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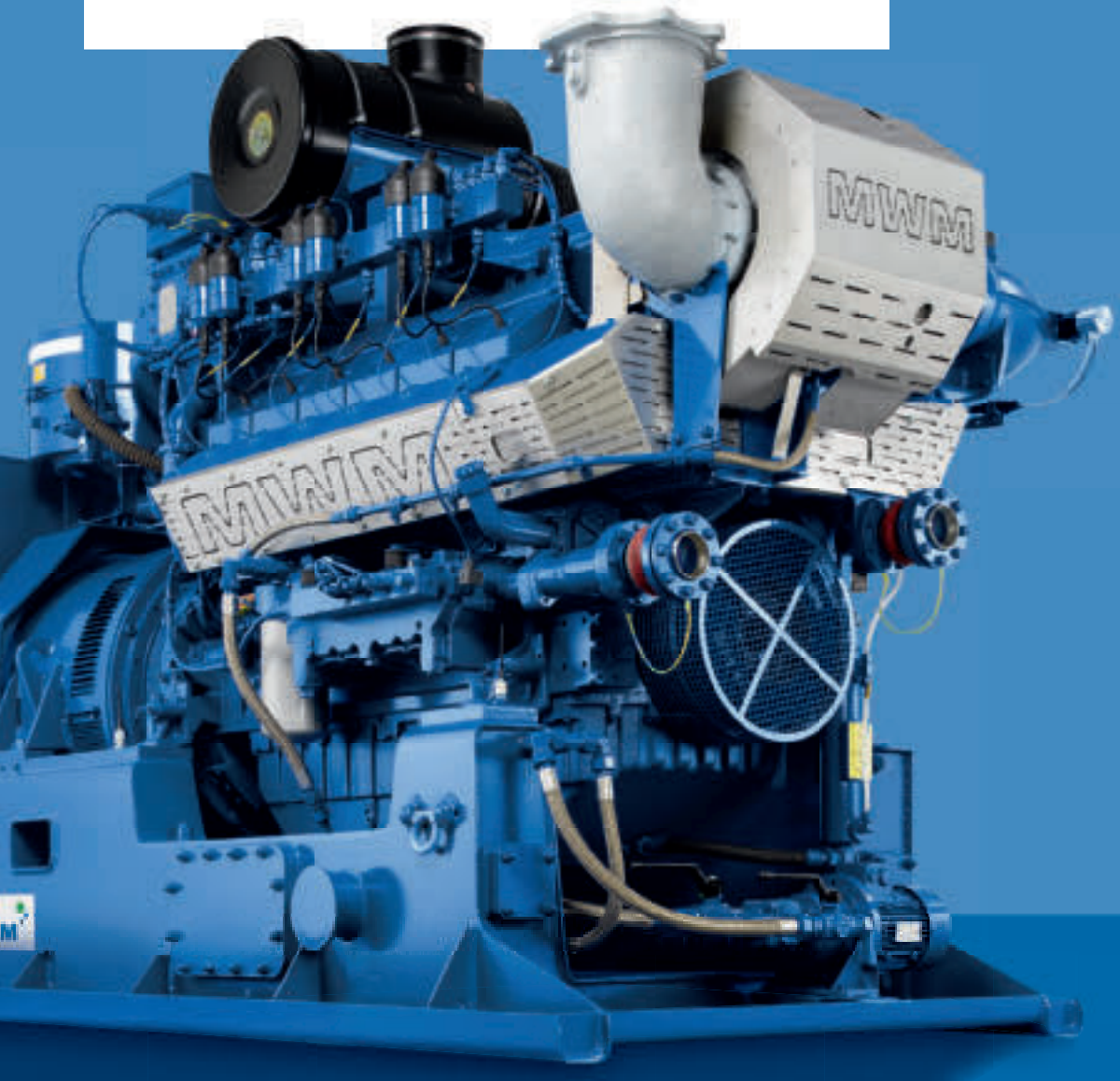
TCG 2016

Efficiency straight down the line.

MWM
Energy. Efficiency. Environment.
A Caterpillar Company



Reliability

System

Service

Profit

The TCG 2016. Top performance from MWM – used successfully worldwide.

Friedrichshagen CHP plant, Germany

This project was completed very quickly in collaboration with SES Energiesysteme GmbH Berlin. A Type TCG 2016 V16 gas engine efficiently undertakes basic load operation for the local combined heat and power plant. What is special about this low-emission CHP plant is that the boilers' efficiency is increased by preheating the air current to them using the heat from the mixture cooling circuit along with the radiant heat of the gas engine. The result is that gas consumption is reduced by as much as 176,000 m^3/a.

Gut Kletkamp CHP plant, Germany

Nawaro Kletkamp GmbH & Co. KG runs a biogas combined heat and power plant. Around 20 tons of corn silage are used as an input fuel each day. The heat produced by the engine is used to dry grain and to heat the plant's own buildings and even to heat parts of the neighboring town of Lütjenburg. After the fermentation process is finished, the substrate remnants are used as a fertilizer. The plant saves the equivalent of 4,000 tons of CO_2 per year.

Nong Bua Farm biogas plant, Thailand

Nong Bua livestock farm in Thailand takes its liquid pig manure, a substance often left unused as a waste product, and uses it as an important source of electricity. It is sufficient to fuel an MWM biogas plant incorporating two Type TCG 2016 V16 gas engines, each producing 700 kW_{el} of electricity.

Mölme CHP plant, Germany

A biogas CHP plant has been constructed in Mölme in collaboration with SEVA Energie AG. The electricity generated from the renewable substances corn and manure is fed into the local mains grid. The heat generated is used mainly by the plant itself in order to maintain the temperature in the fermentation tanks. This ensures maximum biogas production and an optimum gas yield.

Strong arguments for a strong brand: MWM.

MWM has 140 years of experience

MWM has made a tradition out of innovation. We have been developing and building engines and gensets for a wide range of uses since 1871. Our global success is founded on having invented the most advanced four-stroke diesel engines. And, 30 years ago, we became one of the first manufacturers to revolutionize generator technology using high-performance gas engines. To this day we continue to work constantly on making our systems more efficient.

MWM understands what's really needed

Today, cost-effectiveness is crucial! MWM offers cooperation all along the line, which pays off right across the process chain. We are the complete partner to our customers: from the selection of the system layout for the project, all the way to service and repair.

MWM offers the most economical service concepts

With its worldwide service network, long service intervals and low maintenance costs, MWM Service is an important factor for lasting efficiency. Innovative offerings such as remote diagnosis, remote parameter configuration and the generation of operating values can be provided cheaply anywhere in the world using the Internet. The new MWM Logistics Centre also means fast deliveries and low spares costs. Shortblocks can be delivered and assembled easily, so your system will be ready for operation in the shortest possible time. Another benefit is that our own training centre offers top-level, practically oriented courses for your technicians.

MWM thinks in terms of the complete solution

Only if all of the components in your system are selected and configured perfectly for your needs will you achieve optimum overall efficiency. We have the experience, the technology and the capacity. Our engineers can develop tailor-made complete solutions especially for you. From comprehensive cogeneration concepts for electricity, heat and cooling, to containerized solutions, to turn-key systems – MWM can develop complete concepts to suit your needs and implement them reliably too. All in all, system engineering just the way you want it.

You can rely on MWM

Clear statements, transparent offers: we keep our promise. We are always there when you need us. Test us – on site, at your plant.

MWM's compact performer. Economical long-term.

More profit

The TCG 2016 is highly efficient thanks to its optimized camshaft, combustion chamber and spark plugs. Save as much as 15 % per annum on fuel costs – and increase your plant's profitability.

Less overall costs

With its optimized engine components, the TCG 2016 requires up to 50 % less lubricating oil than other similar gensets. In terms of efficiency that means long-term savings.

Lower installation costs

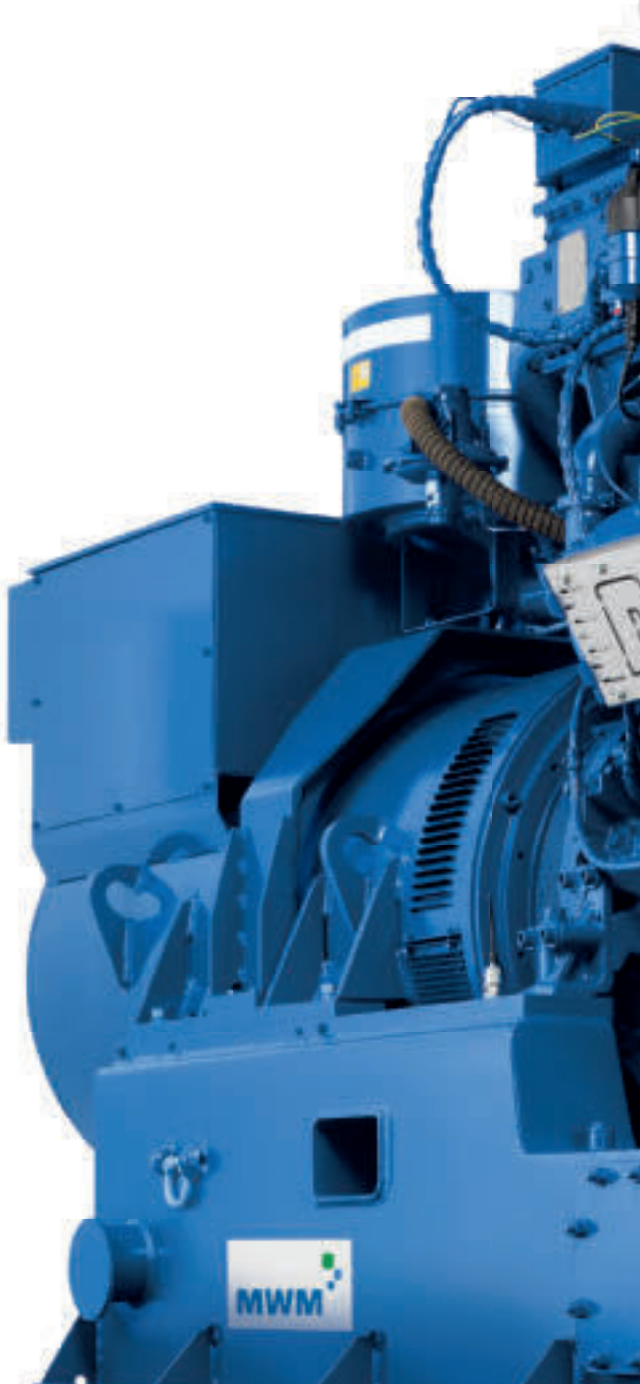
Thanks to its smaller dimensions (width x length), the TCG 2016 demands up to 50 % less space than comparable systems. For you that means lower installation costs.

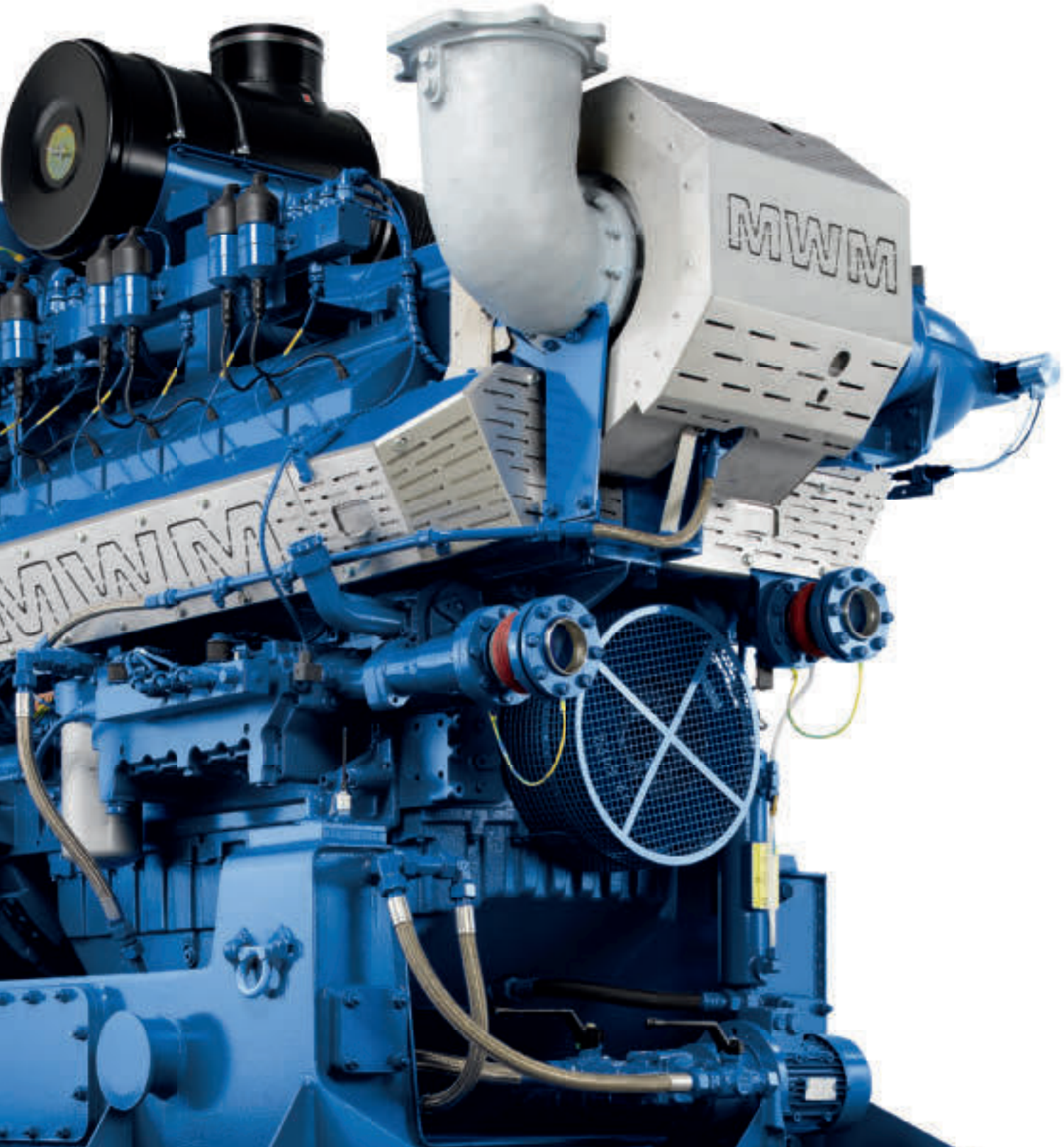
Optimum control concept

TEM (Total Electronic Management) controls not just the engine but the entire system including the heat supply from cogeneration. Temperature monitoring for each cylinder and anti-knock control ensure the best possible utilization of fuel and maximum power output, even if gas composition fluctuates.

Flexible usage

The latest technology such as our gas-mixer and TEM allows you to use a wide variety of gases. Even the most problematic gases such as colliery gas, landfill gas and sewage gas can be used without difficulty.




MWM

Technical data 50 Hz

Engine type		TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Bore/stroke	mm	132/160	132/160	132/160
Displacement	dm^3	17.5	26.3	35.0
Speed	min^{-1}	1500	1500	1500
Mean piston speed	m/s	8.0	8.0	8.0
Length [1]	mm	3090	3690	4090
Width [1]	mm	1490	1490	1590
Height [1]	mm	2190	2190	2190
Dry weight genset	kg	5340	7000	8450

Natural gas applications

NO_x ≤ 500 mg/Nm^3 [2] **dry exhaust manifolds**

Engine type			TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Electrical power [3]		kW	400	600	800
Mean effective pressure		bar	19.0	18.9	18.9
Thermal output [4]	±8 %	kW	427	654	854
Electrical efficiency [3]		%	42.3	42.0	42.5
Thermal efficiency [3]		%	45.2	45.8	45.3
Total efficiency [3]		%	87.5	87.8	87.8

Biogas applications

NO_x ≤ 500 mg/Nm^3 [2]
Sewage gas (65 % CH_4 / 35 % CO_2)
Biogas (60 % CH_4 / 32 % CO_2, rest N_2)
Landfill gas (50 % CH_4 / 27 % CO_2, rest N_2)

Minimum heating value (LHV) H_u = 5.0 kWh/Nm^3
dry exhaust manifolds

Engine type			TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Electrical power [5]		kW	400	600	800
Mean effective pressure		bar	19.0	18.9	18.9
Thermal output [4]	±8 %	kW	394	595	790
Electrical efficiency [5]		%	42.8	42.7	42.8
Thermal efficiency [5]		%	42.1	42.3	42.3
Total efficiency [5]		%	84.9	85.0	85.1

1) Transport dimensions for gensets; components set up separately must be taken into consideration.
2) NOX emissions: NO_x ≤ 0.5 g NO_2/Nm^3 dry exhaust gas at 5 % O_2.
3) According to ISO 3046/1 at voltage = 0.4 kV, cosphi = 1 for 50 Hz, and a methane number of MN 70.
4) Cooling of the exhaust gases to 120 °C for natural gas and 150 °C for biogas
5) According to ISO 3046/1 at voltage = 0.4 kV, cosphi = 1 for 50 Hz.

Specifications for special gases and two-gas operation on request.

The figures in these data sheets are for information purposes only and are not binding.
The information given in the offer is decisive.

Technical data 60 Hz

Engine type		TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Bore/stroke	mm	132/160	132/160	132/160
Displacement	dm^3	17.5	26.3	35.0
Speed	min^{-1}	1800	1800	1800
Mean piston speed	m/s	9.6	9.6	9.6
Length [1]	mm	3170	3770	4130
Width [1]	mm	1490	1490	1490
Height [1]	mm	2190	2190	2190
Dry weight genset	kg	5120	6260	6780

Natural gas applications

NO_x ≤ 500 mg/Nm^3 [2] **dry exhaust manifolds**

Engine type			TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Electrical power [3]		kW	400	600	800
Mean effective pressure		bar	15.8	15.7	15.7
Thermal output [4]	±8 %	kW	445	675	886
Electrical efficiency [3]		%	41.4	41.3	41.6
Thermal efficiency [3]		%	46.0	46.5	46.3
Total efficiency [3]		%	87.4	87.8	87.9

Biogas applications

NO_x ≤ 500 mg/Nm^3 [2]
Sewage gas (65 % CH_4 / 35 % CO_2)
Biogas (60 % CH_4 / 32 % CO_2, rest N_2)
Landfill gas (50 % CH_4 / 27 % CO_2, rest N_2)

Minimum heating value (LHV) H_u = 5.0 kWh/Nm^3
dry exhaust manifolds

Engine type			TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Electrical power [5]		kW	400	600	800
Mean effective pressure		bar	15.8	15.7	15.7
Thermal output [4]	±8 %	kW	416	634	829
Electrical efficiency [5]		%	41.6	41.4	41.7
Thermal efficiency [5]		%	43.2	43.7	43.3
Total efficiency [5]		%	84.8	85.1	85.0

1) Transport dimensions for gensets; components set up separately must be taken into consideration.
2) NOX emissions: NO_x ≤ 0.5 g NO_2/Nm^3 dry exhaust gas at 5 % O_2.
3) According to ISO 3046/1 at voltage = 0.48 kV, cosphi = 1 for 60 Hz, and a methane number of MN 70.
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MWM
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Performance

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TCG 2020

Efficiency straight down the line.

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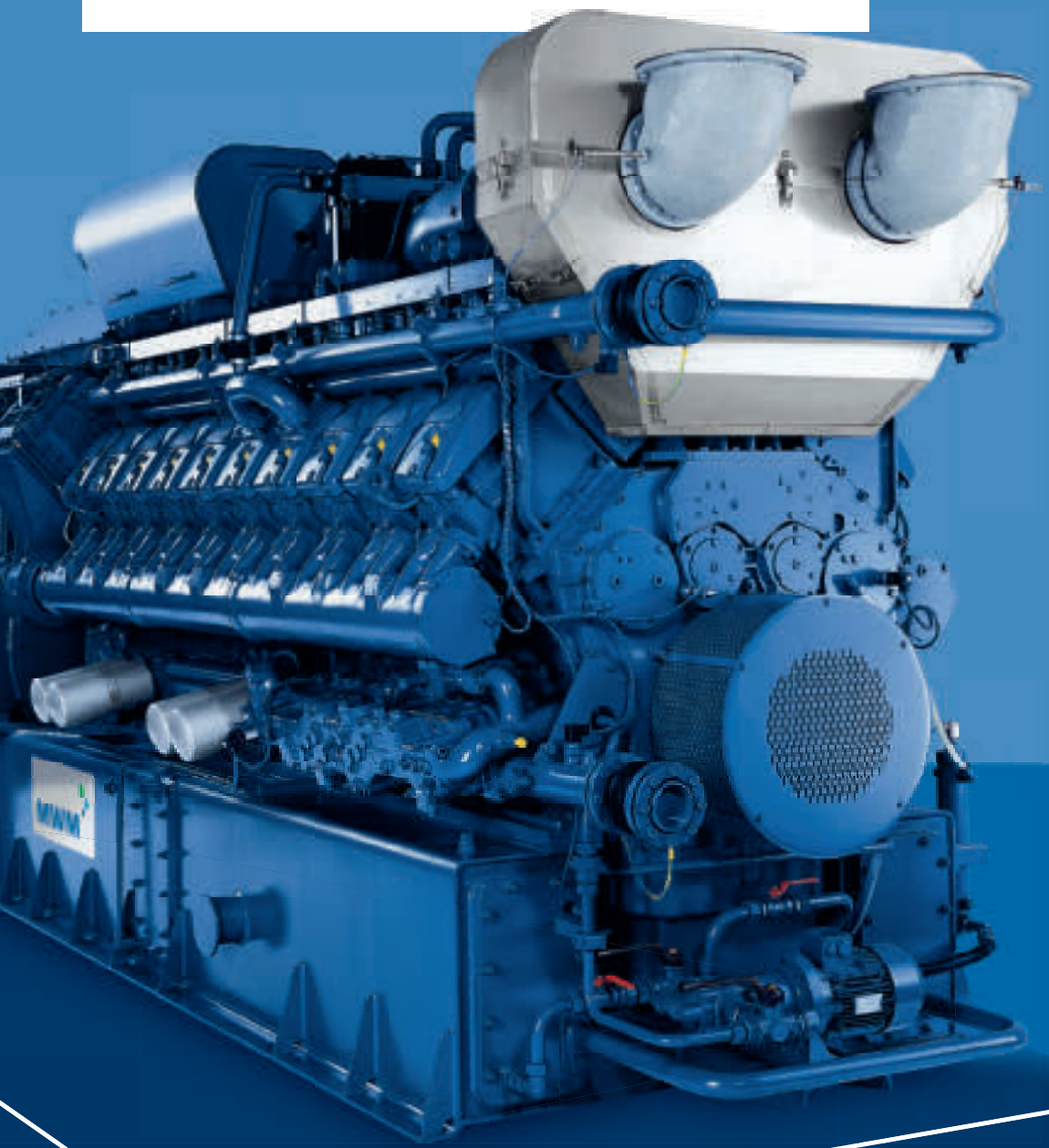

Reliability

System

Service

Profit

The TCG 2020. Top performance from MWM – used successfully worldwide.

Brandenburg Cogeneration Plant, Germany

The City of Brandenburg's cogeneration plant produces 15,992 MWh of district heating and 15,920 MWh of cogenerated electricity each year. MWM supplied the powerful genset for commissioning in 2009 and assisted a partner company in designing and installing the entire cogeneration plant. Other MWM plants are at the planning stage, using the same, successful arrangement.

Viikinmäki Sewage Plant, Finland

Viikinmäki Sewage Plant treats 3.53 million cubic meters of effluent per year for the Greater Helsinki area. Installed in 1994, the four original units were supplemented in 2009 by another TCG 2020 V12 producing 1 MW_{el} which enables the sewage gas to be converted into energy to power the entire plant. Today, thanks to their high efficiency and low maintenance requirements, the MWM units produce 100 % of the heat and 50 % of the power needed by the sewage works.

Taiyuan City Coal Mine, China

MWM equipped Taiyuan's state coal mine with a total of three Type TCG 2020 V20 units. The system utilizes gases from the mine and the steam and heat from the cooling water in order to generate electricity. This process obtained CDM certification with ease, meaning it qualifies for CDM credits. All in all, there were plenty of good reasons for the client to order a further four TCG 2020 V20 units.

Delta Energy B.V. Greenhouse Complex, Netherlands

The Dutch branch of MWM built one of Europe's biggest gas engine plants. Seventeen TCG 2020 V16 engines, generating a total of 27 MW_{el}, produce the heat and electricity required to run a 51 hectare greenhouse complex. This complex produces around 4,000 tons of tomatoes each year, enough to satisfy the fresh tomato demand of more than half a million people.

Strong arguments for a strong brand: MWM.

MWM has 140 years of experience

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You can rely on MWM

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Top marks for ecology and economy.

More profit

The TCG 2020 is highly efficient thanks to its optimized inlet duct, combustion chamber and spark plugs. Save as much as 15 % per annum on fuel costs – and increase your plant's profitability.

Less overall costs

With its optimized engine components, the TCG 2020 requires up to 50 % less lubricating oil than other similar gensets. In terms of efficiency that means long-term savings.

Different engines to suit your needs

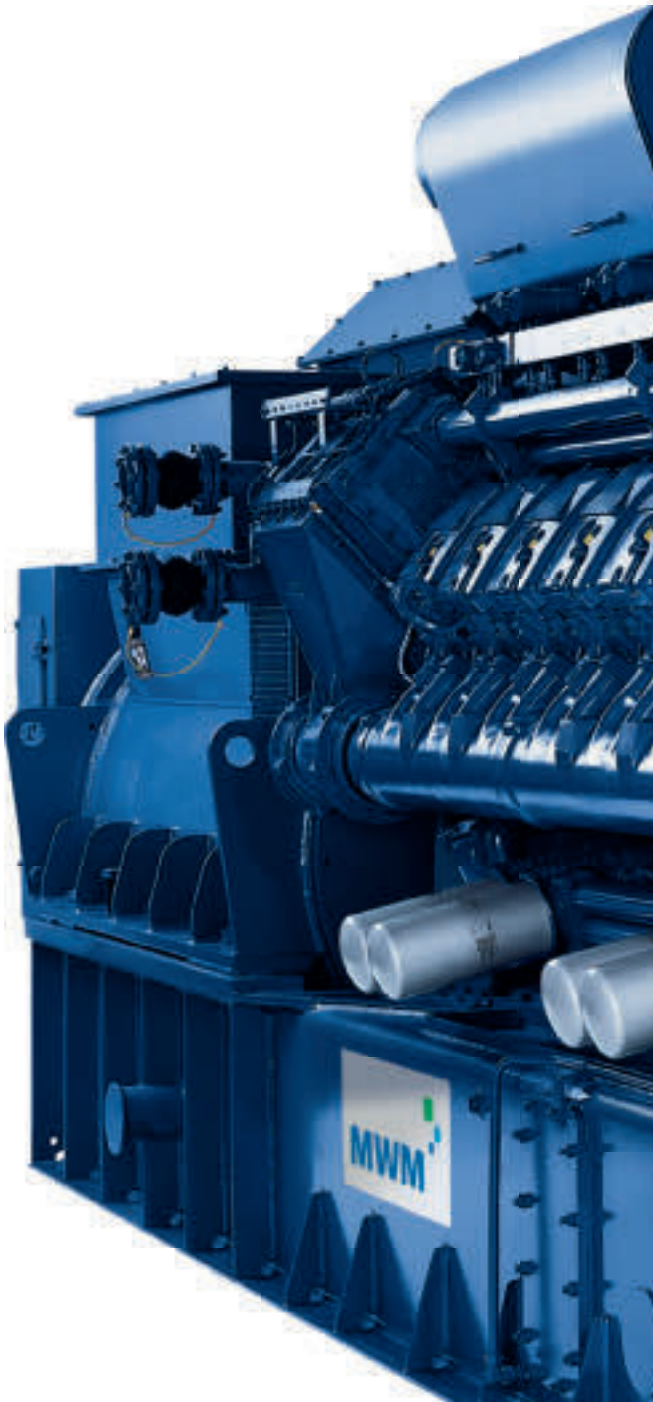
Whether you need high efficiency or an optimized standalone unit with good load compensation and black start properties – we can provide you with an engine tailored exactly to your needs.

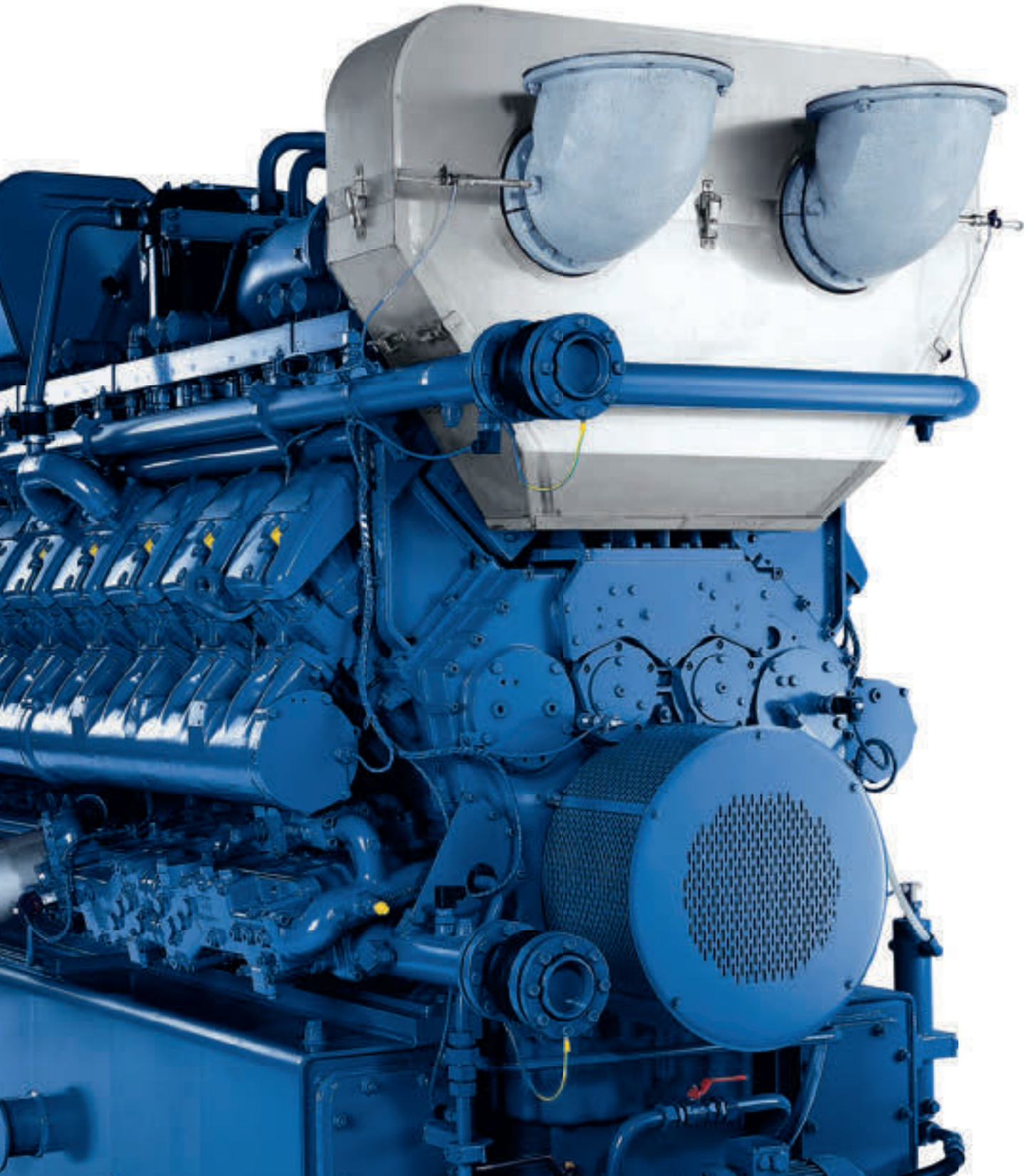
Optimum control concept

TEM (Total Electronic Management) controls not just the engine but the entire system including the heat supply from cogeneration. Temperature monitoring for each cylinder and anti-knock control ensure the best possible utilization of fuel and maximum power output, even if gas composition fluctuates.

Flexible usage

The latest technology such as our gas-mixer and TEM allows you to use a wide variety of gases. Even the most problematic gases such as colliery gas, landfill gas and sewage gas can be used without difficulty.





Technical data 50 Hz

Engine type		TCG 2020	V12 K1 [1]	V12 K [1]	V12 [2]	V16 K [1]	V16 [2]	V20 [2]
Bore/stroke		mm	170/195	170/195	170/195	170/195	170/195	170/195
Displacement		dm^3	53.1	53.1	53.1	70.8	70.8	88.5
Speed		min^{-1}	1500	1500	1500	1500	1500	1500
Mean piston speed		m/s	9.8	9.8	9.8	9.8	9.8	9.8
Length [3]		mm	4660	4790	4790	5430	5430	6200
Width [3]		mm	1810	1810	1810	1810	1810	1710
Height [3]		mm	2210	2210	2210	2210	2210	2190
Dry weight genset		kg	11200	11700	11700	13320	13320	17900

Natural gas applications

NO_x ≤ 500 mg/Nm³ **dry exhaust manifolds**

Engine type		TCG 2020	V12 K1 [1]	V12 K [1]	V12 [2]	V16 K [1]	V16 [2]	V20 [2]
Electrical power [4]		kW	1000	1125	1200	1500	1560	2000
Mean effective pressure		bar	15.5	17.4	18.6	17.4	18.1	18.6
Thermal output [5]	±8 %	kW	1177	1253	1190	1675	1579	1977
Electrical efficiency [4]		%	40.0	40.9	43.6	40.9	43.2	43.7
Thermal efficiency [4]		%	47.0	45.6	43.3	45.7	43.8	43.2
Total efficiency [4]		%	87.0	86.5	86.9	86.6	87.0	86.9

Biogas applications

NO_x ≤ 500 mg/Nm³
Sewage gas (65 % CH_4 / 35 % CO_2)
Biogas (60 % CH_4 / 32 % CO_2, rest N_2)
Landfill gas (50 % CH_4 / 27 % CO_2, rest N_2)

Minimum heating value (LHV) H_u = 5,0 kWh/Nm³
dry exhaust manifolds

Engine type		TCG 2020	V12 [2]	V16 [2]	V20 [2]
Electrical power [6]		kW	1200	1560	2000
Mean effective pressure		bar	18.6	18.1	18.6
Thermal output [5]	±8 %	kW	1250	1645	2021
Electrical efficiency [6]		%	42.0	41.7	42.9
Thermal efficiency [6]		%	43.8	44.0	43.3
Total efficiency [6]		%	85.8	85.7	86.2

1) Optimized efficiency version.
2) Version optimized for standalone operation and load compensation.
3) Transport dimensions for gensets; components set up separately must be taken into consideration.
4) According to ISO 3046/1 at voltage = 0.4 kV, cosphi = 1 for 50 Hz, and a methane number of MN 80 (TCG 2020) or MN 70 (TCG 2020K).
5) Cooling of the exhaust gases to 120 °C for natural gas and 150 °C for biogas.
6) According to ISO 3046/1 at voltage = 0.4 kV, cosphi = 1 for 50 Hz.

Data for special gas and dual gas operation on request.

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Technical data 60 Hz

Engine type		TCG 2020	V12 K [1]	V12 [2]	V16 K [1]	V16 [2]	V20 [2]
Bore/stroke		mm	170/195	170/195	170/195	170/195	170/195
Displacement		dm^3	53.1	53.1	70.8	70.8	88.5
Speed		min^{-1}	1500	1500	1500	1500	1500
Mean piston speed		m/s	9.8	9.8	9.8	9.8	9.8
Length [3]		mm	5970	5970	6640	6640	7470
Width [3]		mm	1790	1790	1790	1790	1710
Height [3]		mm	2210	2210	2210	2210	2190
Dry weight genset		kg	12850	12850	14850	14850	19400

Natural gas applications

NO_x ≤ 500 mg/Nm³ **dry exhaust manifolds**

Engine type		TCG 2020	V12 K [1]	V12 [2]	V16 K [1]	V16 [2]	V20 [2]
Electrical power [4]		kW	1125	1200	1500	1560	2000
Mean effective pressure		bar	17.7	18.8	17.7	18.2	18.8
Thermal output [5]	±8 %	kW	1261	1196	1686	1589	1983
Electrical efficiency [4]		%	40.7	43.4	40.6	43.0	43.4
Thermal efficiency [4]		%	45.6	43.2	45.7	43.7	43.2
Total efficiency [4]		%	86.3	86.6	86.3	86.7	86.6

Biogas applications

NO_x ≤ 500 mg/Nm³
Sewage gas (65 % CH_4 / 35 % CO_2)
Biogas (60 % CH_4 / 32 % CO_2, rest N_2)
Landfill gas (50 % CH_4 / 27 % CO_2, rest N_2)

Minimum heating value (LHV) H_u = 5,0 kWh/Nm³
dry exhaust manifolds

Engine type		TCG 2020	V12 [2]	V16 [2]	V20 [2]
Electrical power [6]		kW	1200	1560	2000
Mean effective pressure		bar	18.8	18.2	18.8
Thermal output [5]	±8 %	kW	1258	1657	2027
Electrical efficiency [6]		%	41.8	41.4	42.6
Thermal efficiency [6]		%	43.8	43.9	43.3
Total efficiency [6]		%	85.6	85.3	85.9

1) Optimized efficiency version.
2) Version optimized for standalone operation and load compensation.
3) Transport dimensions for gensets; components set up separately must be taken into consideration.
4) According to ISO 3046/1 at voltage = 0.48 kV, cosphi = 1 for 60 Hz, and a methane number of MN 80 (TCG 2020) or MN 70 (TCG 2020K).
5) Cooling of the exhaust gases to 120 °C for natural gas and 150 °C for biogas.
6) According to ISO 3046/1 at voltage = 0.48 kV, cosphi = 1 for 60 Hz.

Data for special gas and dual gas operation on request.

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Version 03-13/EN

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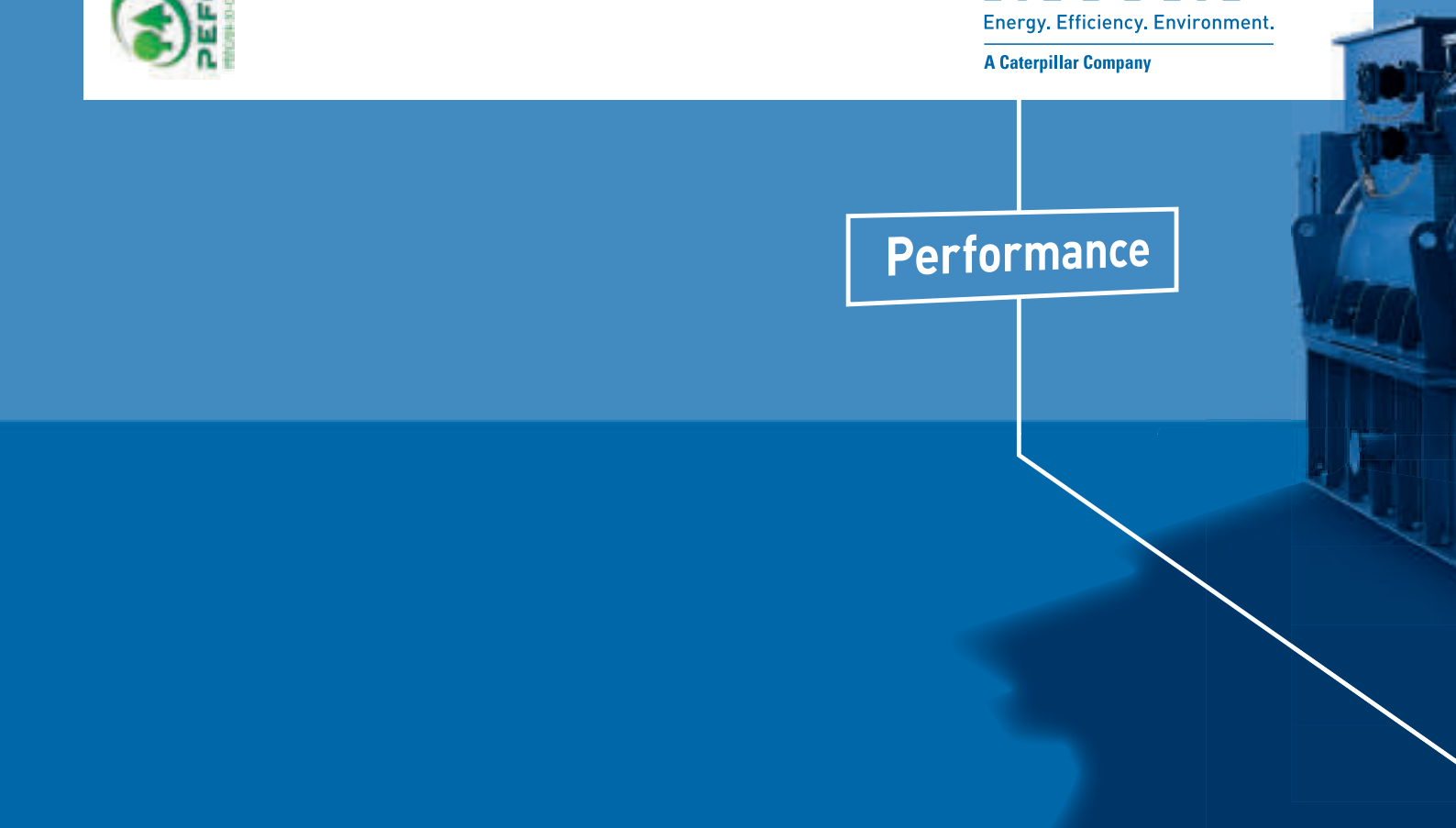
Performance



www.mwm.net

TCG 2032

Efficiency straight down the line.

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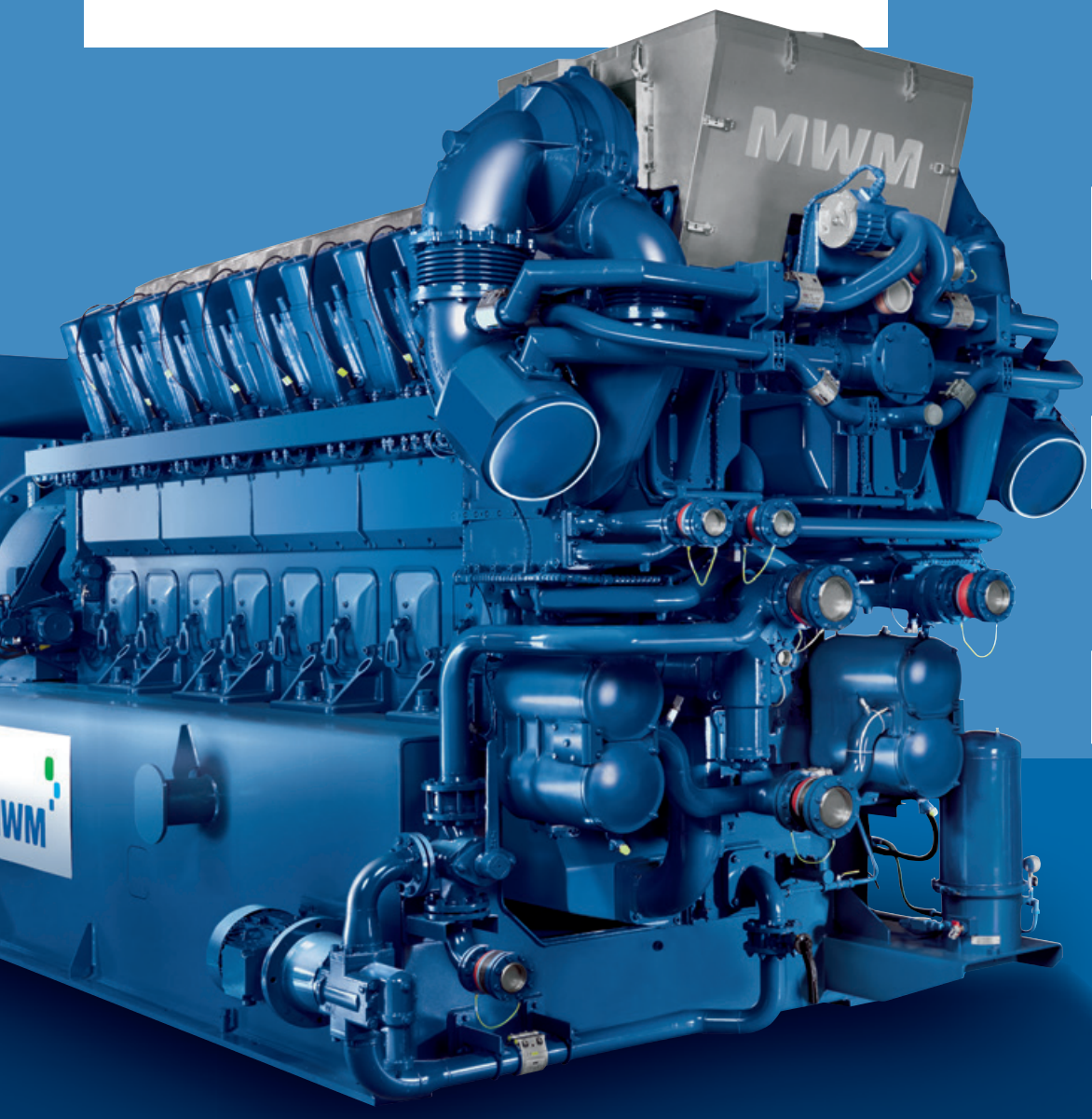


Reliability

System

Service

Profit

The TCG 2032. Top performance from MWM – used successfully worldwide.

Precision Energy, Bangladesh

In 2010, MWM shipped 15 TCG 2032 V16s to Precision Energy Bangladesh within just three months. The gas engines produce a constant overall output of 60 MW_{el}. All of the electric energy that has been generated is fed into the public grid. More information about this project can be found in our MWM movie "60 MW Around the World" at www.mwm.net.

AMD Dresden, Germany

MWM engines were chosen for the energy supply center of the AMD chip factory in Dresden, since our system generates electricity of supreme quality. Moreover, the waste heat is used for heat supply and cold production, thus achieving very high primary energy utilization.

Italiana Coke, Italy

MWM engines were installed for the environmentally friendly utilization of the coke oven gas generated at the coke oven plant Italiana Coke. The electricity rebate, whose amount is determined by law, gives the operator a secure income from the sale of the electricity generated at the plant, in addition to the company's core business, the production of metallurgic coke.

CITIC Guan project, China

The TCG 2032 V12 gas engines in Dongtai as well as the engines of the type TCG 2032 V16 in Xitai produce a total of 18 MW_{el} for the CITIC Guan project for the extraction of raw materials. Building the two plants at the salt lake of the Chaidam basin at an altitude of 3,000 m above sea level presented very special challenges to the project.

Strong arguments for a strong brand: MWM.

MWM has more than 140 years of experience

MWM has made a tradition out of innovation. We have been developing and building engines and gensets for a wide range of uses since 1871. Our global success is founded on having invented the most advanced four-stroke diesel engines. And, 30 years ago, we became one of the first manufacturers to revolutionize generator technology using high-performance gas engines. To this day we continue to work constantly on making our systems more efficient.

MWM understands what's really needed

Today, cost-effectiveness is crucial! MWM offers cooperation all along the line, which pays off right across the process chain. We are the complete partner to our customers: from the selection of the system layout for the project, all the way to service and repair.

MWM offers the most economical service concepts

With its worldwide service network, long service intervals and low maintenance costs, MWM Service is an important factor for lasting efficiency. Innovative offerings such as remote diagnosis, remote parameter configuration and the generation of operating values can be provided cheaply anywhere in the world using the Internet. The new MWM Logistics Centre also means fast deliveries and low spares costs. Shortblocks can be delivered and assembled easily, so your system will be ready for operation in the shortest possible time. Another benefit is that our own training centre offers top-level, practically oriented courses for your technicians.

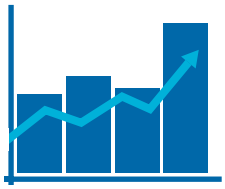
MWM thinks in terms of the complete solution

Only if all of the components in your system are selected and configured perfectly for your needs will you achieve optimum overall efficiency. We have the experience, the technology and the capacity. Our engineers can develop tailor-made complete solutions especially for you. From comprehensive cogeneration concepts for electricity, heat and cooling, to containerized solutions, to turn-key systems – MWM can develop complete concepts to suit your needs, and implement them reliably too. All in all, system engineering just the way you want it.

You can rely on MWM

Clear statements, transparent offers: we keep our promise. We are always there when you need us. Test us – on site, at your plant.

Performance. Reliability. Cost-effectiveness. For your success.



More profit

The optimized maintenance concept with cylinder units simplifies accessibility and, along with the reduction of the number of different parts, minimizes the time required for maintenance. This saves up to 20% in service costs. At the same time you profit from up to 30% less lubricating oil consumption compared to other engines.

Longer runtimes

Thanks to the extended service intervals, the TGC 2032 runs up to 200 hours longer per annum than comparable products.

Greater reliability

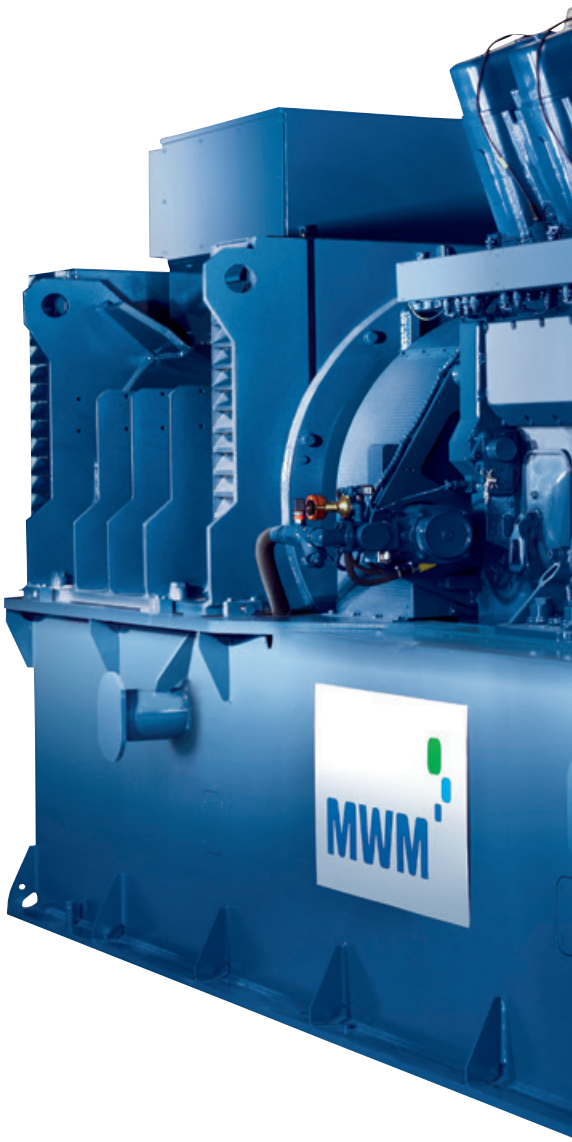
The particle-free combustion with chamber plugs extends the service intervals for the exhaust gas heat exchanger and reduces service costs compared to other combustion methods.

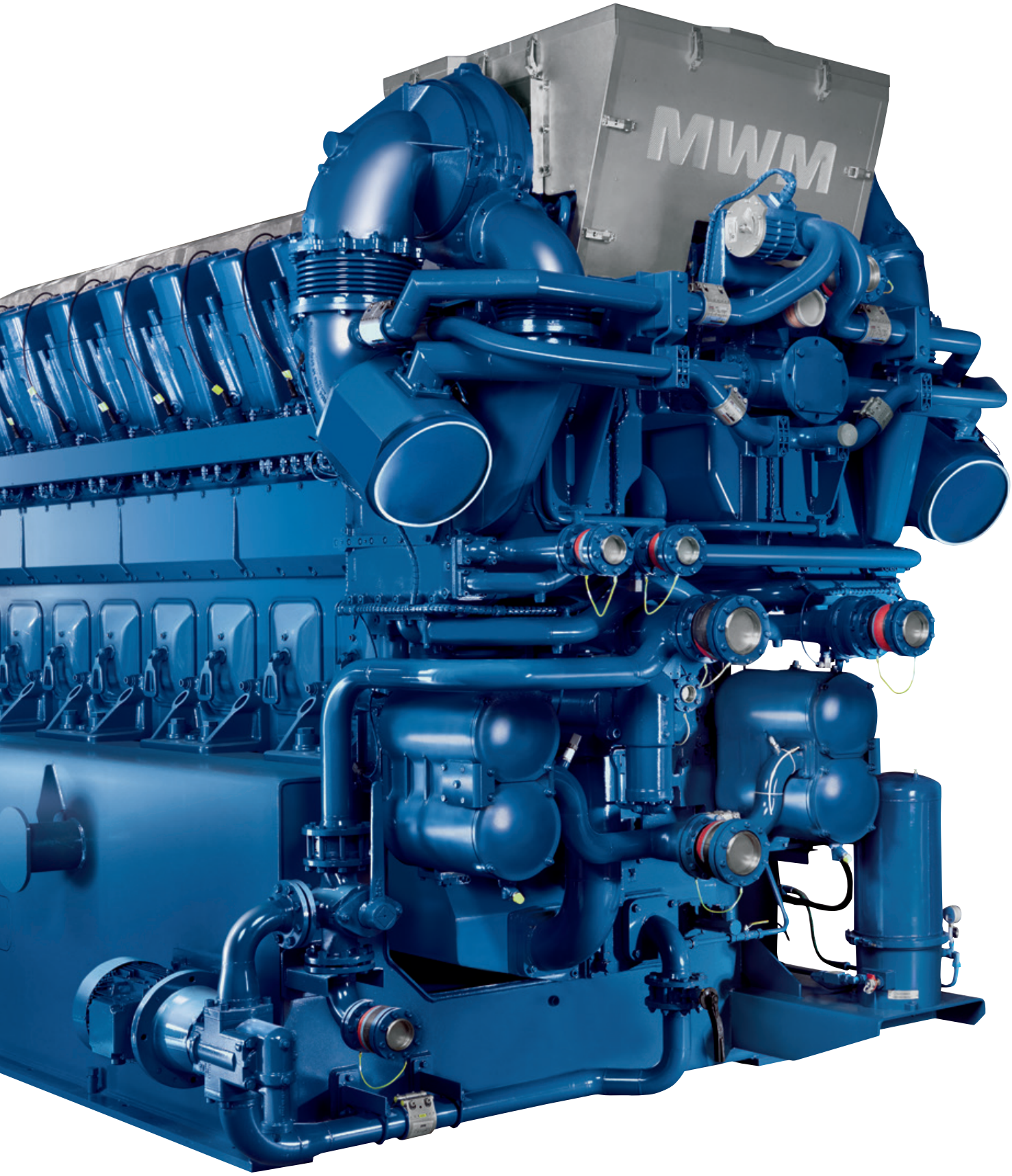
Optimum efficiency

State-of-the-art technologies, such as the optimized gas mixer and TEM (Total Electronic Management), ensure efficient operation even with such difficult gases as mine gas, landfill gas, or sewage gas. This is also true when the gas composition is fluctuating – thanks to fast response times due to the temperature monitoring for each cylinder. TEM not only controls the engine, but the entire system, including heat extraction.

Full turbo power

The new high-pressure turbo charger A140 in combination with optimized gas exchange allows the engine to run at full power, even under tropical conditions.

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Technical data 50 Hz

Engine type		TCG 2032 V12	TCG 2032 V16
Bore/stroke	mm	260/320	260/320
Displacement	dm^3	203.9	271.8
Speed	min^{-1}	1000	1000
Mean piston speed	m/s	10.7	10.7
Length [1]	mm	7860	9200
Width [1]	mm	2660	2690
Height [1]	mm	3390	3390
Dry weight engine	kg	43100	51400

Natural gas applications

NO_x ≤ 500 mg/Nm^3 [2] **dry exhaust pipes**

Engine type		TCG 2032 V12	TCG 2032 V16
Electrical power [3]	kW	3333	4300
Mean effective pressure	bar	20.0	19.4
Thermal output [4] ±8 %	kW	3206	4164
Electrical efficiency [3]	%	44.1	44.1
Thermal efficiency [3]	%	42.4	42.7
Total efficiency [3]	%	86.5	86.8

Biogas applications

NO_x ≤ 500 mg/Nm^3 [2]
Sewage gas (65 % CH_4 / 35 % CO_2)
Biogas (60 % CH_4 / 32 % CO_2, rest N_2)
Landfill gas (50 % CH_4 / 27 % CO_2, rest N_2)

minimum heating value H_u = 5.0 kWh/Nm^3
dry exhaust pipes

Engine type		TCG 2032 V12	TCG 2032 V16
Electrical power [5]	kW	2830	3770
Mean effective pressure	bar	17.0	17.0
Thermal output [4] ±8 %	kW	2734	3460
Electrical efficiency [5]	%	42.3	42.9
Thermal efficiency [5]	%	40.8	39.4
Total efficiency [5]	%	83.1	82.3

1) Transport dimensions for gensets; components set up separately must be taken into consideration.
2) NO_x-emissions: NO_x ≤ 0.5 g NO_2/Nm^3 dry exhaust gas at 5 % O_2.
3) According to ISO 3046/1 at voltage = 11 kV, cosphi = 1 for 50 Hz, and a methane number of MN 70.
4) Cooling of the exhaust gases to 120°C for natural gas and 180°C for biogas.
5) According to ISO 3046/1 at voltage = 11 kV, cosphi = 1 for 50 Hz.

Data for special gases and dual gas operation on request.

The values given on these datasheets are for information purposes only and not binding.
The information given in the offer is decisive.

Technical data 60 Hz

Engine type		TCG 2032 V12	TCG 2032 V16
Bore/stroke	mm	260/320	260/320
Displacement	dm^3	203.9	271.8
Speed	min^{-1}	900	900
Mean piston speed	m/s	9.6	9.6
Length [1]	mm	8000	9420
Width [1]	mm	2660	2690
Height [1]	mm	3390	3390
Dry weight engine	kg	42500	51450

Natural gas applications

NO_x ≤ 500 mg/Nm^3 [2] **dry exhaust pipes**

Engine type			TCG 2032 V12	TCG 2032 V16
Electrical power [3]		kW	3000	4000
Mean effective pressure		bar	18.1	18.1
Thermal output [4]	±8 %	kW	2893	3884
Electrical efficiency [3]		%	43.7	43.7
Thermal efficiency [3]		%	42.1	42.4
Total efficiency [3]		%	85.8	86.1

Biogas applications

NO_x ≤ 500 mg/Nm^3 [2]
Sewage gas (65 % CH_4 / 35 % CO_2)
Biogas (60 % CH_4 / 32 % CO_2, rest N_2)
Landfill gas (50 % CH_4 / 27 % CO_2, rest N_2)

minimum heating value H_u = 5.0 kWh/Nm^3
dry exhaust pipes

Engine type			TCG 2032 V12	TCG 2032 V16
Electrical power [5]		kW	2530	3370
Mean effective pressure		bar	17.0	17.0
Thermal output [4]	±8 %	kW	2416	3018
Electrical efficiency [5]		%	42.2	43.1
Thermal efficiency [5]		%	40.3	38.6
Total efficiency [5]		%	82.5	81.7

1) Transport dimensions for gensets; components set up separately must be taken into consideration.
2) NO_x-emissions: NO_x ≤ 0.5 g NO_2/Nm^3 dry exhaust gas at 5 % O_2.
3) According to ISO 3046/1 at voltage = 4,16 kV, cosphi = 1 for 60 Hz, and a methane number of MN 80.
4) Cooling of the exhaust gases to 120°C for natural gas and 180°C for biogas.
5) According to ISO 3046/1 at voltage = 4.16 kV, cosphi = 1 for 60 Hz.

Data for special gases and dual gas operation on request.

The values given on these datasheets are for information purposes only and not binding.
The information given in the offer is decisive.

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