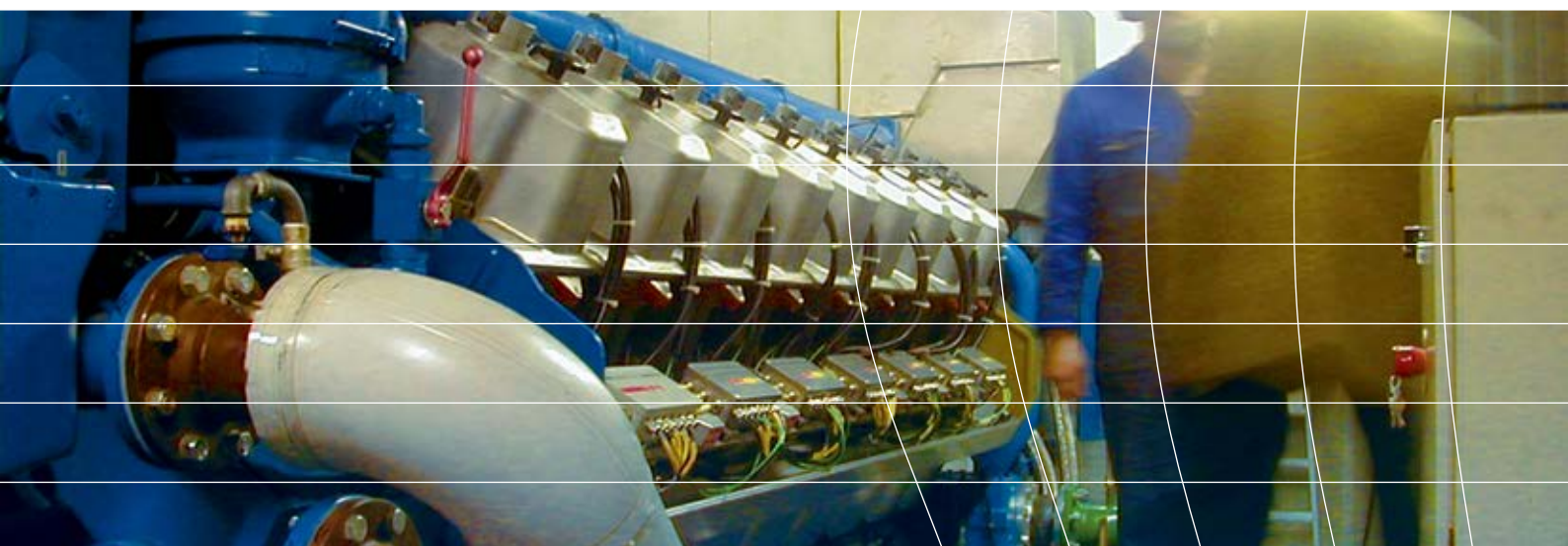
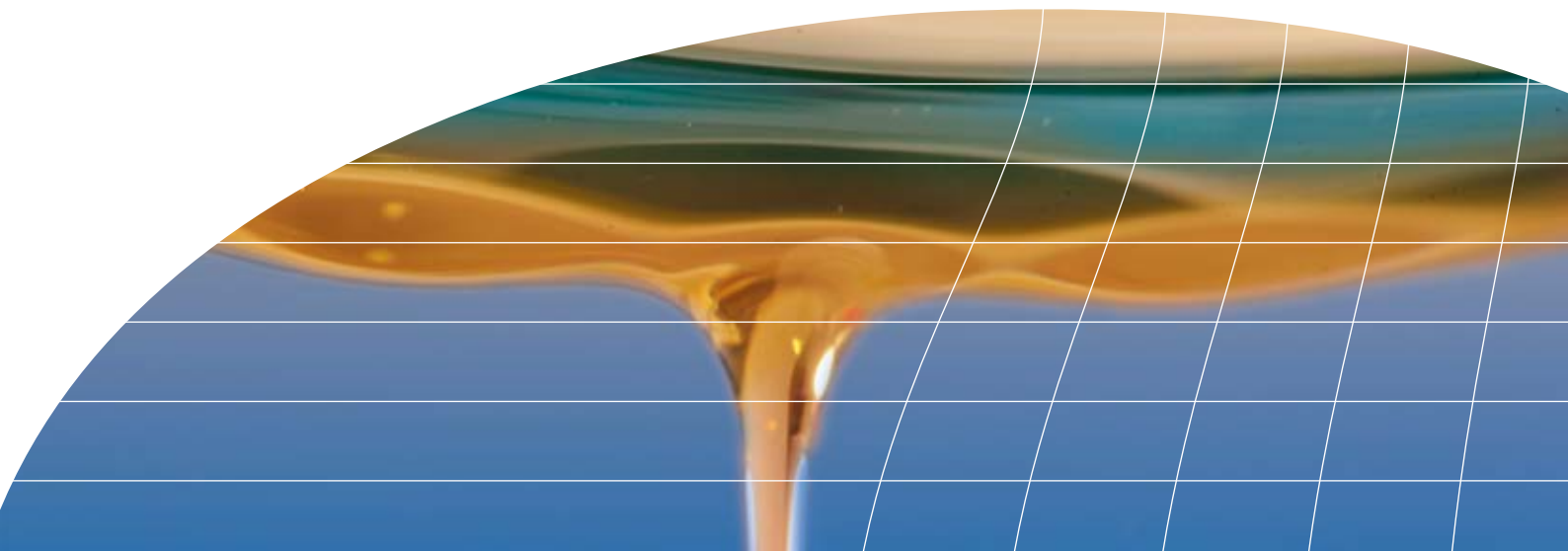


# NATERIA oils for Gas engines

High performance and reliability in all conditions



**TOTAL**



# NATERIA: lubricants designed for high performance and reliability of gas engines

From a few kilowatts to several dozen megawatts, gas engines provide flexible & clean power using various types of gas.

Engine performance depends on operating conditions, particularly on the origin of the gas and its properties. In the combustion chamber, the components of these gases and their reaction products (such as H<sub>2</sub>S, halogenous components, silica and dust) cause **nitration, corrosion and oxidation**. These are responsible for conditions such as varnish build up, ring sticking and sludge formation, which decrease engine productivity, reduce engine life expectancy and ultimately increase costs.

Total Nateria lubricants are formulated to resist the most severe operating conditions and deliver a sustainable level of lubrication which guarantees to maintain engine performance.

## ■ NATERIA benefits for all gas engines

- **Optimized drain interval**
- **Wear reduction**
- **Better engine cleanliness**



Formulations specifically designed to meet equipment constraints.

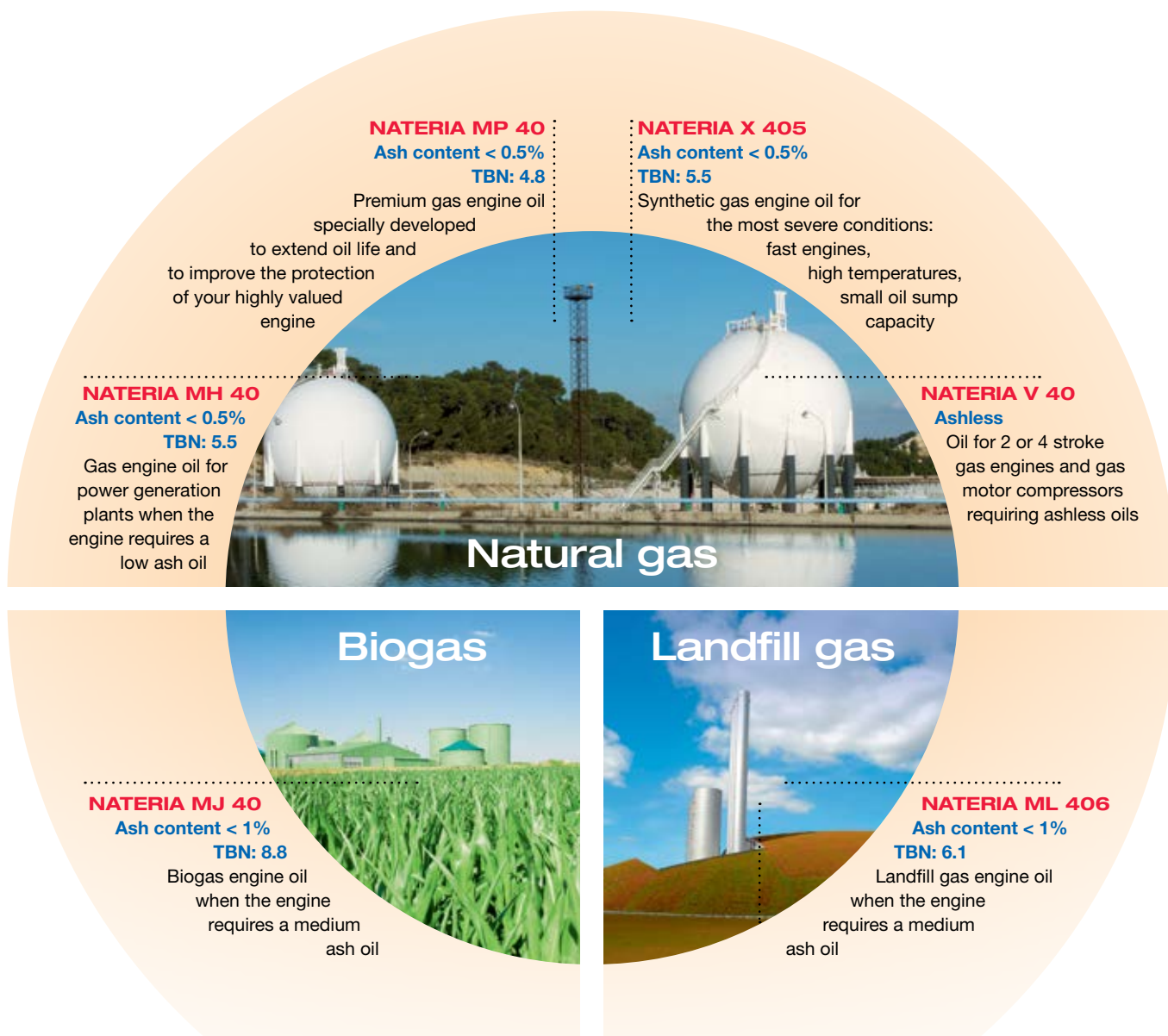
Selected base oils and additives to meet all engine manufacturer requirements even in the most aggressive environments (H<sub>2</sub>S, moisture, contaminants).

## ■ NATERIA advantages

- **Exceptional thermal stability** of base oils gives improved resistance to oxidation and nitration,
- **Reinforced wear protection** for optimum protection of the most stressed components,
- **TBN / Ash content** adapted to improve engine cleanliness.



# A full range of lubricants...



## ANAC oil monitoring optimize the operation costs of your equipment

### In-depth diagnostics system for industrial gas engines



**ANAC GAS** is an in-depth diagnostics system for the follow-up of the behaviour and depletion of the lubricant and the mechanical wear of industrial gas engines. It is recommended for follow-up of engines operating on natural gas, landfill gas, sewage gas or biogas and for determining the optimal oil drain period.



**ANAC COOLANT** is an in-depth diagnostics system for the follow-up of cooling liquids and cooling systems. It is recommended for follow-up of the coolant behaviour in use and the condition of the system in which the coolant liquid is operating, for punctual analysis and diagnosis in certain cases (breakdown, expertise) and for compliance check of new coolants.

# ... And coolants dedicated to your needs

**COOLELF SUPRA** and **GLACELF SUPRA**, our premium quality coolants based on the latest organic technology, will bring high performance and extended service life to your equipment, as well as reducing the overall maintenance costs.

- Excellent heat transfer for improved engine cooling
- Reinforced protection against freezing and boiling
- Very high protection of the cylinders at high temperature
- Excellent protection of the engine materials against corrosion and cavitation
- Exceptional coolant service-life

**The best protection for gas engines due to the combination of outstanding lubricant and coolant performance.**

## PROTECTION OF THE CYLINDERS

Liners after 400 hours of thermal shock tests on 6.2 L engine



Mineral coolant



**COOLELF SUPRA**

Excellent protection against cavitation

## PROTECTION OF THE HEAT EXCHANGER TUBES

Results after 18 months on 4MW Wärtsilä SACM preheating circuit



Mineral coolant



**COOLELF SUPRA**

Absence of deposit with COOLELF SUPRA GF NP

## ANAC makes a difference

ISO 9001:2008 green

**ANAC references : FEZC --21 --20**  
**Your references :**  
 Machine: Engine on natural gas

**TOTAL** **ANAC**

**Make and type:**  
 Machine: Cummins QSK60G

**TOTAL LUBRIFIANTS**

Diagnosis date: 22 november 2012  
 Oil : Total Nateria MJ 40

	GAS	GAS	GAS	GAS	GAS
Sample date	12-AUG-12	20-AUG-12	04-SEP-12	12-SEP-12	21-SEP-12
Sample Number	80031171	80031173	80031175	80031178	80032804
Intern. sample	X			X	X
Working time	4514 H	4774 H	5081 H	5281 H	5481 H
Mileage oil	1000 H	1200 H	200 H	400 H	600 H
Oil consumption	115 L			20 L	65 L

Wear						
Iron	ppm	5	8	3	2	4
Lead	ppm	12	18	2	2	3
Copper	ppm	1	2	1	< 1	< 1
Tin	ppm	< 1	< 1	< 1	< 1	< 1
Chromium	ppm	< 1	< 1	< 1	< 1	< 1
Aluminium	ppm	1	2	2	2	2
Nickel	ppm	< 1	< 1	< 1	< 1	< 1

Contamination						
Silicon	ppm	2	3	3	2	2
Water	%	OK	OK	OK	OK	OK

- Database on constructor limits and statistical references based on history
- Specific and personalised comments
- User friendly website for management of diagnosis data
- Reports available by post, e-mail, fax or Internet
- Over 10 years of experience on diagnosis of gas engines
- Reports available in 15 languages

[www.anac-diagnosis.com](http://www.anac-diagnosis.com)

# ENGINES MANUFACTURERS APPROVALS & REFERENCES

Total cooperates with all major manufacturers to optimize the formulation of NATERIA lubricants. The assessments of engine field tests lead to approvals and recommendations with the OEM.

■ **In Löningen** (Germany), on the heat & energy production site GF-Bio-Energie Hasetal GmbH, the **MTU 4000 V12** engine (Power 1160 kW) is fuelled with **Biogas** and lubricated with **NATERIA MJ 40, COOLELF** and monitored with **ANAC GAS**.



© Getty Images



After 18,000 hours of operating time, the final field test inspection was performed by MTU: “Limited deposits on the pistons on the heat exchanger as well as on the turbo charger were a surprising advantage of the medium ash oil NATERIA MJ 40.”  
“The very fine, soft and dusty consistency of the ash is a highly appreciable property.”

*“We choose TOTAL products because of the high-value product properties, such as long oil lifetime. We appreciate the very good technical support.”*

Company Director

■ **In Stadtwerke Malchow** (Germany), on a heat production site, the **MAN E2876 LE 302** engine (Power 196 kW) is fuelled with **natural gas** and lubricated with **NATERIA MP 40, COOLELF** and monitored with **ANAC GAS**.



After 13,000 hours of operating time, **NATERIA MP 40** exhibited a longer drain interval in comparison to other similar gas engine oils.



© MWM

■ **In Yangquan** (China), **Coal Mine Gas** is the energy source for various engines, lubricated with **NATERIA MH 40** and **COOLELF**:  
**6 MWM TCG 2020** engines  
**4 GE JENBACHER J620GS** engines  
**3 CATERPILLAR G3520C** engines



Using **NATERIA MH 40** and **COOLELF** in all engines enabled the customer to optimise drain intervals and reduce their maintenance operations.

*“In addition to the good lubrication performance of NATERIA oils, we are very satisfied with Total’s after-sales service such as ANAC oil monitoring.”*

Heads of Technical & Purchase Departments

■ **Shanghai Laogang** (China) is the biggest landfill operator of Asia, a joint venture between Veolia Environmental Services, CITIC and Shanghai Chengtou.  
**4 GE JENBACHER J420** engines are lubricated with **NATERIA MH 40** and **COOLELF**.



The customer appreciated Total’s professional technical service and support. They have recommended **NATERIA MH 40** low ash oil for use in landfill based operations to ensure optimum performance

# 5 good reasons for choosing TOTAL

## A major player

Total Lubrificants is a subsidiary of Total Group. The Group is the world's fifth largest publicly-traded integrated international oil and gas company\* and employs more than 96,000 people on five continents. Total Lubrificants manufactures and sells its lubricants in more than 150 countries.

## Innovation

Thanks to a major investment in R&D and close cooperation with equipment manufacturers, Total Lubrificants creates high-technology products with substantial added value, for optimal performance and protection of your machinery.

## Quality and environment

Total Lubrificants ISO 9001 certification is the guarantee of a long term commitment to quality. From the initial design stage, our R&D teams seek to develop products with characteristics that minimise toxicity risks and that may be either recycled or disposed of in a manner that creates the least environmental impact.

## Local support and responsive logistics

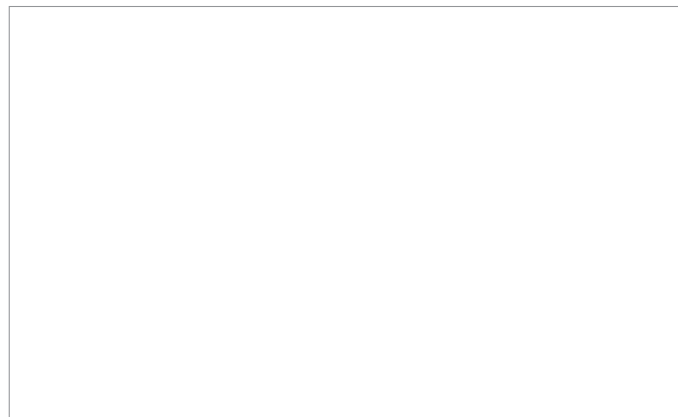
Thanks to our local commercial and technical presence, we can respond to your specific needs. Our integrated organization, including our own production plants and logistics, ensures that we can supply products within the tightest deadlines.

## Partnership

We are at your side bringing our expertise to optimize the productivity of your machinery and reduce your maintenance costs. The large variety of our product ranges allows you to cover all your needs for maintenance, specialty lubricants or coolants.

*\* Based on market capitalization (in dollars) as of December 31, 2012*

Material Safety Data Sheets available at [www.quickfds.com](http://www.quickfds.com)



[www.lubricants.total.com](http://www.lubricants.total.com)  
[www.lubricants.total.com/pro/industry.html](http://www.lubricants.total.com/pro/industry.html)



The right choice in lubricants

**TOTAL**