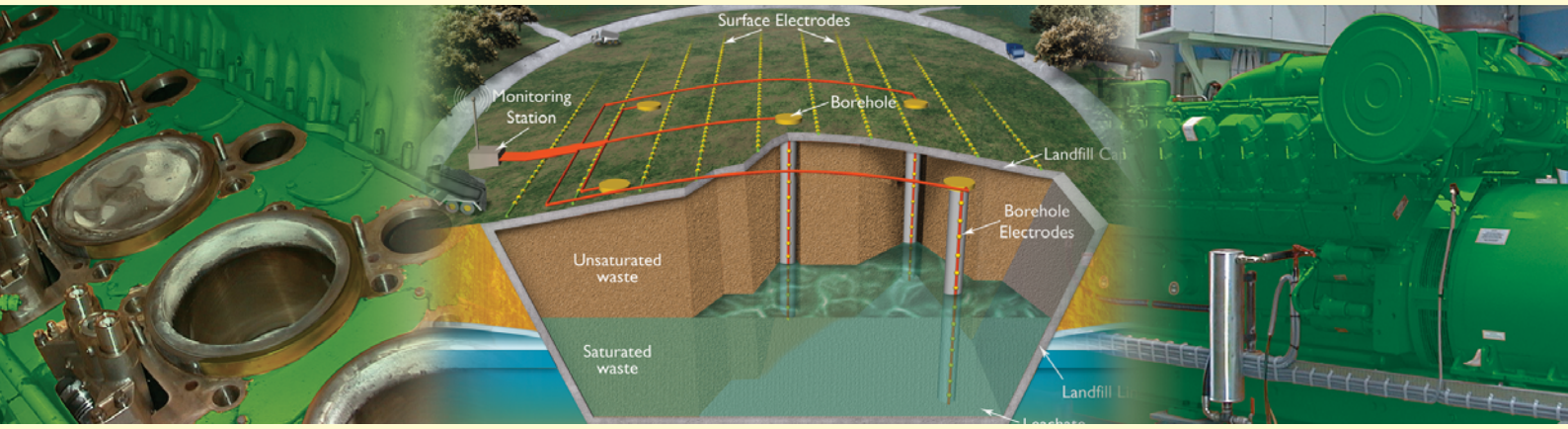
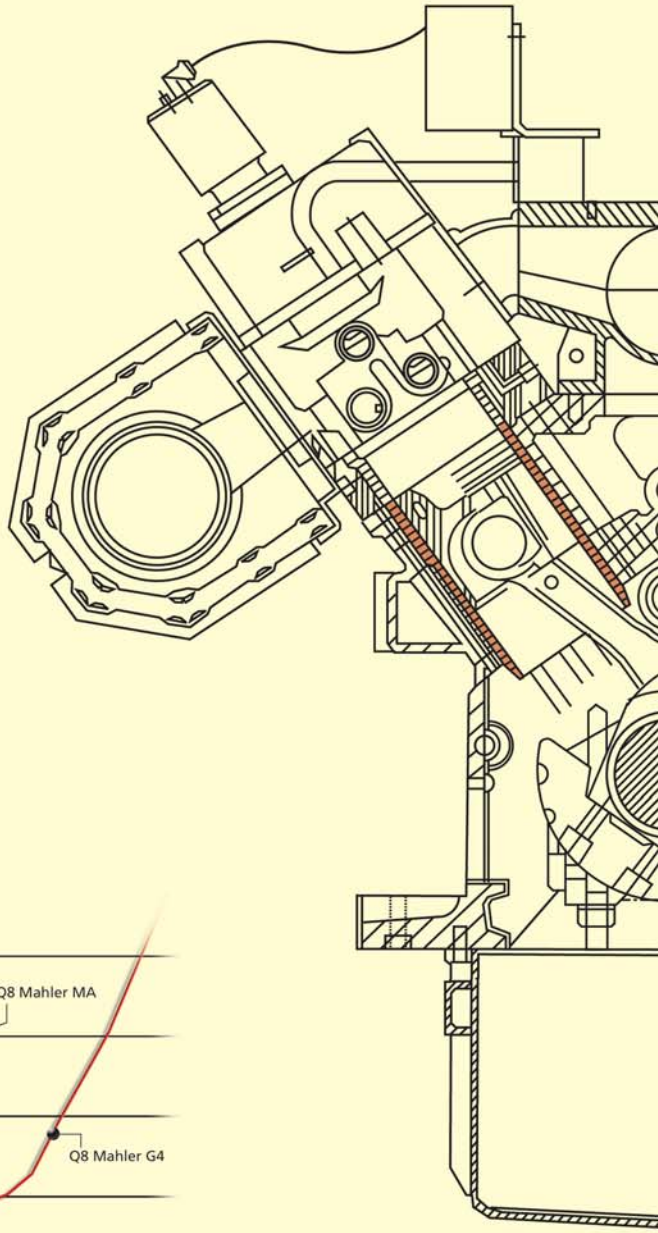
Stationary Gas Engine Oils

High performance lubricants for
stationary engines running on all types of gas



Q8 Oils

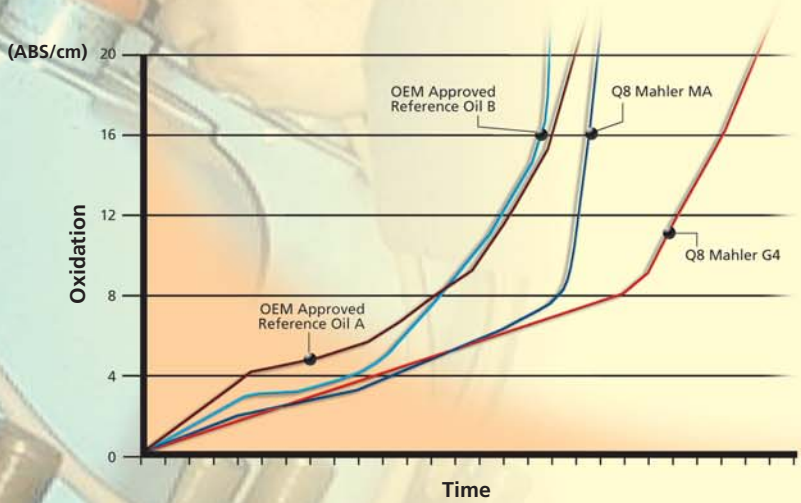
Q8 Mahler
Productivity a



Oxidation Control

The thin oil film separating the liner from the piston is subjected to high temperatures & pressure, with oxygen and nitrogen present during the combustion cycle. It is therefore crucial that oils are formulated to resist oxidation and nitration.

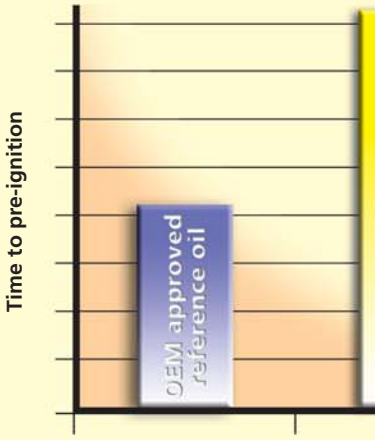
The improved oxidation control of Q8 Mahler extends oil life and keeps the pistons clean. The unique combination of carefully selected additives and our own base oils considerably reduces liner and piston lacquering. Moreover, ring groove deposits are prevented.



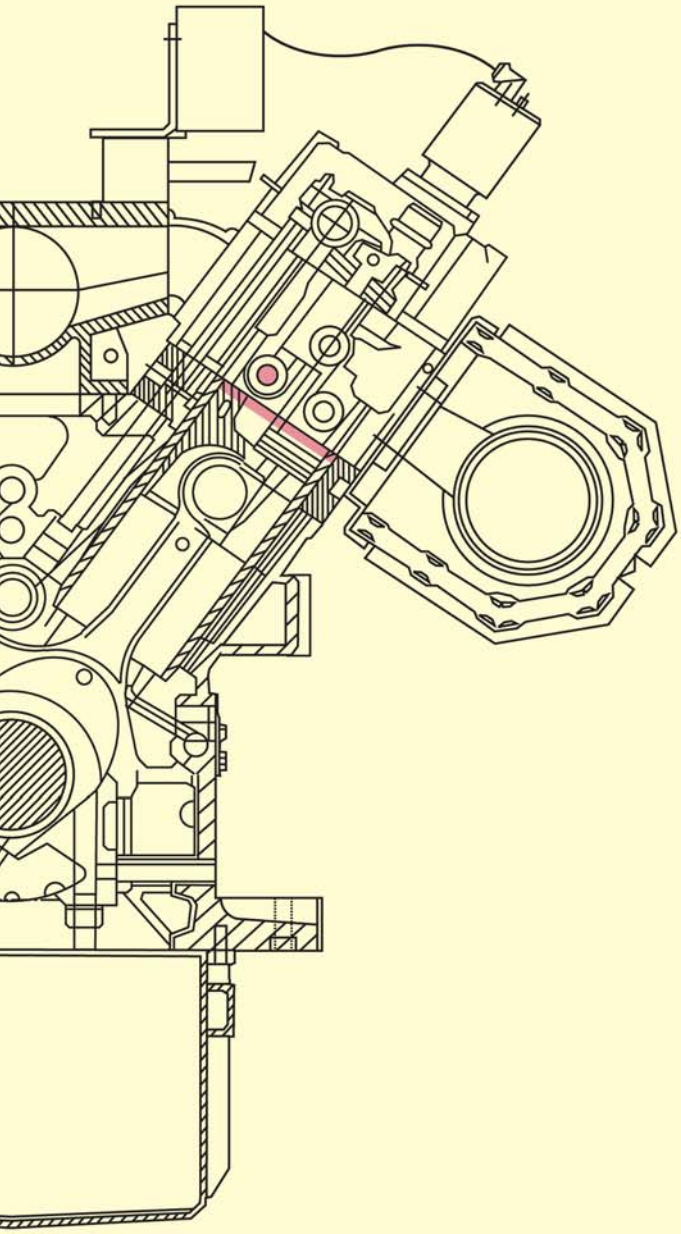
Gas Engine Oil Oxidation Test

Eventually oxidation levels will rise resulting in an increase in oil viscosity and the formation of weak organic acids. The graph above clearly demonstrates how the latest generation Q8 Mahler G4 has further improved on the already excellent performance of Q8 Mahler MA.

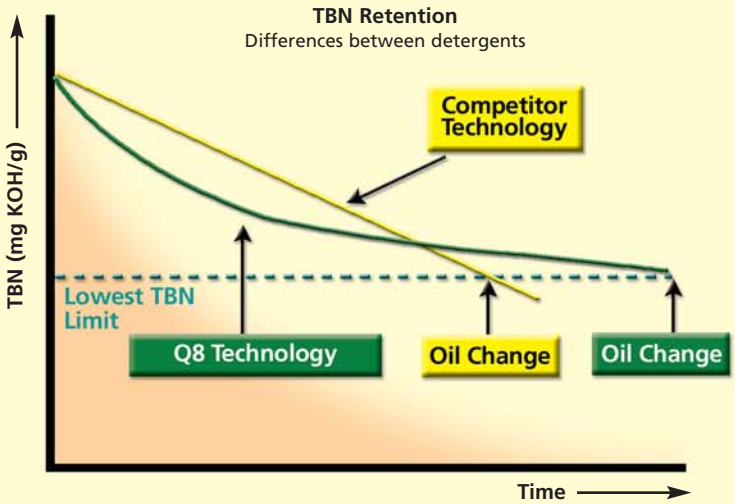
Deposit Pre-Ig



and Reliability 24/7



TBN Retention Difference



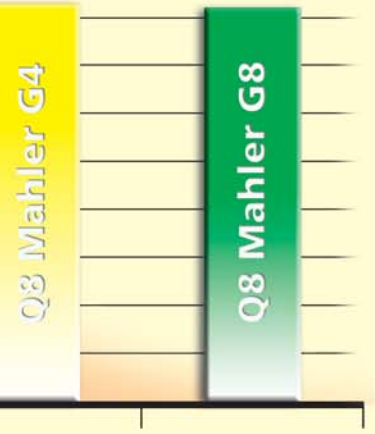
Compared to competitors, our technology gives Q8 Mahler a unique TBN retention curve that means the product has a longer service life.

Deposit Control

For the latest generation of Q8 Mahler products we have developed new additive technology which generates considerably less ash and therefore reduces deposits.

Endoscope inspections during field trials of Q8 Mahler clearly demonstrated a reduction in ash deposits.

nition Test



Metallic additives are used to improve oil performance e.g. anti-wear and Total Base Number. These additives burn to ash in the combustion chamber, some of which prevent molecular welding of hot metal surfaces in contact e.g. preventing the valve seat from recessing. However too much deposit formation will lead to pre-ignition which reduces engine efficiency and productivity. Q8Oils have therefore developed a test to demonstrate an oils tendency to leave harmful deposits in the combustion chamber. The graph on the left clearly shows the superior performance of Q8 Mahler G4 and G8 when compared to an equivalent OEM approved product.

KRAS - Kuwait Routine Analysis Service

Regular analysis of the oil can determine change intervals and prevent engine damage. KRAS provides fast and reliable results via e-mail or Internet access, to customers own data. KRAS is designed to monitor engines running on all types of gas.

Every report includes a conclusion and recommendation of any action required. Many aspects are shown in the report, including some data in graphical format and minimum and maximum levels to provide a quick overview. All Q8Oils product engineers are qualified to give advice with your results.

Viscosity
Measuring viscosity can indicate conditions such as oil thickening (from oxidation or nitration) and increased contamination levels like combustion soot.

Total Base Number
Total Base number (TBN) is an indication of the oils neutralizing acids, important when the gas contains high levels of sulfur. When biogas or landfill gas is used, oils with higher TBN will provide longer protection against acids.

Total Acid Number
Total Acid number (TAN) is a measure of the acid level in the oil and an indicator of high oxidation, nitration and/or contamination. Often accompanied by an increase in oxidation, TAN analysis together with TBN is used to establish the optimum oil drain interval.

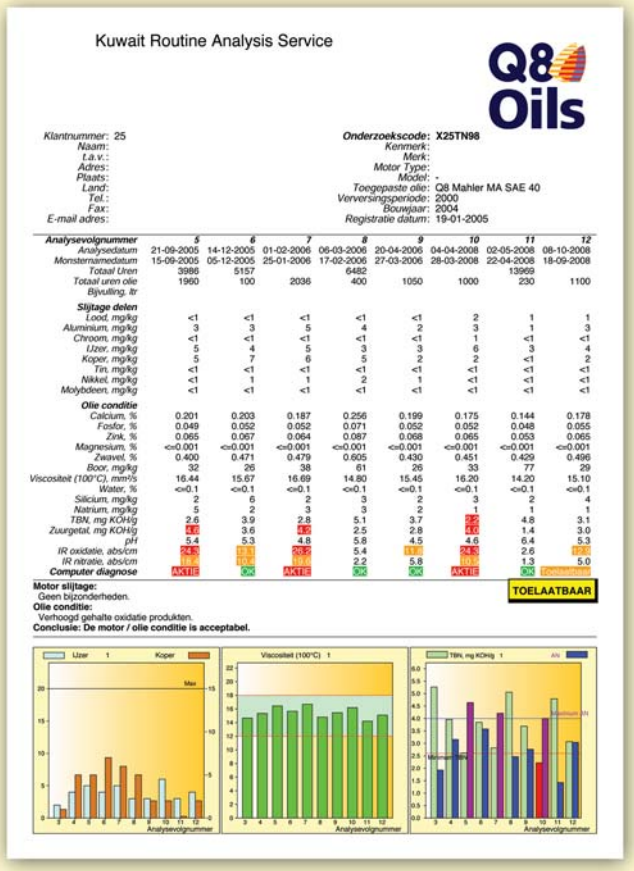
pH_r
pH_r is a measure of the acidity or base of a fluid.

Oxidation
Oxidation occurs when the oil molecules are exposed to oxygen over long periods, especially during high operating temperatures. Oxidation is a common problem and can cause premature thickening of the oil and formation of severe varnish and carbon deposits.

Nitration
Nitration is a degradation of the oil by reaction with gaseous Nitrous Oxides (NOx) created during combustion and can indicate issues such as rust and corrosion.

Water
Water contamination can cause problems in the engines from as little as 100 ppm, such as foaming and the breakdown of the oil into emulsions and sludge that will block filters.

ICP
Inductive Coupled Plasma (ICP) can detect even the lowest metal concentration and wear particles in the oil sample. For example silicon, either from the fuel source or a damaged air inlet filter can be detected.



Kuwait Routine Analysis Service

Klantnummer: 25
Naam:
t.a.v.:
Adres:
Plaats:
Land:
Tel.:
Fax:
E-mail adres:

Onderzoekscode: X25TN98
Kenmerk:
Merk:
Motor Type:
Model: -
Toegepaste olie: Q8 Mahler MA SAE 40
Verversingsperiode: 2000
Bouwjaar: 2004
Registratie datum: 19-01-2005

Analysevolgnummer	5	6	7	8	9	10	11	12
Analysedatum	21-09-2005	14-12-2005	01-02-2006	06-03-2006	20-04-2006	04-04-2008	02-05-2008	08-10-2008
Monsternamedatum	15-09-2005	05-12-2005	25-01-2006	17-02-2006	27-03-2006	28-03-2008	22-04-2008	18-09-2008
Totaal Uren	3986	5157		6482			13969	
Totaal uren olie	1960	100	2036	400	1050	1000	230	1100
Bijvulling, ltr								
Slijtage delen								
Lood, mg/kg	<1	<1	<1	<1	<1	2	1	1
Aluminium, mg/kg	3	3	5	4	2	3	1	3
Chroom, mg/kg	<1	<1	<1	<1	<1	1	<1	<1
IJzer, mg/kg	5	4	5	3	3	6	3	4
Koper, mg/kg	5	7	6	5	2	2	<1	2
Tin, mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Nikkel, mg/kg	<1	1	1	2	1	<1	<1	<1
Molybdeen, mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Olie conditie								
Calcium, %	0.201	0.203	0.187	0.256	0.199	0.175	0.144	0.178
Fosfor, %	0.049	0.052	0.052	0.071	0.052	0.052	0.048	0.055
Zink, %	0.065	0.067	0.064	0.087	0.068	0.065	0.053	0.065
Magnesium, %	<=0.001	<=0.001	<=0.001	<=0.001	<=0.001	<=0.001	<=0.001	<=0.001
Zwavel, %	0.400	0.471	0.479	0.605	0.430	0.451	0.429	0.496
Boor, mg/kg	32	26	38	61	26	33	77	29
Viscositeit (100°C), mm²/s	16.44	15.67	16.69	14.80	15.45	16.20	14.20	15.10
Water, %	<=0.1	<=0.1	<=0.1	<=0.1	<=0.1	<=0.1	<=0.1	<=0.1
Silicium, mg/kg	2	6	2	3	2	3	2	4
Natrium, mg/kg	5	2	3	3	2	1	1	1
TBN, mg KOH/g	2.6	3.9	2.8	5.1	3.7	2.2	4.8	3.1
Zuurgetal, mg KOH/g	4.0	3.6	4.5	2.5	2.8	4.0	1.4	3.0
pH	5.4	5.3	4.8	5.8	4.5	4.6	6.4	5.3
IR oxidatie, abs/cm	20.5	17.1	20.5	5.4	13.7	20.5	2.6	17.7
IR nitratie, abs/cm	17.7	17.7	17.7	2.2	5.8	17.7	1.3	5.0
Computer diagnose	ACTIE	OK	ACTIE	OK	OK	ACTIE	OK	CONSULTANT

Motor slijtage:
Geen bijzonderheden.
Olie conditie:
Verhoogd gehalte oxidatie produkten.
Conclusie: De motor / olie conditie is acceptabel.

TOELAATBAAR

As well as KRAS, Q8Oils can offer other services:

Endoscopy:
Q8Oils technical engineers can conduct endoscope examinations of the engine, which can prevent additional downtime and the need to dismantle the engine, so avoiding significant costs.

What our customers think of Q8 Mahler...

Our company highly recommends Q8 Mahler HA and MA. By using Q8 Mahler we have been able to reduce our operating costs by reducing oil consumption and extending drain intervals. Q8 Mahler has also made dramatic differences in our engine fleet e.g. preventing and even removing lacquer build up.

While we operate in the Bio-Gas market with aggressive fuel sources that can quickly and abruptly impact the oil, Q8 Mahler has proven to be affordable, stable, predictable and reliable where many others have not. The Q8Oils team continues to display a high degree of integrity, are customer oriented and have been interested in exploring options and alternatives that will benefit our business. In the 3 plus years of using Q8 Mahler, we have nothing but great things to say about the product, the company and its support of our business.

Bill Deckard, Director of US Operations,
Power Generation and LFG Operations & Maintenance, Nashville, U.S.A.

After 9000 operating hours the engine suffered from heavy detonation problems. More than 6 times a week the engine would be shut down and we had to consider costly clean-up of the combustion-chambers. However Q8 Oils suggested a change to Q8 Mahler R 40. Nothing else was done to the engine. This change instantly and completely eliminated the detonation problem. After 2000 hours on Q8 Mahler R 40 we have seen a 30% reduction in oil consumption and after tuning, the engine is now providing more than 1% point higher electrical efficiency.

Laurids Jonassen, Plant Manager,
Ejstrupholm Varmeværk, Denmark.

Energy Developments UK Ltd have been using a range of Q8Oils products on our engines (Deutz/ Caterpillar/ Jenbacher) for nearly seven years and can fully recommend Q8 Mahler. In the UK, Mahler MA has achieved a better than expected oil life accompanied with reduced combustion chamber deposits and minimal liner lacquering, resulting in extended liner and cylinder head life.

As with all engines running on landfill gas, all the mentioned benefits are of great importance for both the smooth running and reduction in operating costs. Equally important is the customer support and technical backup which Q8Oils provide. EDL have worked closely with the Technical Team over the years which have resulted in benefits for both parties, especially with respect to the oil analysis techniques and the trialling of new products.

Tim Orsborne, Maintenance Co-Coordinator,
Energy Developments Ltd, Middlesex, United Kingdom.

We have been using Q8 Mahler for many years in maintaining co-generation plants in many different types of engines including Waukesha, MAN, Ford, Perkins and Guascor. We also find it very easy to convince new customers to use Q8 Mahler as it has proven to help reduce both oil consumption and operating costs. We also use the Q8Oils analysis to monitor the engine performance. As well as excellent products, I am also very satisfied with the service, dedication and expertise of the Q8Oils technical department.

Arie Batenburg, Director,
Batenburg Technical Service, The Netherlands.

Q8Oils

www.Q8Oils.com

Q8 Mahler Gas Engine Oils

The products listed below are only intended as a guide. Engine operating conditions vary dramatically and we recommend you talk with one of our application engineers to ensure your selection guarantees the best performance and maximum reliability.

The formulation technology of Q8 Mahler MA and HA has been successfully proven in our customers engines over the last 20 years. The market demand for lubricants that meet the needs of the increasing number of high-efficiency engines has lead to the development of the new Mahler G range.

Natural Gas

Q8 Mahler MA SAE 40	TBN mg KOH/g - D 2896 = 5.5 Sulphated ash mass % - D 874 = 0.5	Q8 Mahler MA is suitable for a wide range of engines. It has well balanced performance characteristics and its TBN value is designed to control acid levels so that extended drain periods are possible.
Q8 Mahler G4 SAE 40	TBN mg KOH/g - D 2896 = 6.0 Sulphated ash mass % - D 874 = 0.4	Q8 Mahler G4 is designed for engines that are sensitive to deposit formation. Its chemical composition includes highly effective dispersants which reduce deposits.
Q8 Mahler G5 SAE 40	TBN mg KOH/g - D 2896 = 6.5 Sulphated ash mass % - D 874 = 0.5	Q8 Mahler G5 is a variant of Q8 Mahler G4, but with alternative performance characteristics and a slightly higher TBN value.
Q8 Mahler R SAE 40	TBN mg KOH/g - D 2896 = 7.0 Sulphated ash mass % - D 874 = 0.5	Q8 Mahler R is manufactured with synthetic base oils for extreme operating conditions. Even at high temperatures it is very oxidation stable and will help extend drain intervals.

Bio, Landfill, Sewage & Other Gases

Q8 Mahler HA SAE 40	TBN mg KOH/g - D 2896 = 7.9 Sulphated ash mass % - D 874 = 0.9	Q8 Mahler HA is a variant of MA for engines running on aggressive gas. It has good TBN reserves to suppress the high levels of acid generated during the combustion process.
Q8 Mahler G8 SAE 40	TBN mg KOH/g - D 2896 = 8.5 Sulphated ash mass % - D 874 = 0.8	Q8 Mahler G8 is manufactured for high pressure engines running on aggressive gas. It has high TBN reserves to suppress the high levels of acid generated during the combustion process.
Q8 Mahler G10 SAE 40	TBN mg KOH/g - D 2896 = 10 Sulphated ash mass % - D 874 = 1.0	Q8 Mahler G10 has the same characteristics as Q8 Mahler Maxx, but a sulphated ash mass (around 1) that is still acceptable for OEM-requirements.
Q8 Mahler Maxx SAE 40	TBN mg KOH/g - D 2896 = 11.0 Sulphated ash mass % - D 874 = 1.2	Q8 Mahler Maxx is designed for very aggressive gases. Even under severe operating conditions its very high TBN reserves will enable long drain periods.

Automotive Engines

The Q8 Mahler range includes products for automotive gas engines, including motors that have been converted to run on natural gas. For more information on Q8 Mahler C and Q8 Mahler T, please contact your Q8Oils product engineer.

After 15 years and millions of trouble free operating hours, the Q8 Mahler range has proven itself to be a market leader. Thousands of gas engines are running on Q8 Mahler and when combining its applications and approvals, it includes the worlds leading engine manufacturers such as: GE Jenbacher, Caterpillar, Ficantieri, GMT (VM), Perkins, Guascor, MAN, MWM (Deutz), Rolls Royce Bergen, Tedom, Wärtsilä, Waukesha.

Q8Oils

www.Q8Oils.com

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