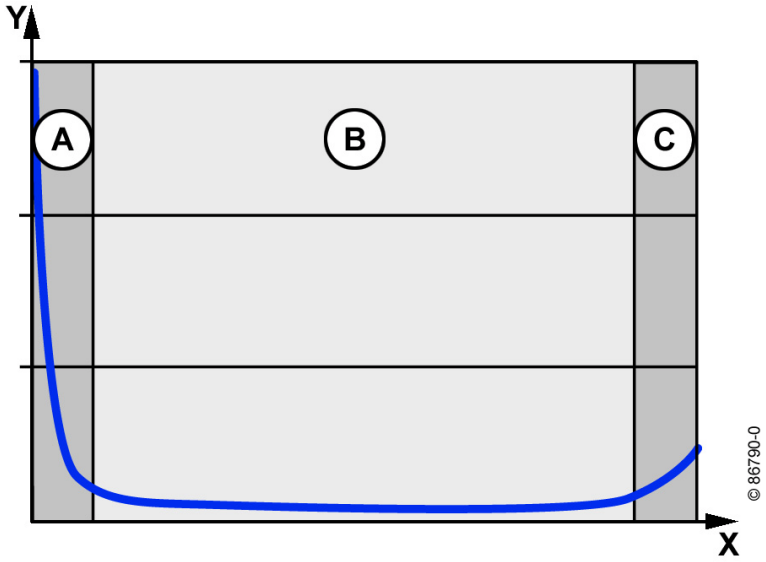
Lube oil consumption

The specific lube oil consumption is regarded as the quantity of lube oil which is consumed per time unit at a certain power. This does not include oil losses caused by leaks, and also excludes planned oil changes as per the maintenance schedule.

The lube oil consumption is determined over a longer period in the same type of operation during continuous operation.

The lube oil consumption drops after the first operating hours (run-in time). Then it should remain constantly low for a longer period. The wear in the engine increases with a very long runtime and with it the lube oil consumption.



A 4

X axis:	Runtime
Y axis:	Lube oil consumption
Range A:	Run-in time
Range B:	Operating period
Range C:	Period of rising lube oil consumption due to increasing material wear

Caterpillar Energy Solutions GmbH specifies the lube oil consumption at full load in units of grams per kWh [g/kWh] in the technical data sheets. It refers to the respective genset-specific rated power. The lube oil consumption can differ within a model series because of different components with different rated power or a different type of gas.

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The consumption values apply exclusively with strict adherence to the following technical framework conditions:

- The value only applies as the mean consumption value between the completed run-in phase and maintenance levels E60/E70
- Mean engine load between E70 maintenance levels ≥ 85 % (in accordance with display in the engine controller)
- Minimum run time between starts:

TCG 2016	≥ 8 operating hours (load ≥ 85 %)
TCG 3016	≥ 8 operating hours (load ≥ 85 %)
TCG 2020	≥ 8 operating hours (load ≥ 85 %)
TCG 3020	≥ 8 operating hours (load ≥ 85 %)
TCG 2032	≥ 24 operating hours (load ≥ 85 %)
TCG 2032B	≥ 24 operating hours (load ≥ 85 %)

- The specific lube oil consumption increases with systems which are started frequently or are operated at low power. This is described in the section entitled "Mean lube oil consumption with partial load". For example, this applies with gensets in flexible operation
- Oil consumption measurement is only permitted on run-in engines (> 1,000 operating hours)
- The entire operating time between two oil change intervals is regarded as the time interval for performing an oil consumption measurement
- Correct regular maintenance in accordance with the maintenance and inspection schedules
- Exclusive use of original parts
- Gensets which are installed in accordance with the Application and Installation Guides

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Mean lube oil consumption at full load:

The lube oil consumption specifications can be found in the order-specific data sheet.

Mean lube oil consumption with partial load:

The specific lube oil consumption increases during partial load. Since the power gensets are operated at a constant speed and the cylinder pressure drops at the same time, a power-related greater quantity of lube oil is transported into the combustion chamber via the piston rings and the valve shaft seals.

The specific oil consumption at partial load can be determined with sufficient accuracy using the following formula:

Spec. oil consumption = ((2 * spec. oil consumption at full load)) / ((100 % + partial load in %))

Example:

Spec. oil consumption at 50 % = (2 * 0.2 g/kWh) / (1 + 0.5) = 0.266 g/kWh

Since the lube oil consumption can be shown differently, reference is made to other specification options in the following in order to provide comparability:

- Specification in g.kWh, but relating to mechanical power or power at the flywheel (so-called "brake" power. In English it is also referred to as the Brake Specific Oil Consumption, "BSOC"). Whereas the specification of the lube oil consumption includes electrical secondary consumers such as generators or genset components in the order-specific data sheet, with this specification these additional loads for the engine are ignored, whereby the lube oil may be shown as less that it would be in practice
- Specified in g/h. In order to provide comparability, a conversion via the power per time interval must take place
- Maximum lube oil consumption. This value applies as a value which must not be exceeded, unlike the usual mean lube oil consumption, which does not take short-term spikes caused by changes to the load collective into consideration, for example

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Interpretation of parameters of the lube oil analysis

Viscosity

Unit: mm^2/s

The viscosity indicates the flow capacity of the lube oil (resistance to shift of two adjacent layers, inner friction). The viscosity is temperature-dependent.

The viscosity is increased by:

- Ageing/oxidation
- Soot/solid foreign bodies
- Evaporation of components with a low boiling point

Total Base Number (TBN)

Unit: mgKOH/g

The TBN indicates the alkaline reserve of the lube oil and characterizes the chemical neutralization capacity.

This is a necessary property of the lube oil to check the corrosive wear.

With the use of the lube oil, the alkaline reserve is reduced due to a reaction with acids. The acids are ultimately products of the reaction caused by the combustion process as well as ageing/oil oxidation and nitration.

During operation with acid-forming fuel gases (especially landfill, sewage and biogases), a fast reduction of the TBN is to be expected.

Acid Number (AN, formerly TAN) or Neutralization Number (Nz)

Unit: mgKOH/g

The method covers the strong and weak acids. The strong acids are recorded separately as Strong Acid Number (SAN). Lube oil ingredients influence the value of the AN which may be between 0.5 and 2 mgKOH/g in new lube oils.

Oxidation and nitration processes can produce weak organic acids. These are only partially neutralized by the alkaline properties of the lube oil. If the lube oil has a sufficient alkaline reserve, the AN only records the weak organic acids.

There is a rough correlation between AN rise, lube oil ageing and lube oil nitration.

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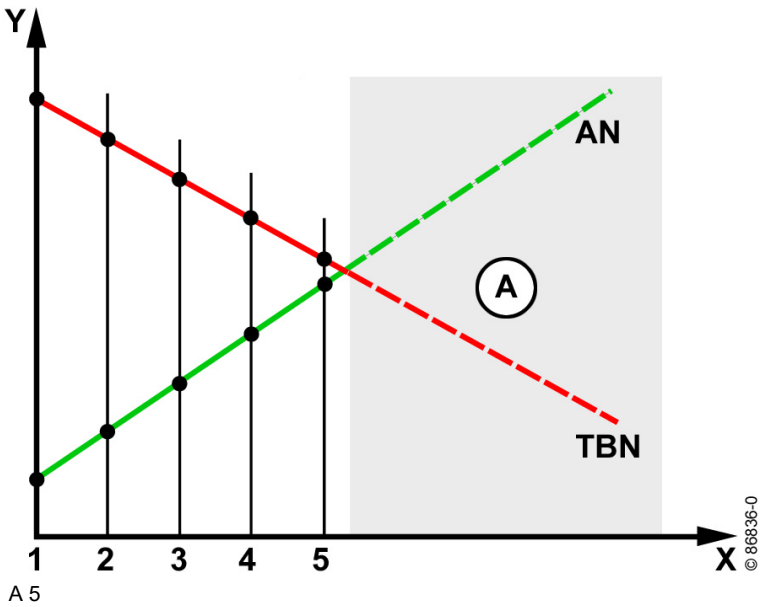
Explanation of the relation between TBN and AN

The TBN falls whilst the AN rises. Since, according to the limit value list, the AN must always be smaller than the TBN, no engine operation is permitted in range A.



A 5

X axis:	Runtime
Y axis:	Numeric value of analysis result
Range A:	Impermissible operating period
Positions 1-5:	Time of lube oil analysis
Position 5:	Time of next lube oil change

Strong Acid Number (SAN)

Unit: mgKOH/g

The method only covers strong acids (e.g. sulfuric acid). If a SAN is proven, there is a risk of corrosion. The determination of the SAN is only necessary for fuel gases of the Low gas quality.

Ageing/oxidation

Unit: A/cm

Ageing/oxidation is caused by a reaction of the basic oil and ingredient molecules with oxygen which leads to an increase in the viscosity and the Acid Number. Component smearing and sludge deposits can occur. The oxidation products can form organic acids which lead to corrosion even when the lube oil still has alkaline reserves.

The extinction at wave number 1710 cm^{-1} in the infrared light spectrum is measured whereby the carbonyl compounds formed in the oxidation are recorded.

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Nitration

Unit: A/cm

Nitration is caused by reactions of the basic oil and ingredient molecules with nitrogen oxides. The influences are comparable with those of ageing/oxidation. They lead to changes in the lube oil parameters. However, the risk of corrosive products caused by reactions is higher in comparison. In the case of strong nitration, the alkaline reserve usually also decreases significantly.

The extinction at the wave factor cm^{-1} in the infrared light spectrum is measured.

i-pH

Unit: none

The method serves to determine the pH value of the lube oil. The measurement result is specified in dimensionless pH value units. Over-acidification of the lube oil leads to corrosive wear. The i-pH-value was developed to detect the presence of strong acids in lube oils even at extremely low concentrations. It serves as an early warning value.

Water

Unit: wt.%

Water in the lube oil generally leads to an emulsion which leads on the whole to increased wear and corrosion risk.

Water increases the viscosity of the lube oil.

Possible causes:

- Leaks in the coolant system
- Condensation processes in the lube oil system due to frequent starts and emergency stops
- Improper storage of the lube oil
- Insufficient ventilation of the crankcase or lube oil tank
- Penetration of rain water into the exhaust system

Glycol

Unit: ppm

Glycol leads to formation of sludge and filter blockage due to a reaction with the lube oil ingredients.

Glycol is incompatible with mineral oil.

Possible causes:

- Leaks in the coolant system
- Contamination with a lube oil based on polyglycol

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Interpretation of elements of the lube oil analysis

Silicon

Unit: mg/kg

Possible origin:

- Component in antifoaming ingredients
- Dust from suction intake air
  - Leads to abrasive wear even in the smallest of amounts.
- Compounds of fuel gases (e.g. landfill, sewage and biogases)
  - The silicon load in the lube oil also gives an indirect indication of the silicon load of the fuel gas.

Sodium

Unit: mg/kg

Typical element of ingredients for corrosion protection in the coolant. Strong increase in the sodium content is a sign of contaminated coolant. The engine must be checked continuously for possible coolant leaks in the course of further operation.

In many cases no water can be found in the lube oil despite high sodium values and the associated contamination because it evaporates due to the lube oil temperature during engine operation.

Aluminum

Unit: mg/kg

Typical wear element of pistons and slide bearings, for example.

Aluminum may also be a part of contaminated suction intake air under certain circumstances.

Iron

Unit: mg/kg

Typical wear element of cylinder liners, cams/tappets, shaft journals, piston rings and toothed wheels.

Chrome

Unit: mg/kg

Typical wear element of piston rings, valve stems, cams/tappets and other high alloyed engine components.

Copper

Unit: mg/kg

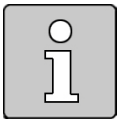
Typical wear element of bearings and corrosion product of lube oil coolers and lube oil lines.

Copper is also part of different mounting compounds.

Lead

Unit: mg/kg

Typical wear element of slide bearings and solder from lube oil coolers and lube oil lines.



The cause of a rapid change in the wear rate for lead and copper is frequently chemically corrosive wear (note limit value for i-pH-value).

Tin

Unit: mg/kg

Typical wear element of slide bearings.

Molybdenum

Unit: mg/kg

May be part of lube oil ingredients as well as different mounting compounds.

Also used as a running surface coating for sliding bearings.

Interpretation of optionally analyzed elements of the lube oil analysis

Potassium and boron

Unit: mg/kg

Typical elements of ingredients for corrosion protection in the coolant. An increase in the lube oil is a sign of a contamination by coolant.

However, boron is a typical element of frequently used ingredients in the lube oil.

Calcium, zinc, phosphorus, sulfur

Unit: mg/kg

Typical elements of ingredients in the lube oil.

Sulfur is also a part of the lube oil and fuel gases.

2105/28 EN

Service Information

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This is a translation of the German original. All translations are based on the German original.

Approved lube oils

Valid for: TCG 2016

Recommended lube oils with a sulfate ash content of up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MWM						
Premium GMO 240[1)]	Mineral	0,55	5,2	40	122,0	13,3
Premium GMO 440[1)]	Synthetic	0,42	5,4	40	127,0	13,5

[1)] Not available in all countries, please contact your MWM service partner

Lube oils with a sulfate ash content up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra LA	Mineral	0,50	6,5	40	137,0	14,5
NG 40	Mineral	0,54	5,6	40	122,5	13,8
Eco Gas 4000 XD	Mineral	0,62	7,3	40	116,5	13,3
ALCO						
Eurotec Accelera GEO SAE 40	Mineral	0,50	5,5	40	108,0	13,7
ARAL AG	Mineral					
Degasol NGL	Mineral	0,45	5,1	40	130,0	13,5
Atlantic	Mineral					
Low Ash Gas Engine Oil SAE 40	Mineral	0,50	5,4	40	104,0	13,5
AVIA						
Gasmotorenöl LA 40	Mineral	0,50	6,5	40	136,0	14,5
Gasmotorenöl LA-XT 40	Mineral	0,54	5,6	40	123,0	13,8
Gasmotorenöl LA-Plus 40	Mineral	0,62	7,3	40	116,5	13,3
AZTEC OILS						
AZTEC Emprotec GEO NBG-L 40	Mineral	0,50	5,7	40	130,0	15,0
AZTEC Emprotec GEO BLG-L 40[1)]	Mineral	0,56	4,7	40	129,0	15,0

[1)] Recommended for use with sewage gas, landfill gas and other biogases

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
BAYWA						
Tectrol Methaflexx NG	Mineral	0,45	5,5	40	156,0	14,5
Tectrol MethaFlexx NG Plus	Mineral	0,50	5,9	40	141,5	14,9
Tectrol MethaFlexx NG Pro	Mineral	0,50	5,5	40	120,7	13,7
Tectrol MethaFlexx SG Pro	Mineral	0,50	4,9	40	116,0	13,2
BP AG						
BP Energas NGL	Mineral	0,45	5,1	40	130,0	13,5
CASTROL						
Duratec L	Mineral	0,45	5,1	40	130,0	13,5
Duratec HPL	Mineral	0,45	5,1	40	121,0	13,0
Duratec XPL	Synthetic	0,45	4,9	20W-40	109,0	14,0
Caterpillar						
NGEO Advanced 40	Mineral	0,50	6,0	40	115,0	13,0
NGEO Ultra 40	Mineral	0,54	6,0	40	125,0	13,0
NGEO Special Application[1)]	Mineral	0,60	5,3	40	137,5	15,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CEPSA						
Troncoil Gas	Mineral	0,46	5,2	40	144,8	14,5
Troncoil Gas LD40	Mineral	0,50	4,6	40	133,1	14,0
Troncoil Biogas Low Ash[1)]	Mineral	0,55	4,5	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CHEVRON / CALTEX / TEXACO						
Geotex PX 40	Mineral	0,50	5,4	40	88,0	13,2
HDAX 5200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 6500 LFG[1)]	Mineral	0,55	4,5	40	121,0	13,5
HDAX 9200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 9300 SAE 40	Mineral	0,70	6,2	40	116,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
DeOliebron						
Tor Geo GB/LF 40	Mineral	0,57	4,5	40	124,4	13,6
ENGEN						
GEO N-40	Mineral	0,50	5,5	40	125,8	14,0
ENI						
Autol ELA 40	Mineral	0,50	5,5	40	138,0	14,0
GEUM NG	Mineral	0,50	5,5	40	124,0	13,6
ENOC						
Khaura LA 40	Mineral	0,50	5,4	40	119,3	13,6

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
EXOL						
Taurus GEO G240	Mineral	0,49	5,5	40	126,0	13,8
Taurus LFG 240	Mineral	0,58	4,5	40	118,0	13,2
FUCHS						
Titan Ganymet LA	Mineral	0,45	5,5	40	156,0	14,5
Titan Ganymet Plus LA	Mineral	0,50	6,6	40	142,1	15,1
Titan Ganymet Pro LA	Mineral	0,50	5,5	40	120,7	13,7
Titan Ganymet Pro MA[1)]	Mineral	0,56	4,7	40	117,2	13,4
Titan Ganymet Pro 4000	Mineral	0,62	4,8	40	113,9	12,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GALP						
Galp GNX 4005	Mineral	0,50	5,4	40	88,0	13,2
Power Gas NGB 40	Mineral	0,50	5,5	40	122,0	13,5
Power Gas SG 40[1)]	Mineral	0,56	4,7	40	125,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GAZPROMNEFT						
G-Profi PSN 40	Mineral	0,49	5,5	40	125,8	14,0
GULF OIL						
Gulfco LA Supreme	Mineral	0,50	5,4	40	124,0	14,4
HESSOL						
Gasmotorenöl Low Ash	Mineral	0,50	6,5	40	137,0	14,5
Gasmotorenöl SAE 40 LA Pro	Mineral	0,54	5,6	40	122,5	13,8
HILL Corporation LLC						
Fastroil Gas Engine Oil SAE40	Mineral	0,50	5,3	40	128,5	13,5
I.G.A.T.						
Platin Cogeneration Oil SAE 40	Mineral	0,50	5,4	40	124,0	13,6
INDIAN OIL CORPORATION						
Servo NGE 40	Mineral	0,50	5,3	40	125,0	13,5
JX Nippon						
Gas Engine Oil M40 (M)	Mineral	0,50	4,7	40	101,9	13,8
KUWAIT PETROLEUM - Q8						
Mahler MA	Mineral	0,50	5,5	40	138,0	14,0
Mahler G4	Mineral	0,40	5,5	40	120,0	13,3
Mahler G5	Mineral	0,50	6,0	40	120,0	13,3
Mahler GR5	Mineral	0,50	6,0	40	88,7	13,2
LUBES SCHMIERSTOFFE						
TIGROL GEO EXTRA 40	Mineral	0,57	4,5	40	124,4	13,3

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
LUKOIL						
Efforse XDI 4004	Mineral	0,48	5,1	40	121,0	13,6
MABANOL						
Neon LAX 40	Mineral	0,50	5,0	40	123,0	13,6
MOBIL						
Pegasus 605[1)]	Mineral	0,52	7,1	40	126,0	13,3
Pegesus 605 Ultra[1)]	Mineral	0,60	5,3	40	137,5	15,0
Pegasus 805	Mineral	0,54	6,2	40	130,0	13,5
Pegasus 805 Ultra	Mineral	0,50	6,2	40	129,0	13,8
Pegasus 1005	Mineral	0,50	5,0	40	125,0	13,0
Pegasus 1107	Mineral	0,65	6,7	40	106,0	13,1
Pegasus 1	Synthetic	0,51	6,5	15W-40	93,8	13,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOL						
GMO Energy 40	Mineral	0,50	5,4	40	123,4	13,6
MORRIS LUBRICANTS						
GEO Ultra 40	Mineral	0,50	5,5	40	121,1	13,7
GEO Ultra LZ 40[1)]	Mineral	0,50	6,9	40	113,8	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOTOREX						
Evolube NG SAE40	Mineral	0,50	5,5	40	125,0	13,9
MOTUL						
GASMA	Mineral	0,50	5,5	40	126,0	13,6
GASMA SP SAE 40	Mineral	0,65	4,6	40	114,2	12,9
CRESSIDA[1)]	Mineral	0,50	4,5	40	126,0	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
NILS						
Burian Light	Mineral	0,50	6,5	40	136,0	14,5
NIS						
Nisotec GEO NBG	Mineral	0,50	5,4	40	120,5	13,5
NORTH SEA LUBRICANTS						
Tidal Power LA 40	Mineral	0,49	6,0	40	144,0	14,5
OILFINO						
Famagas LA 40	Mineral	0,48	5,6	40	147,0	14,3
Linogas LA 40	Mineral	0,49	5,2	40	123,0	13,6
ORI-TECH						
Gas Engine Oil 40 C	Mineral	0,49	5,5	40	119,8	14,0

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ORLEN OIL						
Delgas L 40	Mineral	0,50	5,4	40	126,0	13,9
PAZ Lubricants & Chemicals						
PAZ NG 40	Mineral	0,50	5,5	40	120,0	13,9
PETRO CANADA						
Sentron LD 3000	Mineral	0,47	3,9	40	124,0	13,7
Sentron LD 5000	Mineral	0,57	4,8	40	124,0	13,4
Sentron LD 8000	Mineral	0,52	4,6	40	120,6	13,3
Sentron CG40 Plus[1)]	Mineral	0,52	4,5	40	119,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PETRONAS						
GEO NG	Mineral	0,48	5,4	40	121,8	13,5
GEO BLG[1)]	Mineral	0,50	4,5	40	119,3	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PT. PERTAMINA LUBRICANTS						
NG Lube SAE40	Mineral	0,53	5,1	40	120,0	13,6
NG Lube HSG SAE40[1)]	Mineral	0,50	4,7	40	118,9	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PHILLIPS 66						
El Mar LA4 GEO 40	Mineral	0,50	5,5	40	128,0	13,9
REPSOL						
Extra Gas 40	Mineral	0,50	6,0	40	133,0	13,5
Super Motor Gas 4005	Mineral	0,50	6,4	40	129,0	13,0
Long Life Gas 4005	Mineral	0,50	5,1	40	118,0	13,2
ROLOIL						
Mogas 40	Mineral	0,50	5,5	40	138,0	14,0
Mogas G4	Mineral	0,40	5,5	40	120,0	13,3
Mogas G5	Mineral	0,50	6,0	40	120,0	13,3
Mogas XNG	Mineral	0,50	5,5	40	122,2	13,5
ROWE						
Hightec Powerplant SAE40	Mineral	0,50	5,4	40	124,0	13,6
SASOL						
Gas Engine Oil LA 40	Mineral	0,50	5,5	40	127,0	14,0

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
SHELL						
Mysella S3 N	Mineral	0,45	5,0	40	139,0	14,0
Mysella S5 N	Mineral	0,48	4,5	40	125,0	13,7
Mysella S5 S[1)]	Mineral	0,57	5,3	40	135,0	13,5
Mysella S6 N	Mineral	0,69	5,6	40	118,0	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SINOPEC						
GS200-L	Mineral	0,50	5,5	40	116,8	13,1
GS200[1)]	Mineral	0,49	6,1	40	119,2	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SRS						
Mihagrun LA 40	Mineral	0,48	5,6	40	147,0	14,3
Mihagrun LAX 40	Mineral	0,50	5,0	40	123,0	13,6
Mihagrun X 40[1)]	Mineral	0,55	4,8	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SYNLUBE						
GEO LD40	Mineral	0,50	5,5	40	135,5	14,0
TOTAL						
Nateria MH 40	Mineral	0,43	5,5	40	142,2	14,8
Nateria MP 40	Mineral	0,50	4,6	40	133,1	14,0
Nateria MX 40	Mineral	0,51	7,2	40	122,5	13,9
VALVOLINE						
GEO SNG-4	Mineral	0,50	4,7	40	121,0	13,6
GEO SLF 40[1)]	Mineral	0,50	6,2	40	112,8	12,9
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
WIPA CHEMICALS INTERNATIONAL						
Ecosyn GE 4004	Synthetic	0,40	5,5	40	135,0	13,7
Ecosyn GE 4006[1)]	Synthetic	0,60	7,5	40	156,0	13,9
Ecosyn GE C104	Synthetic	0,40	5,5	40	135,0	13,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
77 LUBRICANTS						
Gas Engine Oil LA 40	Mineral	0,49	6,0	40	144,0	14,5

Lube oils with a sulfate ash content of 0.6 to 1.0 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra Plus	Mineral	0,85	9,8	40	133,0	14,2
AVIA						
Gasmotorenöl HA 40	Mineral	0,85	9,8	40	133,0	14,2
BAYWA						
Tectrol Methaflexx HC Premium	Mineral	0,70	8,2	40	105,0	14,4
Tectrol Methaflexx HC Plus	Mineral	0,80	9,2	40	132,0	14,5
Tectrol Methaflexx GE-M	Mineral	0,90	7,9	40	141,2	14,1
Tectrol Methaflexx D Plus	Mineral	0,98	10,6	40	137,0	15,0
CASTROL						
Duratec M	Mineral	0,72	7,5	40	125,0	13,0
CHEVRON / CALTEX / TEXACO						
Geotex LF 40	Mineral	0,99	8,0	40	138,0	14,0
ENI						
Autol BGJ 40	Mineral	0,90	7,9	40	141,2	14,1
FUCHS						
Titan Ganymet Plus	Mineral	0,80	9,2	40	132,0	14,5
Titan Ganymet Ultra	Mineral	0,70	8,2	40	105,0	13,4
GALP						
Power Gas SG Plus 40[1)]	Mineral	0,83	7,3	40	116,7	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
HESSOL						
Gasmotorenöl SAE40	Mineral	0,85	9,8	40	133,0	14,2
KLONDIKE						
SAE40 Mid Ash Long-Life Sour Gas Engine Oil	Mineral	0,90	7,9	40	141,2	14,1
KUWAIT PETROLEUM - Q8						
Mahler HA	Mineral	0,90	7,9	40	141,2	14,1
Mahler G8	Mineral	0,80	8,0	40	120,0	13,3
Mahler GR8	Mineral	0,80	8,0	40	88,2	13,1
MOBIL						
Pegasus 610 Ultra	Mineral	1,00	11,3	40	113,8	12,9
NILS						
Burian SAE 40	Mineral	0,85	9,8	40	133,0	14,2

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
PETRO CANADA						
Sentron CG40	Mineral	0,92	8,5	40	128,0	13,3
PHI OIL						
Gas Engine Oil MA 40	Mineral	0,91	9,8	40	133,0	14,2
ROLOIL						
Mogas 40 AC	Mineral	0,90	7,9	40	141,2	14,1
Mogas G8	Mineral	0,80	8,0	40	120,0	13,3
Mogas GR8	Mineral	0,90	8,5	40	88,2	13,1
TOTAL						
Nateria MJ 40	Mineral	0,82	8,8	40	148,0	15,1

Approved lube oils

Valid for: TCG 2020

Recommended lube oils with a sulfate ash content of up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MWM						
Premium GMO 240[1)]	Mineral	0,55	5,2	40	122,0	13,3
Premium GMO 440[1)]	Synthetic	0,42	5,4	40	127,0	13,5

[1)] Not available in all countries, please contact your MWM service partner

Lube oils with a sulfate ash content up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra LA	Mineral	0,50	6,5	40	137,0	14,5
NG 40	Mineral	0,54	5,6	40	122,5	13,8
Eco Gas 4000 XD	Mineral	0,62	7,3	40	116,5	13,3
ALCO						
Eurotec Accelera GEO SAE 40	Mineral	0,50	5,5	40	108,0	13,7
ARAL AG	Mineral					
Degasol NGL	Mineral	0,45	5,1	40	130,0	13,5
Atlantic	Mineral					
Low Ash Gas Engine Oil SAE 40	Mineral	0,50	5,4	40	104,0	13,5
AVIA						
Gasmotorenöl LA 40	Mineral	0,50	6,5	40	136,0	14,5
Gasmotorenöl LA-XT 40	Mineral	0,54	5,6	40	123,0	13,8
Gasmotorenöl LA-Plus 40	Mineral	0,62	7,3	40	116,5	13,3
AZTEC OILS						
AZTEC Emprotec GEO NBG-L 40	Mineral	0,50	5,7	40	130,0	15,0
AZTEC Emprotec GEO BLG-L 40[1)]	Mineral	0,56	4,7	40	129,0	15,0

[1)] Recommended for use with sewage gas, landfill gas and other biogases

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
BAYWA						
Tectrol Methaflexx NG	Mineral	0,45	5,5	40	156,0	14,5
Tectrol MethaFlexx NG Plus	Mineral	0,50	5,9	40	141,5	14,9
Tectrol MethaFlexx NG Pro	Mineral	0,50	5,5	40	120,7	13,7
Tectrol MethaFlexx SG Pro	Mineral	0,50	4,9	40	116,0	13,2
BP AG						
BP Energas NGL	Mineral	0,45	5,1	40	130,0	13,5
CASTROL						
Duratec L	Mineral	0,45	5,1	40	130,0	13,5
Duratec HPL	Mineral	0,45	5,1	40	121,0	13,0
Duratec XPL	Synthetic	0,45	4,9	20W-40	109,0	14,0
Caterpillar						
NGEO Advanced 40	Mineral	0,50	6,0	40	115,0	13,0
NGEO Ultra 40	Mineral	0,54	6,0	40	125,0	13,0
NGEO Special Application[1)]	Mineral	0,60	5,3	40	137,5	15,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CEPSA						
Troncoil Gas	Mineral	0,46	5,2	40	144,8	14,5
Troncoil Gas LD40	Mineral	0,50	4,6	40	133,1	14,0
Troncoil Biogas Low Ash[1)]	Mineral	0,55	4,5	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CHEVRON / CALTEX / TEXACO						
Geotex PX 40	Mineral	0,50	5,4	40	88,0	13,2
HDAX 5200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 6500 LFG[1)]	Mineral	0,55	4,5	40	121,0	13,5
HDAX 9200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 9300 SAE 40	Mineral	0,70	6,2	40	116,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
DeOliebron						
Tor Geo GB/LF 40	Mineral	0,57	4,5	40	124,4	13,6
ENGEN						
GEO N-40	Mineral	0,50	5,5	40	125,8	14,0
ENI						
Autol ELA 40	Mineral	0,50	5,5	40	138,0	14,0
GEUM NG	Mineral	0,50	5,5	40	124,0	13,6
ENOC						
Khaura LA 40	Mineral	0,50	5,4	40	119,3	13,6

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
EXOL						
Taurus GEO G240	Mineral	0,49	5,5	40	126,0	13,8
Taurus LFG 240	Mineral	0,58	4,5	40	118,0	13,2
FUCHS						
Titan Ganymet LA	Mineral	0,45	5,5	40	156,0	14,5
Titan Ganymet Plus LA	Mineral	0,50	6,6	40	142,1	15,1
Titan Ganymet Pro LA	Mineral	0,50	5,5	40	120,7	13,7
Titan Ganymet Pro MA[1)]	Mineral	0,56	4,7	40	117,2	13,4
Titan Ganymet Pro 4000	Mineral	0,62	4,8	40	113,9	12,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GALP						
Galp GNX 4005	Mineral	0,50	5,4	40	88,0	13,2
Power Gas NGB 40	Mineral	0,50	5,5	40	122,0	13,5
Power Gas SG 40[1)]	Mineral	0,56	4,7	40	125,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GAZPROMNEFT						
G-Profi PSN 40	Mineral	0,49	5,5	40	125,8	14,0
GULF OIL						
Gulfco LA Supreme	Mineral	0,50	5,4	40	124,0	14,4
HESSOL						
Gasmotorenöl Low Ash	Mineral	0,50	6,5	40	137,0	14,5
Gasmotorenöl SAE 40 LA Pro	Mineral	0,54	5,6	40	122,5	13,8
HILL Corporation LLC						
Fastroil Gas Engine Oil SAE40	Mineral	0,50	5,3	40	128,5	13,5
I.G.A.T.						
Platin Cogeneration Oil SAE 40	Mineral	0,50	5,4	40	124,0	13,6
INDIAN OIL CORPORATION						
Servo NGE 40	Mineral	0,50	5,3	40	125,0	13,5
JX Nippon						
Gas Engine Oil M40 (M)	Mineral	0,50	4,7	40	101,9	13,8
KUWAIT PETROLEUM - Q8						
Mahler MA	Mineral	0,50	5,5	40	138,0	14,0
Mahler G4	Mineral	0,40	5,5	40	120,0	13,3
Mahler G5	Mineral	0,50	6,0	40	120,0	13,3
Mahler GR5	Mineral	0,50	6,0	40	88,7	13,2
LUBES SCHMIERSTOFFE						
TIGROL GEO EXTRA 40	Mineral	0,57	4,5	40	124,4	13,3

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
LUKOIL						
Efforse XDI 4004	Mineral	0,48	5,1	40	121,0	13,6
MABANOL						
Neon LAX 40	Mineral	0,50	5,0	40	123,0	13,6
MOBIL						
Pegasus 605[1)]	Mineral	0,52	7,1	40	126,0	13,3
Pegesus 605 Ultra[1)]	Mineral	0,60	5,3	40	137,5	15,0
Pegasus 805	Mineral	0,54	6,2	40	130,0	13,5
Pegasus 805 Ultra	Mineral	0,50	6,2	40	129,0	13,8
Pegasus 1005	Mineral	0,50	5,0	40	125,0	13,0
Pegasus 1107	Mineral	0,65	6,7	40	106,0	13,1
Pegasus 1	Synthetic	0,51	6,5	15W-40	93,8	13,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOL						
GMO Energy 40	Mineral	0,50	5,4	40	123,4	13,6
MORRIS LUBRICANTS						
GEO Ultra 40	Mineral	0,50	5,5	40	121,1	13,7
GEO Ultra LZ 40[1)]	Mineral	0,50	6,9	40	113,8	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOTOREX						
Evolube NG SAE40	Mineral	0,50	5,5	40	125,0	13,9
MOTUL						
GASMA	Mineral	0,50	5,5	40	126,0	13,6
GASMA SP SAE 40	Mineral	0,65	4,6	40	114,2	12,9
CRESSIDA[1)]	Mineral	0,50	4,5	40	126,0	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
NILS						
Burian Light	Mineral	0,50	6,5	40	136,0	14,5
NIS						
Nisotec GEO NBG	Mineral	0,50	5,4	40	120,5	13,5
NORTH SEA LUBRICANTS						
Tidal Power LA 40	Mineral	0,49	6,0	40	144,0	14,5
OILFINO						
Famagas LA 40	Mineral	0,48	5,6	40	147,0	14,3
Linogas LA 40	Mineral	0,49	5,2	40	123,0	13,6
ORI-TECH						
Gas Engine Oil 40 C	Mineral	0,49	5,5	40	119,8	14,0

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ORLEN OIL						
Delgas L 40	Mineral	0,50	5,4	40	126,0	13,9
PAZ Lubricants & Chemicals						
PAZ NG 40	Mineral	0,50	5,5	40	120,0	13,9
PETRO CANADA						
Sentron LD 3000	Mineral	0,47	3,9	40	124,0	13,7
Sentron LD 5000	Mineral	0,57	4,8	40	124,0	13,4
Sentron LD 8000	Mineral	0,52	4,6	40	120,6	13,3
Sentron CG40 Plus[1)]	Mineral	0,52	4,5	40	119,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PETRONAS						
GEO NG	Mineral	0,48	5,4	40	121,8	13,5
GEO BLG[1)]	Mineral	0,50	4,5	40	119,3	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PT. PERTAMINA LUBRICANTS						
NG Lube SAE40	Mineral	0,53	5,1	40	120,0	13,6
NG Lube HSG SAE40[1)]	Mineral	0,50	4,7	40	118,9	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PHILLIPS 66						
El Mar LA4 GEO 40	Mineral	0,50	5,5	40	128,0	13,9
REPSOL						
Extra Gas 40	Mineral	0,50	6,0	40	133,0	13,5
Super Motor Gas 4005	Mineral	0,50	6,4	40	129,0	13,0
Long Life Gas 4005	Mineral	0,50	5,1	40	118,0	13,2
ROLOIL						
Mogas 40	Mineral	0,50	5,5	40	138,0	14,0
Mogas G4	Mineral	0,40	5,5	40	120,0	13,3
Mogas G5	Mineral	0,50	6,0	40	120,0	13,3
Mogas XNG	Mineral	0,50	5,5	40	122,2	13,5
ROWE						
Hightec Powerplant SAE40	Mineral	0,50	5,4	40	124,0	13,6
SASOL						
Gas Engine Oil LA 40	Mineral	0,50	5,5	40	127,0	14,0

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
SHELL						
Mysella S3 N	Mineral	0,45	5,0	40	139,0	14,0
Mysella S5 N	Mineral	0,48	4,5	40	125,0	13,7
Mysella S5 S[1)]	Mineral	0,57	5,3	40	135,0	13,5
Mysella S6 N	Mineral	0,69	5,6	40	118,0	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SINOPEC						
GS200-L	Mineral	0,50	5,5	40	116,8	13,1
GS200[1)]	Mineral	0,49	6,1	40	119,2	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SRS						
Mihagrun LA 40	Mineral	0,48	5,6	40	147,0	14,3
Mihagrun LAX 40	Mineral	0,50	5,0	40	123,0	13,6
Mihagrun X 40[1)]	Mineral	0,55	4,8	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SYNLUBE						
GEO LD40	Mineral	0,50	5,5	40	135,5	14,0
TOTAL						
Nateria MH 40	Mineral	0,43	5,5	40	142,2	14,8
Nateria MP 40	Mineral	0,50	4,6	40	133,1	14,0
Nateria MX 40	Mineral	0,51	7,2	40	122,5	13,9
VALVOLINE						
GEO SNG-4	Mineral	0,50	4,7	40	121,0	13,6
GEO SLF 40[1)]	Mineral	0,50	6,2	40	112,8	12,9
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
WIPA CHEMICALS INTERNATIONAL						
Ecosyn GE 4004	Synthetic	0,40	5,5	40	135,0	13,7
Ecosyn GE 4006[1)]	Synthetic	0,60	7,5	40	156,0	13,9
Ecosyn GE C104	Synthetic	0,40	5,5	40	135,0	13,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
77 LUBRICANTS						
Gas Engine Oil LA 40	Mineral	0,49	6,0	40	144,0	14,5

Lube oils with a sulfate ash content of 0.6 to 1.0 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra Plus	Mineral	0,85	9,8	40	133,0	14,2
AVIA						
Gasmotorenöl HA 40	Mineral	0,85	9,8	40	133,0	14,2
BAYWA						
Tectrol Methaflexx HC Premium	Mineral	0,70	8,2	40	105,0	14,4
Tectrol Methaflexx HC Plus	Mineral	0,80	9,2	40	132,0	14,5
Tectrol Methaflexx GE-M	Mineral	0,90	7,9	40	141,2	14,1
Tectrol Methaflexx D Plus	Mineral	0,98	10,6	40	137,0	15,0
CASTROL						
Duratec M	Mineral	0,72	7,5	40	125,0	13,0
CHEVRON / CALTEX / TEXACO						
Geotex LF 40	Mineral	0,99	8,0	40	138,0	14,0
ENI						
Autol BGJ 40	Mineral	0,90	7,9	40	141,2	14,1
FUCHS						
Titan Ganymet Plus	Mineral	0,80	9,2	40	132,0	14,5
Titan Ganymet Ultra	Mineral	0,70	8,2	40	105,0	13,4
GALP						
Power Gas SG Plus 40[1)]	Mineral	0,83	7,3	40	116,7	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
HESSOL						
Gasmotorenöl SAE40	Mineral	0,85	9,8	40	133,0	14,2
KLONDIKE						
SAE40 Mid Ash Long-Life Sour Gas Engine Oil	Mineral	0,90	7,9	40	141,2	14,1
KUWAIT PETROLEUM - Q8						
Mahler HA	Mineral	0,90	7,9	40	141,2	14,1
Mahler G8	Mineral	0,80	8,0	40	120,0	13,3
Mahler GR8	Mineral	0,80	8,0	40	88,2	13,1
MOBIL						
Pegasus 610 Ultra	Mineral	1,00	11,3	40	113,8	12,9
NILS						
Burian SAE 40	Mineral	0,85	9,8	40	133,0	14,2

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
PETRO CANADA						
Sentron CG40	Mineral	0,92	8,5	40	128,0	13,3
PHI OIL						
Gas Engine Oil MA 40	Mineral	0,91	9,8	40	133,0	14,2
ROLOIL						
Mogas 40 AC	Mineral	0,90	7,9	40	141,2	14,1
Mogas G8	Mineral	0,80	8,0	40	120,0	13,3
Mogas GR8	Mineral	0,90	8,5	40	88,2	13,1
TOTAL						
Nateria MJ 40	Mineral	0,82	8,8	40	148,0	15,1

Approved lube oils

Valid for: TCG 2032

Recommended lube oils with a sulfate ash content of up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MWM						
Premium GMO 240[1)]	Mineral	0,55	5,2	40	122,0	13,3
Premium GMO 440[1)2)]	Synthetic	0,42	5,4	40	127,0	13,5

[1)] Not available in all countries, please contact your MWM service partner

[2)] Conversions on the genset may be necessary, please contact your MWM service partner

Lube oils with a sulfate ash content up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra LA	Mineral	0,50	6,5	40	137,0	14,5
NG 40	Mineral	0,54	5,6	40	122,5	13,8
Eco Gas 4000 XD	Mineral	0,62	7,3	40	116,5	13,3
ALCO						
Eurotec Accelera GEO SAE 40	Mineral	0,50	5,5	40	108,0	13,7
ARAL AG	Mineral					
Degasol NGL	Mineral	0,45	5,1	40	130,0	13,5
Atlantic	Mineral					
Low Ash Gas Engine Oil SAE 40	Mineral	0,50	5,4	40	104,0	13,5
AVIA						
Gasmotorenöl LA 40	Mineral	0,50	6,5	40	136,0	14,5
Gasmotorenöl LA-XT 40	Mineral	0,54	5,6	40	123,0	13,8
Gasmotorenöl LA-Plus 40	Mineral	0,62	7,3	40	116,5	13,3

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
AZTEC OILS						
AZTEC Emprotec GEO NBG-L 40	Mineral	0,50	5,7	40	130,0	15,0
AZTEC Emprotec GEO BLG-L 40[1)]	Mineral	0,56	4,7	40	129,0	15,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
BAYWA						
Tectrol Methaflexx NG	Mineral	0,45	5,5	40	156,0	14,5
Tectrol MethaFlexx NG Plus	Mineral	0,50	5,9	40	141,5	14,9
Tectrol MethaFlexx NG Pro	Mineral	0,50	5,5	40	120,7	13,7
Tectrol MethaFlexx SG Pro	Mineral	0,50	4,9	40	116,0	13,2
BP AG						
BP Energas NGL	Mineral	0,45	5,1	40	130,0	13,5
CASTROL						
Duratec L	Mineral	0,45	5,1	40	130,0	13,5
Duratec HPL	Mineral	0,45	5,1	40	121,0	13,0
Duratec XPL	Synthetic	0,45	4,9	20W-40	109,0	14,0
Caterpillar						
NGEO Advanced 40	Mineral	0,50	6,0	40	115,0	13,0
NGEO Ultra 40	Mineral	0,54	6,0	40	125,0	13,0
NGEO Special Application[1)]	Mineral	0,60	5,3	40	137,5	15,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CEPSA						
Troncoil Gas	Mineral	0,46	5,2	40	144,8	14,5
Troncoil Gas LD40	Mineral	0,50	4,6	40	133,1	14,0
Troncoil Biogas Low Ash[1)]	Mineral	0,55	4,5	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CHEVRON / CALTEX / TEXACO						
Geotex PX 40	Mineral	0,50	5,4	40	88,0	13,2
HDAX 5200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 6500 LFG[1)]	Mineral	0,55	4,5	40	121,0	13,5
HDAX 9200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 9300 SAE 40	Mineral	0,70	6,2	40	116,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
DeOliebron						
Tor Geo GB/LF 40	Mineral	0,57	4,5	40	124,4	13,6
ENGEN						
GEO N-40	Mineral	0,50	5,5	40	125,8	14,0

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ENI						
Autol ELA 40	Mineral	0,50	5,5	40	138,0	14,0
GEUM NG	Mineral	0,50	5,5	40	124,0	13,6
ENOC						
Khaura LA 40	Mineral	0,50	5,4	40	119,3	13,6
EXOL						
Taurus GEO G240	Mineral	0,49	5,5	40	126,0	13,8
Taurus LFG 240	Mineral	0,58	4,5	40	118,0	13,2
FUCHS						
Titan Ganymet LA	Mineral	0,45	5,5	40	156,0	14,5
Titan Ganymet Plus LA	Mineral	0,50	6,6	40	142,1	15,1
Titan Ganymet Pro LA	Mineral	0,50	5,5	40	120,7	13,7
Titan Ganymet Pro MA[1)]	Mineral	0,56	4,7	40	117,2	13,4
Titan Ganymet Pro 4000	Mineral	0,62	4,8	40	113,9	12,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GALP						
Galp GNX 4005	Mineral	0,50	5,4	40	88,0	13,2
Power Gas NGB 40	Mineral	0,50	5,5	40	122,0	13,5
Power Gas SG 40[1)]	Mineral	0,56	4,7	40	125,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GAZPROMNEFT						
G-Profi PSN 40	Mineral	0,49	5,5	40	125,8	14,0
GULF OIL						
Gulfco LA Supreme	Mineral	0,50	5,4	40	124,0	14,4
HESSOL						
Gasmotorenöl Low Ash	Mineral	0,50	6,5	40	137,0	14,5
Gasmotorenöl SAE 40 LA Pro	Mineral	0,54	5,6	40	122,5	13,8
HILL Corporation LLC						
Fastroil Gas Engine Oil SAE40	Mineral	0,50	5,3	40	128,5	13,5
I.G.A.T.						
Platin Cogeneration Oil SAE 40	Mineral	0,50	5,4	40	124,0	13,6
INDIAN OIL CORPORATION						
Servo NGE 40	Mineral	0,50	5,3	40	125,0	13,5
JX Nippon						
Gas Engine Oil M40 (M)	Mineral	0,50	4,7	40	101,9	13,8

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
KUWAIT PETROLEUM - Q8						
Mahler MA	Mineral	0,50	5,5	40	138,0	14,0
Mahler G4	Mineral	0,40	5,5	40	120,0	13,3
Mahler G5	Mineral	0,50	6,0	40	120,0	13,3
Mahler GR5	Mineral	0,50	6,0	40	88,7	13,2
LUBES SCHMIERSTOFFE						
TIGROL GEO EXTRA 40	Mineral	0,57	4,5	40	124,4	13,3
LUKOIL						
Efforse XDI 4004	Mineral	0,48	5,1	40	121,0	13,6
MABANOL						
Neon LAX 40	Mineral	0,50	5,0	40	123,0	13,6
MOBIL						
Pegasus 605[1)]	Mineral	0,52	7,1	40	126,0	13,3
Pegesus 605 Ultra[1)]	Mineral	0,60	5,3	40	137,5	15,0
Pegasus 805	Mineral	0,54	6,2	40	130,0	13,5
Pegasus 805 Ultra	Mineral	0,50	6,2	40	129,0	13,8
Pegasus 1005	Mineral	0,50	5,0	40	125,0	13,0
Pegasus 1107	Mineral	0,65	6,7	40	106,0	13,1
Pegasus 1	Synthetic	0,51	6,5	15W-40	93,8	13,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOL						
GMO Energy 40	Mineral	0,50	5,4	40	123,4	13,6
MORRIS LUBRICANTS						
GEO Ultra 40	Mineral	0,50	5,5	40	121,1	13,7
GEO Ultra LZ 40[1)]	Mineral	0,50	6,9	40	113,8	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOTOREX						
Evolube NG SAE40	Mineral	0,50	5,5	40	125,0	13,9
MOTUL						
GASMA	Mineral	0,50	5,5	40	126,0	13,6
GASMA SP SAE 40	Mineral	0,65	4,6	40	114,2	12,9
CRESSIDA[1)]	Mineral	0,50	4,5	40	126,0	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
NILS						
Burian Light	Mineral	0,50	6,5	40	136,0	14,5
NIS						
Nisotec GEO NBG	Mineral	0,50	5,4	40	120,5	13,5

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
NORTH SEA LUBRICANTS						
Tidal Power LA 40	Mineral	0,49	6,0	40	144,0	14,5
OILFINO						
Famagas LA 40	Mineral	0,48	5,6	40	147,0	14,3
Linogas LA 40	Mineral	0,49	5,2	40	123,0	13,6
ORI-TECH						
Gas Engine Oil 40 C	Mineral	0,49	5,5	40	119,8	14,0
ORLEN OIL						
Delgas L 40	Mineral	0,50	5,4	40	126,0	13,9
PAZ Lubricants & Chemicals						
PAZ NG 40	Mineral	0,50	5,5	40	120,0	13,9
PETRO CANADA						
Sentron LD 3000	Mineral	0,47	3,9	40	124,0	13,7
Sentron LD 5000	Mineral	0,57	4,8	40	124,0	13,4
Sentron LD 8000	Mineral	0,52	4,6	40	120,6	13,3
Sentron CG40 Plus[1)]	Mineral	0,52	4,5	40	119,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PETRONAS						
GEO NG	Mineral	0,48	5,4	40	121,8	13,5
GEO BLG[1)]	Mineral	0,50	4,5	40	119,3	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PT. PERTAMINA LUBRICANTS						
NG Lube SAE40	Mineral	0,53	5,1	40	120,0	13,6
NG Lube HSG SAE40[1)]	Mineral	0,50	4,7	40	118,9	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PHILLIPS 66						
El Mar LA4 GEO 40	Mineral	0,50	5,5	40	128,0	13,9
REPSOL						
Extra Gas 40	Mineral	0,50	6,0	40	133,0	13,5
Super Motor Gas 4005	Mineral	0,50	6,4	40	129,0	13,0
Long Life Gas 4005	Mineral	0,50	5,1	40	118,0	13,2
ROLOIL						
Mogas 40	Mineral	0,50	5,5	40	138,0	14,0
Mogas G4	Mineral	0,40	5,5	40	120,0	13,3
Mogas G5	Mineral	0,50	6,0	40	120,0	13,3
Mogas XNG	Mineral	0,50	5,5	40	122,2	13,5

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ROWE						
Hightec Powerplant SAE40	Mineral	0,50	5,4	40	124,0	13,6
SASOL						
Gas Engine Oil LA 40	Mineral	0,50	5,5	40	127,0	14,0
SHELL						
Mysella S3 N	Mineral	0,45	5,0	40	139,0	14,0
Mysella S5 N	Mineral	0,48	4,5	40	125,0	13,7
Mysella S5 S[1)]	Mineral	0,57	5,3	40	135,0	13,5
Mysella S6 N	Mineral	0,69	5,6	40	118,0	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SINOPEC						
GS200-L	Mineral	0,50	5,5	40	116,8	13,1
GS200[1)]	Mineral	0,49	6,1	40	119,2	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SRS						
Mihagrun LA 40	Mineral	0,48	5,6	40	147,0	14,3
Mihagrun LAX 40	Mineral	0,50	5,0	40	123,0	13,6
Mihagrun X 40[1)]	Mineral	0,55	4,8	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SYNLUBE						
GEO LD40	Mineral	0,50	5,5	40	135,5	14,0
TOTAL						
Nateria MH 40	Mineral	0,43	5,5	40	142,2	14,8
Nateria MP 40	Mineral	0,50	4,6	40	133,1	14,0
Nateria MX 40	Mineral	0,51	7,2	40	122,5	13,9
VALVOLINE						
GEO SNG-4	Mineral	0,50	4,7	40	121,0	13,6
GEO SLF 40[1)]	Mineral	0,50	6,2	40	112,8	12,9
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
WIPA CHEMICALS INTERNATIONAL						
Ecosyn GE 4004[2)]	Synthetic	0,40	5,5	40	135,0	13,7
Ecosyn GE 4006[1)2)]	Synthetic	0,60	7,5	40	156,0	13,9
Ecosyn GE C104[2)]	Synthetic	0,40	5,5	40	135,0	13,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
[2)] Conversions on the genset may be necessary, please contact your MWM service partner						

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
77 LUBRICANTS						
Gas Engine Oil LA 40	Mineral	0,49	6,0	40	144,0	14,5

Lube oils with a sulfate ash content of 0.6 to 1.0 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra Plus	Mineral	0,85	9,8	40	133,0	14,2
AVIA						
Gasmotorenöl HA 40	Mineral	0,85	9,8	40	133,0	14,2
BAYWA						
Tectrol Methaflexx HC Premium	Mineral	0,70	8,2	40	105,0	14,4
Tectrol Methaflexx HC Plus	Mineral	0,80	9,2	40	132,0	14,5
Tectrol Methaflexx GE-M	Mineral	0,90	7,9	40	141,2	14,1
Tectrol Methaflexx D Plus	Mineral	0,98	10,6	40	137,0	15,0
CASTROL						
Duratec M	Mineral	0,72	7,5	40	125,0	13,0
CHEVRON / CALTEX / TEXACO						
Geotex LF 40	Mineral	0,99	8,0	40	138,0	14,0
ENI						
Autol BGJ 40	Mineral	0,90	7,9	40	141,2	14,1
FUCHS						
Titan Ganymet Plus	Mineral	0,80	9,2	40	132,0	14,5
Titan Ganymet Ultra	Mineral	0,70	8,2	40	105,0	13,4
GALP						
Power Gas SG Plus 40[1)]	Mineral	0,83	7,3	40	116,7	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
HESSOL						
Gasmotorenöl SAE40	Mineral	0,85	9,8	40	133,0	14,2
KLONDIKE						
SAE40 Mid Ash Long-Life Sour Gas Engine Oil	Mineral	0,90	7,9	40	141,2	14,1
KUWAIT PETROLEUM - Q8						
Mahler HA	Mineral	0,90	7,9	40	141,2	14,1
Mahler G8	Mineral	0,80	8,0	40	120,0	13,3
Mahler GR8	Mineral	0,80	8,0	40	88,2	13,1
MOBIL						
Pegasus 610 Ultra	Mineral	1,00	11,3	40	113,8	12,9
NILS						
Burian SAE 40	Mineral	0,85	9,8	40	133,0	14,2

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
PETRO CANADA						
Sentron CG40	Mineral	0,92	8,5	40	128,0	13,3
PHI OIL						
Gas Engine Oil MA 40	Mineral	0,91	9,8	40	133,0	14,2
ROLOIL						
Mogas 40 AC	Mineral	0,90	7,9	40	141,2	14,1
Mogas G8	Mineral	0,80	8,0	40	120,0	13,3
Mogas GR8	Mineral	0,90	8,5	40	88,2	13,1
TOTAL						
Nateria MJ 40	Mineral	0,82	8,8	40	148,0	15,1

Approved lube oils

Valid for: TCG 2032B

Recommended lube oils with a sulfate ash content of up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MWM						
Premium GMO 240[1)]	Mineral	0,55	5,2	40	122,0	13,3
Premium GMO 440[1)2)]	Synthetic	0,42	5,4	40	127,0	13,5

[1)] Not available in all countries, please contact your MWM service partner

[2)] Conversions on the genset may be necessary, please contact your MWM service partner

Lube oils with a sulfate ash content up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
NG 40	Mineral	0,54	5,6	40	122,5	13,8
Eco Gas 4000 XD	Mineral	0,62	7,3	40	116,5	13,3
ALCO						
Eurotec Accelera GEO SAE 40	Mineral	0,50	5,5	40	108,0	13,7
Atlantic	Mineral					
Low Ash Gas Engine Oil SAE 40	Mineral	0,50	5,4	40	104,0	13,5
AVIA						
Gasmotorenöl LA-XT 40	Mineral	0,54	5,6	40	123,0	13,8
Gasmotorenöl LA-Plus 40	Mineral	0,62	7,3	40	116,5	13,3
AZTEC OILS						
AZTEC Emprotec GEO NBG-L 40	Mineral	0,50	5,7	40	130,0	15,0
AZTEC Emprotec GEO BLG-L 40[1)]	Mineral	0,56	4,7	40	129,0	15,0

[1)] Recommended for use with sewage gas, landfill gas and other biogases

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
BAYWA						
Tectrol MethaFlexx NG Plus	Mineral	0,50	5,9	40	141,5	14,9
Tectrol MethaFlexx NG Pro	Mineral	0,50	5,5	40	120,7	13,7
Tectrol MethaFlexx SG Pro	Mineral	0,50	4,9	40	116,0	13,2
CASTROL						
Duratec HPL	Mineral	0,45	5,1	40	121,0	13,0
Caterpillar						
NGEO Ultra 40	Mineral	0,54	6,0	40	125,0	13,0
NGEO Special Application[1)]	Mineral	0,60	5,3	40	137,5	15,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CEPSA						
Troncoil Gas LD40	Mineral	0,50	4,6	40	133,1	14,0
Troncoil Biogas Low Ash[1)]	Mineral	0,55	4,5	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CHEVRON / CALTEX / TEXACO						
HDAX 5200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 6500 LFG[1)]	Mineral	0,55	4,5	40	121,0	13,5
HDAX 9200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 9300 SAE 40	Mineral	0,70	6,2	40	116,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
DeOliebron						
Tor Geo GB/LF 40	Mineral	0,57	4,5	40	124,4	13,6
ENGEN						
GEO N-40	Mineral	0,50	5,5	40	125,8	14,0
ENI						
GEUM NG	Mineral	0,50	5,5	40	124,0	13,6
ENOC						
Khaura LA 40	Mineral	0,50	5,4	40	119,3	13,6
EXOL						
Taurus GEO G240	Mineral	0,49	5,5	40	126,0	13,8
Taurus LFG 240	Mineral	0,58	4,5	40	118,0	13,2
FUCHS						
Titan Ganymet Plus LA	Mineral	0,50	6,6	40	142,1	15,1
Titan Ganymet Pro LA	Mineral	0,50	5,5	40	120,7	13,7
Titan Ganymet Pro MA[1)]	Mineral	0,56	4,7	40	117,2	13,4
Titan Ganymet Pro 4000	Mineral	0,62	4,8	40	113,9	12,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
GALP						
Power Gas NGB 40	Mineral	0,50	5,5	40	122,0	13,5
Power Gas SG 40[1)]	Mineral	0,56	4,7	40	125,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GAZPROMNEFT						
G-Profi PSN 40	Mineral	0,49	5,5	40	125,8	14,0
GULF OIL						
Gulfco LA Supreme	Mineral	0,50	5,4	40	124,0	14,4
HESSOL						
Gasmotorenöl SAE 40 LA Pro	Mineral	0,54	5,6	40	122,5	13,8
HILL Corporation LLC						
Fastroil Gas Engine Oil SAE40	Mineral	0,50	5,3	40	128,5	13,5
I.G.A.T.						
Platin Cogeneration Oil SAE 40	Mineral	0,50	5,4	40	124,0	13,6
INDIAN OIL CORPORATION						
Servo NGE 40	Mineral	0,50	5,3	40	125,0	13,5
JX Nippon						
Gas Engine Oil M40 (M)	Mineral	0,50	4,7	40	101,9	13,8
KUWAIT PETROLEUM - Q8						
Mahler G5	Mineral	0,50	6,0	40	120,0	13,3
Mahler GR5	Mineral	0,50	6,0	40	88,7	13,2
LUBES SCHMIERSTOFFE						
TIGROL GEO EXTRA 40	Mineral	0,57	4,5	40	124,4	13,3
LUKOIL						
Efforse XDI 4004	Mineral	0,48	5,1	40	121,0	13,6
MABANOL						
Neon LAX 40	Mineral	0,50	5,0	40	123,0	13,6
MOBIL						
Pegesus 605 Ultra[1)]	Mineral	0,60	5,3	40	137,5	15,0
Pegasus 805 Ultra	Mineral	0,50	6,2	40	129,0	13,8
Pegasus 1005	Mineral	0,50	5,0	40	125,0	13,0
Pegasus 1107	Mineral	0,65	6,7	40	106,0	13,1
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOL						
GMO Energy 40	Mineral	0,50	5,4	40	123,4	13,6

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MORRIS LUBRICANTS						
GEO Ultra 40	Mineral	0,50	5,5	40	121,1	13,7
GEO Ultra LZ 40[1)]	Mineral	0,50	6,9	40	113,8	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOTOREX						
Evolube NG SAE40	Mineral	0,50	5,5	40	125,0	13,9
MOTUL						
GASMA	Mineral	0,50	5,5	40	126,0	13,6
CRESSIDA[1)]	Mineral	0,50	4,5	40	126,0	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
NIS						
Nisotec GEO NBG	Mineral	0,50	5,4	40	120,5	13,5
NORTH SEA LUBRICANTS						
Tidal Power LA 40	Mineral	0,49	6,0	40	144,0	14,5
OILFINO						
Linogas LA 40	Mineral	0,49	5,2	40	123,0	13,6
ORI-TECH						
Gas Engine Oil 40 C	Mineral	0,49	5,5	40	119,8	14,0
ORLEN OIL						
Delgas L 40	Mineral	0,50	5,4	40	126,0	13,9
PAZ Lubricants & Chemicals						
PAZ NG 40	Mineral	0,50	5,5	40	120,0	13,9
PETRO CANADA						
Sentron LD 5000	Mineral	0,57	4,8	40	124,0	13,4
Sentron LD 8000	Mineral	0,52	4,6	40	120,6	13,3
Sentron CG40 Plus[1)]	Mineral	0,52	4,5	40	119,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PETRONAS						
GEO NG	Mineral	0,48	5,4	40	121,8	13,5
GEO BLG[1)]	Mineral	0,50	4,5	40	119,3	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PT. PERTAMINA LUBRICANTS						
NG Lube SAE40	Mineral	0,53	5,1	40	120,0	13,6
NG Lube HSG SAE40[1)]	Mineral	0,50	4,7	40	118,9	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
PHILLIPS 66						
El Mar LA4 GEO 40	Mineral	0,50	5,5	40	128,0	13,9
REPSOL						
Long Life Gas 4005	Mineral	0,50	5,1	40	118,0	13,2
ROLOIL						
Mogas G5	Mineral	0,50	6,0	40	120,0	13,3
Mogas XNG	Mineral	0,50	5,5	40	122,2	13,5
ROWE						
Hightec Powerplant SAE40	Mineral	0,50	5,4	40	124,0	13,6
SASOL						
Gas Engine Oil LA 40	Mineral	0,50	5,5	40	127,0	14,0
SHELL						
Mysella S5 N	Mineral	0,48	4,5	40	125,0	13,7
Mysella S5 S[1)]	Mineral	0,57	5,3	40	135,0	13,5
Mysella S6 N	Mineral	0,69	5,6	40	118,0	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SINOPEC						
GS200-L	Mineral	0,50	5,5	40	116,8	13,1
SRS						
Mihagrun LAX 40	Mineral	0,50	5,0	40	123,0	13,6
Mihagrun X 40[1)]	Mineral	0,55	4,8	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SYNLUBE						
GEO LD40	Mineral	0,50	5,5	40	135,5	14,0
TOTAL						
Nateria MP 40	Mineral	0,50	4,6	40	133,1	14,0
Nateria MX 40	Mineral	0,51	7,2	40	122,5	13,9
VALVOLINE						
GEO SNG-4	Mineral	0,50	4,7	40	121,0	13,6
GEO SLF 40[1)]	Mineral	0,50	6,2	40	112,8	12,9
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
WIPA CHEMICALS INTERNATIONAL						
Ecosyn GE 4004[2)]	Synthetic	0,40	5,5	40	135,0	13,7
[2)] Conversions on the genset may be necessary, please contact your MWM service partner						
77 LUBRICANTS						
Gas Engine Oil LA 40	Mineral	0,49	6,0	40	144,0	14,5

Lube oils with a sulfate ash content of 0.6 to 1.0 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra Plus	Mineral	0,85	9,8	40	133,0	14,2
AVIA						
Gasmotorenöl HA 40	Mineral	0,85	9,8	40	133,0	14,2
BAYWA						
Tectrol Methaflexx HC Premium	Mineral	0,70	8,2	40	105,0	14,4
CASTROL						
Duratec M	Mineral	0,72	7,5	40	125,0	13,0
FUCHS						
Titan Ganymet Ultra	Mineral	0,70	8,2	40	105,0	13,4
HESSOL						
Gasmotorenöl SAE40	Mineral	0,85	9,8	40	133,0	14,2
KUWAIT PETROLEUM - Q8						
Mahler G8	Mineral	0,80	8,0	40	120,0	13,3
Mahler GR8	Mineral	0,80	8,0	40	88,2	13,1
MOBIL						
Pegasus 610 Ultra	Mineral	1,00	11,3	40	113,8	12,9
NILS						
Burian SAE 40	Mineral	0,85	9,8	40	133,0	14,2
PHI OIL						
Gas Engine Oil MA 40	Mineral	0,91	9,8	40	133,0	14,2
ROLOIL						
Mogas G8	Mineral	0,80	8,0	40	120,0	13,3
Mogas GR8	Mineral	0,90	8,5	40	88,2	13,1

Approved lube oils

Valid for: TCG 3016

Recommended lube oils with a sulfate ash content of up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MWM						
Premium GMO 240[1)]	Mineral	0,55	5,2	40	122,0	13,3
Premium GMO 440[1)]	Synthetic	0,42	5,4	40	127,0	13,5

[1)] Not available in all countries, please contact your MWM service partner

Lube oils with a sulfate ash content up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
NG 40	Mineral	0,54	5,6	40	122,5	13,8
Eco Gas 4000 XD	Mineral	0,62	7,3	40	116,5	13,3
ALCO						
Eurotec Accelera GEO SAE 40	Mineral	0,50	5,5	40	108,0	13,7
Atlantic	Mineral					
Low Ash Gas Engine Oil SAE 40	Mineral	0,50	5,4	40	104,0	13,5
AVIA						
Gasmotorenöl LA-XT 40	Mineral	0,54	5,6	40	123,0	13,8
Gasmotorenöl LA-Plus 40	Mineral	0,62	7,3	40	116,5	13,3
AZTEC OILS						
AZTEC Emprotec GEO NBG-L 40	Mineral	0,50	5,7	40	130,0	15,0
AZTEC Emprotec GEO BLG-L 40[1)]	Mineral	0,56	4,7	40	129,0	15,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
BAYWA						
Tectrol MethaFlexx NG Plus	Mineral	0,50	5,9	40	141,5	14,9
Tectrol MethaFlexx NG Pro	Mineral	0,50	5,5	40	120,7	13,7
Tectrol MethaFlexx SG Pro	Mineral	0,50	4,9	40	116,0	13,2

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
CASTROL						
Duratec HPL	Mineral	0,45	5,1	40	121,0	13,0
Caterpillar						
NGEO Ultra 40	Mineral	0,54	6,0	40	125,0	13,0
NGEO Special Application[1)]	Mineral	0,60	5,3	40	137,5	15,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CEPSA						
Troncoil Gas LD40	Mineral	0,50	4,6	40	133,1	14,0
Troncoil Biogas Low Ash[1)]	Mineral	0,55	4,5	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CHEVRON / CALTEX / TEXACO						
HDAX 5200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 6500 LFG[1)]	Mineral	0,55	4,5	40	121,0	13,5
HDAX 9200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 9300 SAE 40	Mineral	0,70	6,2	40	116,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
DeOliebron						
Tor Geo GB/LF 40	Mineral	0,57	4,5	40	124,4	13,6
ENGEN						
GEO N-40	Mineral	0,50	5,5	40	125,8	14,0
ENI						
GEUM NG	Mineral	0,50	5,5	40	124,0	13,6
ENOC						
Khaura LA 40	Mineral	0,50	5,4	40	119,3	13,6
EXOL						
Taurus GEO G240	Mineral	0,49	5,5	40	126,0	13,8
Taurus LFG 240	Mineral	0,58	4,5	40	118,0	13,2
FUCHS						
Titan Ganymet Plus LA	Mineral	0,50	6,6	40	142,1	15,1
Titan Ganymet Pro LA	Mineral	0,50	5,5	40	120,7	13,7
Titan Ganymet Pro MA[1)]	Mineral	0,56	4,7	40	117,2	13,4
Titan Ganymet Pro 4000	Mineral	0,62	4,8	40	113,9	12,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
GALP						
Power Gas NGB 40	Mineral	0,50	5,5	40	122,0	13,5
Power Gas SG 40[1)]	Mineral	0,56	4,7	40	125,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GAZPROMNEFT						
G-Profi PSN 40	Mineral	0,49	5,5	40	125,8	14,0
GULF OIL						
Gulfco LA Supreme	Mineral	0,50	5,4	40	124,0	14,4
HESSOL						
Gasmotorenöl SAE 40 LA Pro	Mineral	0,54	5,6	40	122,5	13,8
HILL Corporation LLC						
Fastroil Gas Engine Oil SAE40	Mineral	0,50	5,3	40	128,5	13,5
I.G.A.T.						
Platin Cogeneration Oil SAE 40	Mineral	0,50	5,4	40	124,0	13,6
INDIAN OIL CORPORATION						
Servo NGE 40	Mineral	0,50	5,3	40	125,0	13,5
JX Nippon						
Gas Engine Oil M40 (M)	Mineral	0,50	4,7	40	101,9	13,8
KUWAIT PETROLEUM - Q8						
Mahler G5	Mineral	0,50	6,0	40	120,0	13,3
Mahler GR5	Mineral	0,50	6,0	40	88,7	13,2
LUBES SCHMIERSTOFFE						
TIGROL GEO EXTRA 40	Mineral	0,57	4,5	40	124,4	13,3
LUKOIL						
Efforse XDI 4004	Mineral	0,48	5,1	40	121,0	13,6
MABANOL						
Neon LAX 40	Mineral	0,50	5,0	40	123,0	13,6
MOBIL						
Pegesus 605 Ultra[1)]	Mineral	0,60	5,3	40	137,5	15,0
Pegasus 805 Ultra	Mineral	0,50	6,2	40	129,0	13,8
Pegasus 1005	Mineral	0,50	5,0	40	125,0	13,0
Pegasus 1107	Mineral	0,65	6,7	40	106,0	13,1
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOL						
GMO Energy 40	Mineral	0,50	5,4	40	123,4	13,6

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MORRIS LUBRICANTS						
GEO Ultra 40	Mineral	0,50	5,5	40	121,1	13,7
GEO Ultra LZ 40[1)]	Mineral	0,50	6,9	40	113,8	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOTOREX						
Evolube NG SAE40	Mineral	0,50	5,5	40	125,0	13,9
MOTUL						
GASMA	Mineral	0,50	5,5	40	126,0	13,6
GASMA SP SAE 40	Mineral	0,65	4,6	40	114,2	12,9
CRESSIDA[1)]	Mineral	0,50	4,5	40	126,0	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
NIS						
Nisotec GEO NBG	Mineral	0,50	5,4	40	120,5	13,5
NORTH SEA LUBRICANTS						
Tidal Power LA 40	Mineral	0,49	6,0	40	144,0	14,5
OILFINO						
Linogas LA 40	Mineral	0,49	5,2	40	123,0	13,6
ORI-TECH						
Gas Engine Oil 40 C	Mineral	0,49	5,5	40	119,8	14,0
ORLEN OIL						
Delgas L 40	Mineral	0,50	5,4	40	126,0	13,9
PAZ Lubricants & Chemicals						
PAZ NG 40	Mineral	0,50	5,5	40	120,0	13,9
PETRO CANADA						
Sentron LD 5000	Mineral	0,57	4,8	40	124,0	13,4
Sentron LD 8000	Mineral	0,52	4,6	40	120,6	13,3
Sentron CG40 Plus[1)]	Mineral	0,52	4,5	40	119,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PETRONAS						
GEO NG	Mineral	0,48	5,4	40	121,8	13,5
GEO BLG[1)]	Mineral	0,50	4,5	40	119,3	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PT. PERTAMINA LUBRICANTS						
NG Lube SAE40	Mineral	0,53	5,1	40	120,0	13,6
NG Lube HSG SAE40[1)]	Mineral	0,50	4,7	40	118,9	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
PHILLIPS 66						
El Mar LA4 GEO 40	Mineral	0,50	5,5	40	128,0	13,9
REPSOL						
Long Life Gas 4005	Mineral	0,50	5,1	40	118,0	13,2
ROLOIL						
Mogas G5	Mineral	0,50	6,0	40	120,0	13,3
Mogas XNG	Mineral	0,50	5,5	40	122,2	13,5
ROWE						
Hightec Powerplant SAE40	Mineral	0,50	5,4	40	124,0	13,6
SASOL						
Gas Engine Oil LA 40	Mineral	0,50	5,5	40	127,0	14,0
SHELL						
Mysella S5 N	Mineral	0,48	4,5	40	125,0	13,7
Mysella S5 S[1)]	Mineral	0,57	5,3	40	135,0	13,5
Mysella S6 N	Mineral	0,69	5,6	40	118,0	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SINOPEC						
GS200-L	Mineral	0,50	5,5	40	116,8	13,1
GS200[1)]	Mineral	0,49	6,1	40	119,2	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SRS						
Mihagrun LAX 40	Mineral	0,50	5,0	40	123,0	13,6
Mihagrun X 40[1)]	Mineral	0,55	4,8	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SYNLUBE						
GEO LD40	Mineral	0,50	5,5	40	135,5	14,0
TOTAL						
Nateria MP 40	Mineral	0,50	4,6	40	133,1	14,0
Nateria MX 40	Mineral	0,51	7,2	40	122,5	13,9
VALVOLINE						
GEO SNG-4	Mineral	0,50	4,7	40	121,0	13,6
GEO SLF 40[1)]	Mineral	0,50	6,2	40	112,8	12,9
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
WIPA CHEMICALS INTERNATIONAL						
Ecosyn GE 4004	Synthetic	0,40	5,5	40	135,0	13,7
77 LUBRICANTS						
Gas Engine Oil LA 40	Mineral	0,49	6,0	40	144,0	14,5

Lube oils with a sulfate ash content of 0.6 to 1.0 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra Plus	Mineral	0,85	9,8	40	133,0	14,2
AVIA						
Gasmotorenöl HA 40	Mineral	0,85	9,8	40	133,0	14,2
BAYWA						
Tectrol Methaflexx HC Premium	Mineral	0,70	8,2	40	105,0	14,4
CASTROL						
Duratec M	Mineral	0,72	7,5	40	125,0	13,0
FUCHS						
Titan Ganymet Ultra	Mineral	0,70	8,2	40	105,0	13,4
GALP						
Power Gas SG Plus 40[1)]	Mineral	0,83	7,3	40	116,7	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
HESSOL						
Gasmotorenöl SAE40	Mineral	0,85	9,8	40	133,0	14,2
KUWAIT PETROLEUM - Q8						
Mahler G8	Mineral	0,80	8,0	40	120,0	13,3
Mahler GR8	Mineral	0,80	8,0	40	88,2	13,1
MOBIL						
Pegasus 610 Ultra	Mineral	1,00	11,3	40	113,8	12,9
NILS						
Burian SAE 40	Mineral	0,85	9,8	40	133,0	14,2
PHI OIL						
Gas Engine Oil MA 40	Mineral	0,91	9,8	40	133,0	14,2
ROLOIL						
Mogas G8	Mineral	0,80	8,0	40	120,0	13,3
Mogas GR8	Mineral	0,90	8,5	40	88,2	13,1

Approved lube oils

Valid for: TCG 3020

Recommended lube oils with a sulfate ash content of up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MWM						
Premium GMO 240[1)]	Mineral	0,55	5,2	40	122,0	13,3
Premium GMO 440[1)2)]	Synthetic	0,42	5,4	40	127,0	13,5

[1)] Not available in all countries, please contact your MWM service partner

[2)] Conversions on the genset may be necessary, please contact your MWM service partner

Lube oils with a sulfate ash content up to 0.6 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
NG 40	Mineral	0,54	5,6	40	122,5	13,8
Eco Gas 4000 XD	Mineral	0,62	7,3	40	116,5	13,3
ALCO						
Eurotec Accelera GEO SAE 40	Mineral	0,50	5,5	40	108,0	13,7
Atlantic	Mineral					
Low Ash Gas Engine Oil SAE 40	Mineral	0,50	5,4	40	104,0	13,5
AVIA						
Gasmotorenöl LA-XT 40	Mineral	0,54	5,6	40	123,0	13,8
Gasmotorenöl LA-Plus 40	Mineral	0,62	7,3	40	116,5	13,3
AZTEC OILS						
AZTEC Emprotec GEO NBG-L 40	Mineral	0,50	5,7	40	130,0	15,0
AZTEC Emprotec GEO BLG-L 40[1)]	Mineral	0,56	4,7	40	129,0	15,0

[1)] Recommended for use with sewage gas, landfill gas and other biogases

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
BAYWA						
Tectrol MethaFlexx NG Plus	Mineral	0,50	5,9	40	141,5	14,9
Tectrol MethaFlexx NG Pro	Mineral	0,50	5,5	40	120,7	13,7
Tectrol MethaFlexx SG Pro	Mineral	0,50	4,9	40	116,0	13,2
CASTROL						
Duratec HPL	Mineral	0,45	5,1	40	121,0	13,0
Caterpillar						
NGEO Ultra 40	Mineral	0,54	6,0	40	125,0	13,0
NGEO Special Application[1)]	Mineral	0,60	5,3	40	137,5	15,0
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CEPSA						
Troncoil Gas LD40	Mineral	0,50	4,6	40	133,1	14,0
Troncoil Biogas Low Ash[1)]	Mineral	0,55	4,5	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
CHEVRON / CALTEX / TEXACO						
HDAX 5200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 6500 LFG[1)]	Mineral	0,55	4,5	40	121,0	13,5
HDAX 9200 Low Ash	Mineral	0,50	4,2	40	124,0	13,5
HDAX 9300 SAE 40	Mineral	0,70	6,2	40	116,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
DeOliebron						
Tor Geo GB/LF 40	Mineral	0,57	4,5	40	124,4	13,6
ENGEN						
GEO N-40	Mineral	0,50	5,5	40	125,8	14,0
ENI						
GEUM NG	Mineral	0,50	5,5	40	124,0	13,6
ENOC						
Khaura LA 40	Mineral	0,50	5,4	40	119,3	13,6
EXOL						
Taurus GEO G240	Mineral	0,49	5,5	40	126,0	13,8
Taurus LFG 240	Mineral	0,58	4,5	40	118,0	13,2

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
FUCHS						
Titan Ganymet Plus LA	Mineral	0,50	6,6	40	142,1	15,1
Titan Ganymet Pro LA	Mineral	0,50	5,5	40	120,7	13,7
Titan Ganymet Pro MA[1)]	Mineral	0,56	4,7	40	117,2	13,4
Titan Ganymet Pro 4000	Mineral	0,62	4,8	40	113,9	12,7
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GALP						
Power Gas NGB 40	Mineral	0,50	5,5	40	122,0	13,5
Power Gas SG 40[1)]	Mineral	0,56	4,7	40	125,0	13,5
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
GAZPROMNEFT						
G-Profi PSN 40	Mineral	0,49	5,5	40	125,8	14,0
GULF OIL						
Gulfco LA Supreme	Mineral	0,50	5,4	40	124,0	14,4
HESSOL						
Gasmotorenöl SAE 40 LA Pro	Mineral	0,54	5,6	40	122,5	13,8
HILL Corporation LLC						
Fastroil Gas Engine Oil SAE40	Mineral	0,50	5,3	40	128,5	13,5
I.G.A.T.						
Platin Cogeneration Oil SAE 40	Mineral	0,50	5,4	40	124,0	13,6
INDIAN OIL CORPORATION						
Servo NGE 40	Mineral	0,50	5,3	40	125,0	13,5
JX Nippon						
Gas Engine Oil M40 (M)	Mineral	0,50	4,7	40	101,9	13,8
KUWAIT PETROLEUM - Q8						
Mahler G5	Mineral	0,50	6,0	40	120,0	13,3
Mahler GR5	Mineral	0,50	6,0	40	88,7	13,2
LUBES SCHMIERSTOFFE						
TIGROL GEO EXTRA 40	Mineral	0,57	4,5	40	124,4	13,3
LUKOIL						
Efforse XDI 4004	Mineral	0,48	5,1	40	121,0	13,6
MABANOL						
Neon LAX 40	Mineral	0,50	5,0	40	123,0	13,6

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
MOBIL						
Pegesus 605 Ultra[1)]	Mineral	0,60	5,3	40	137,5	15,0
Pegasus 805 Ultra	Mineral	0,50	6,2	40	129,0	13,8
Pegasus 1005	Mineral	0,50	5,0	40	125,0	13,0
Pegasus 1107	Mineral	0,65	6,7	40	106,0	13,1
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOL						
GMO Energy 40	Mineral	0,50	5,4	40	123,4	13,6
MORRIS LUBRICANTS						
GEO Ultra 40	Mineral	0,50	5,5	40	121,1	13,7
GEO Ultra LZ 40[1)]	Mineral	0,50	6,9	40	113,8	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
MOTOREX						
Evolube NG SAE40	Mineral	0,50	5,5	40	125,0	13,9
MOTUL						
GASMA	Mineral	0,50	5,5	40	126,0	13,6
GASMA SP SAE 40	Mineral	0,65	4,6	40	114,2	12,9
CRESSIDA[1)]	Mineral	0,50	4,5	40	126,0	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
NIS						
Nisotec GEO NBG	Mineral	0,50	5,4	40	120,5	13,5
NORTH SEA LUBRICANTS						
Tidal Power LA 40	Mineral	0,49	6,0	40	144,0	14,5
OILFINO						
Linogas LA 40	Mineral	0,49	5,2	40	123,0	13,6
ORI-TECH						
Gas Engine Oil 40 C	Mineral	0,49	5,5	40	119,8	14,0
ORLEN OIL						
Delgas L 40	Mineral	0,50	5,4	40	126,0	13,9
PAZ Lubricants & Chemicals						
PAZ NG 40	Mineral	0,50	5,5	40	120,0	13,9
PETRO CANADA						
Sentron LD 5000	Mineral	0,57	4,8	40	124,0	13,4
Sentron LD 8000	Mineral	0,52	4,6	40	120,6	13,3
Sentron CG40 Plus[1)]	Mineral	0,52	4,5	40	119,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
PETRONAS						
GEO NG	Mineral	0,48	5,4	40	121,8	13,5
GEO BLG[1)]	Mineral	0,50	4,5	40	119,3	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PT. PERTAMINA LUBRICANTS						
NG Lube SAE40	Mineral	0,53	5,1	40	120,0	13,6
NG Lube HSG SAE40[1)]	Mineral	0,50	4,7	40	118,9	13,6
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
PHILLIPS 66						
El Mar LA4 GEO 40	Mineral	0,50	5,5	40	128,0	13,9
REPSOL						
Long Life Gas 4005	Mineral	0,50	5,1	40	118,0	13,2
ROLOIL						
Mogas G5	Mineral	0,50	6,0	40	120,0	13,3
Mogas XNG	Mineral	0,50	5,5	40	122,2	13,5
ROWE						
Hightec Powerplant SAE40	Mineral	0,50	5,4	40	124,0	13,6
SASOL						
Gas Engine Oil LA 40	Mineral	0,50	5,5	40	127,0	14,0
SHELL						
Mysella S5 N	Mineral	0,48	4,5	40	125,0	13,7
Mysella S5 S[1)]	Mineral	0,57	5,3	40	135,0	13,5
Mysella S6 N	Mineral	0,69	5,6	40	118,0	13,3
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SINOPEC						
GS200-L	Mineral	0,50	5,5	40	116,8	13,1
GS200[1)]	Mineral	0,49	6,1	40	119,2	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SRS						
Mihagrun LAX 40	Mineral	0,50	5,0	40	123,0	13,6
Mihagrun X 40[1)]	Mineral	0,55	4,8	40	120,0	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
SYNLUBE						
GEO LD40	Mineral	0,50	5,5	40	135,5	14,0

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
TOTAL						
Nateria MP 40	Mineral	0,50	4,6	40	133,1	14,0
Nateria MX 40	Mineral	0,51	7,2	40	122,5	13,9
VALVOLINE						
GEO SNG-4	Mineral	0,50	4,7	40	121,0	13,6
GEO SLF 40[1)]	Mineral	0,50	6,2	40	112,8	12,9
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
WIPA CHEMICALS INTERNATIONAL						
Ecosyn GE 4004[2)]	Synthetic	0,40	5,5	40	135,0	13,7
[2)] Conversions on the genset may be necessary, please contact your MWM service partner						
77 LUBRICANTS						
Gas Engine Oil LA 40	Mineral	0,49	6,0	40	144,0	14,5

Lube oils with a sulfate ash content of 0.6 to 1.0 wt. %

Manufacturer Product	Basic oils	Sulfate ash wt. %	TBN mgKOH/g	Class SAE	Viscosity in mm²/s at 40 °C	 at 100 °C
ADDINOL						
MG 40 Extra Plus	Mineral	0,85	9,8	40	133,0	14,2
AVIA						
Gasmotorenöl HA 40	Mineral	0,85	9,8	40	133,0	14,2
BAYWA						
Tectrol Methaflexx HC Premium	Mineral	0,70	8,2	40	105,0	14,4
CASTROL						
Duratec M	Mineral	0,72	7,5	40	125,0	13,0
FUCHS						
Titan Ganymet Ultra	Mineral	0,70	8,2	40	105,0	13,4
GALP						
Power Gas SG Plus 40[1)]	Mineral	0,83	7,3	40	116,7	13,4
[1)] Recommended for use with sewage gas, landfill gas and other biogases						
HESSOL						
Gasmotorenöl SAE40	Mineral	0,85	9,8	40	133,0	14,2
KUWAIT PETROLEUM - Q8						
Mahler G8	Mineral	0,80	8,0	40	120,0	13,3
Mahler GR8	Mineral	0,80	8,0	40	88,2	13,1
MOBIL						
Pegasus 610 Ultra	Mineral	1,00	11,3	40	113,8	12,9
NILS						
Burian SAE 40	Mineral	0,85	9,8	40	133,0	14,2
PHI OIL						
Gas Engine Oil MA 40	Mineral	0,91	9,8	40	133,0	14,2
ROLOIL						
Mogas G8	Mineral	0,80	8,0	40	120,0	13,3
Mogas GR8	Mineral	0,90	8,5	40	88,2	13,1