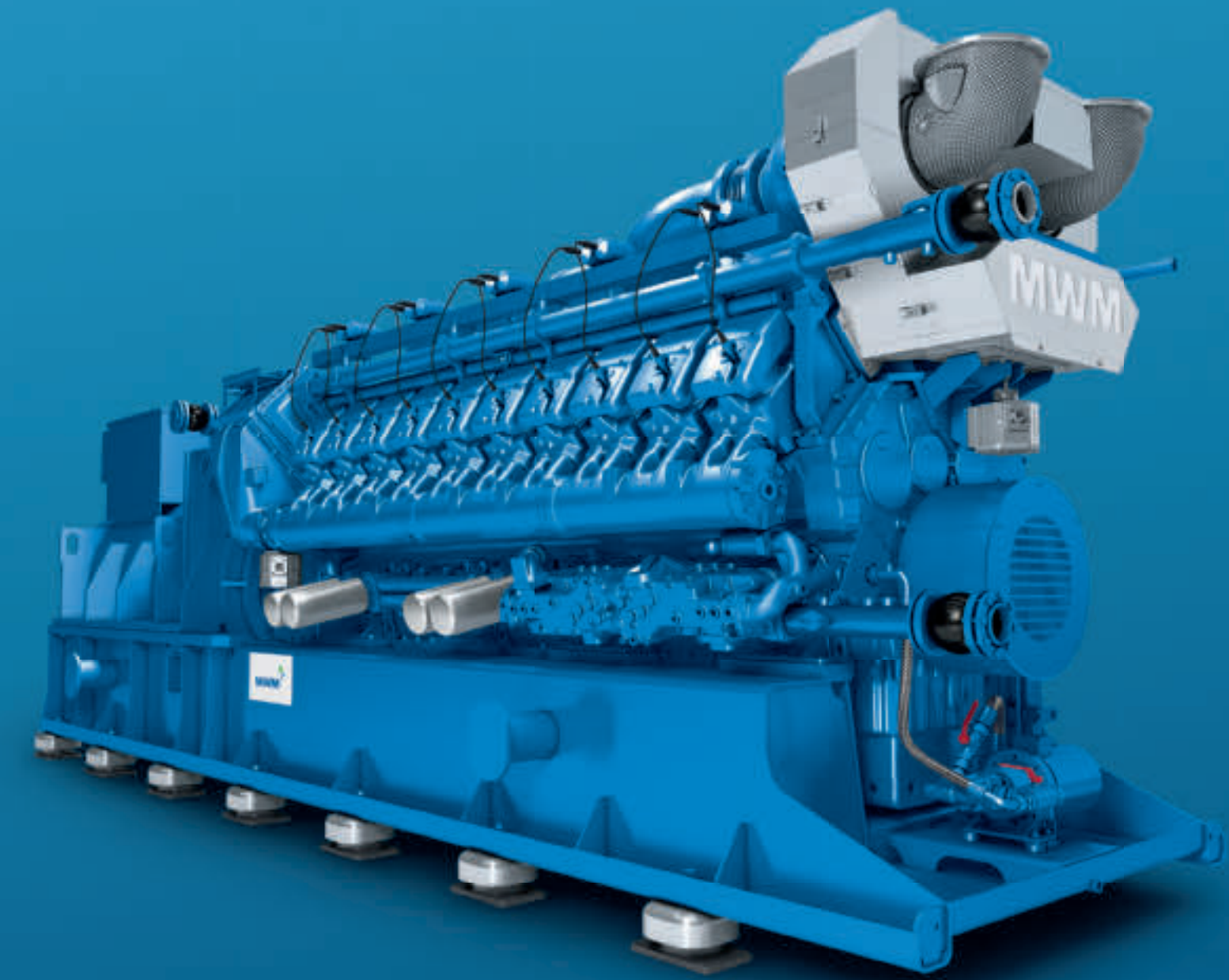
www.mwm.net

TCG 2020

Top marks for ecology and economy.

For Natural Gas and Biogas with an output from 1,000 to 2,000 kW_{el}



MWM

Energy. Efficiency. Environment.

Our experience for your success

Strong partner for your progress

With MWM you can benefit from 140 years of experience in gas engine technology and energy production. Since 2011 the traditional company, Motorenwerke Mannheim, has belonged to the worldwide network of Caterpillar Inc. This gives us an even more unique expertise that benefits you in the development of individual complete solutions.

Worldwide successful technology

MWM offers you the confidence and experience of a specialist who has already successfully installed hundreds of biogas systems with gas power plants within and outside of the European region. Efficiency and reliability are the decisive factors everywhere.

Competent, reliable, and uncomplicated

We want you to be satisfied with us in every phase of the project: That is why we clearly spell out all agreements in a written order confirmation with a detailed schedule. MWM stands for reliability and quality of planning, right down to commissioning.

We stick to our agreements

If you put great value in an optimal return on your investment in a biogas system and smooth handling, MWM is a natural first choice. We offer comprehensive experience and always keep a close eye on the entire process. Seamless and turnkey ready – from initial consultation to handling the completed system by our customer service. We say what we do, and we do what we say.

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

NanJi Water Recycle Centre, Korea

Korea District Heating Corp. is one of the largest suppliers of district heating in the world. In March 2013, two TCG 2020 V16 engines were taken into operation providing an electrical output of 1.6 MW each. The units are part of the first plant installed in South Korea that generates electricity and heat from biogas.

2 x MWM TCG 2020 V16 | Commissioning: 2013

Port Moresby, Papua New Guinea

Two high-efficiency 2020 V12 K gensets with 1.1 MW_{el} output each ensure 24-hour port operations at Port Moresby. The special feature of the system is its dual-gas capability, enabling it to be run on propane and liquefied natural gas without the need for structural modifications.

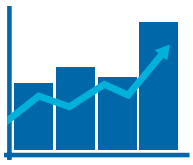
2 x MWM TCG 2020 V12 K | Commissioning: 2012

Sewage Plant Hetlingen, Germany

The WWTP Hetlingen operates four TCG 2020 V12 units with an output of 1.1 kW_{el} and 1.1 kW_{th}. Sewage gas is used as fuel, which is produced during the anaerobic digestion of sewage sludge. The challenge was to install the gensets without shutting down the sewage plant. The plant was awarded CHP of the month.

4 x MWM TCG 2020 V12 | Commissioning: 2011

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

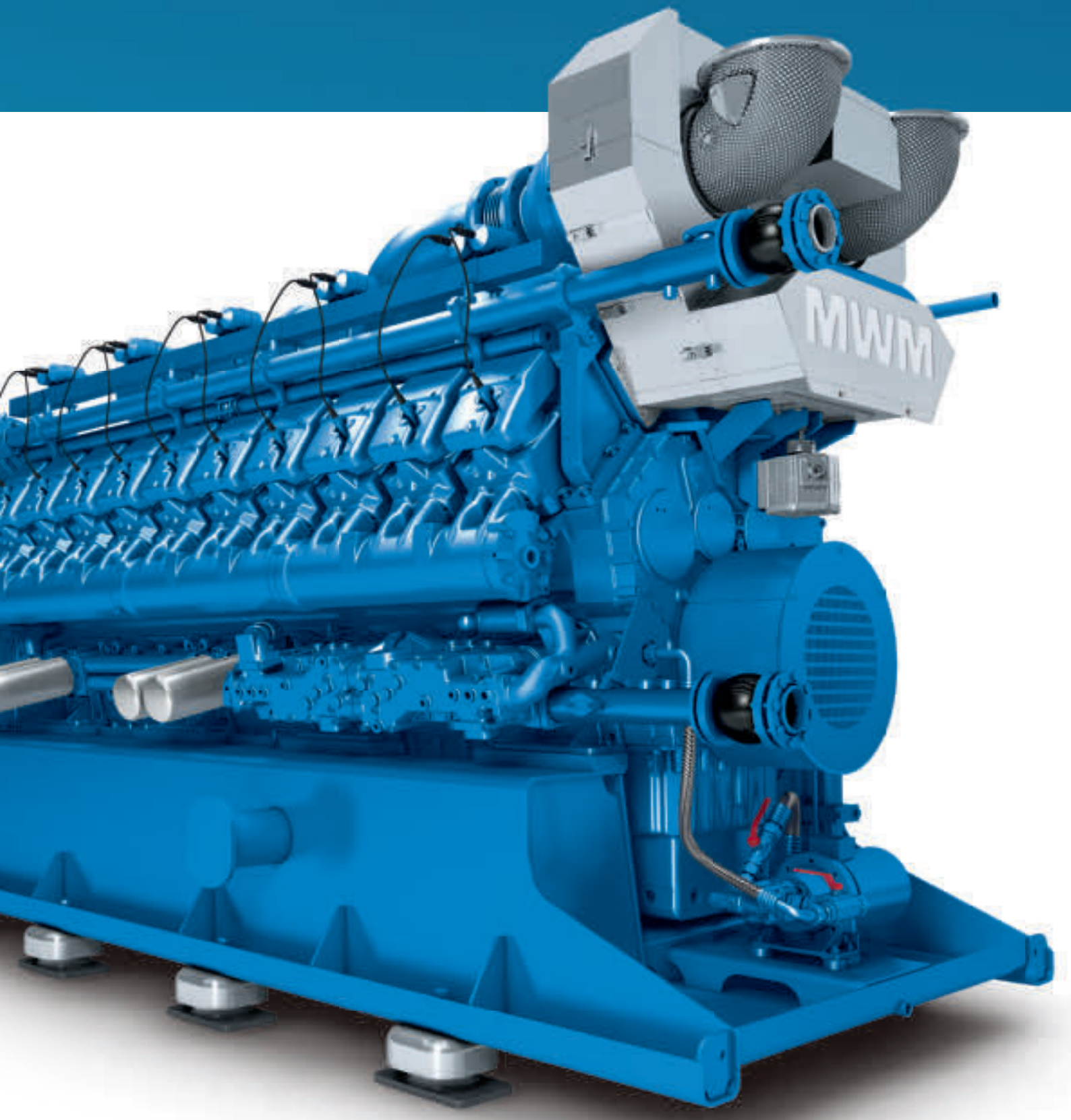
Whether you need high efficiency or an optimized standalone unit with good load compensation and black start properties – we can provide you with an engine tailored exactly to your needs.

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.



TCG2020 V20

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}	1,500	1,500	1,500	1,500	1,500	1,500
Mean piston speed		m/s	9.8	9.8	9.8	9.8	9.8	9.8
Length [3]		mm	4,660	4,790	4,790	5,430	5,430	6,200
Width [3]		mm	1,810	1,810	1,810	1,810	1,810	1,710
Height [3]		mm	2,210	2,210	2,210	2,210	2,210	2,190
Dry weight genset		kg	11,200	11,700	11,700	13,320	13,320	17,900

Natural gas applications

NO_x ≤ 500 mg/m_n^3 **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	1,000	1,125	1,200	1,500	1,560	2,000
Mean effective pressure		bar	15.5	17.4	18.6	17.4	18.1	18.6
Thermal output [5]	±8 %	kW	1,177	1,253	1,190	1,675	1,579	1,977
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/m_n^3
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/m_n^3
Dry exhaust manifolds

Engine type		TCG 2020	V12 [2]	V16 [2]	V20 [2]
Electrical power [6]		kW	1,200	1,560	2,000
Mean effective pressure		bar	18.6	18.1	18.6
Thermal output [5]	±8 %	kW	1,250	1,645	2,021
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) Version optimized for standalone operation and load compensation.
2) Optimized efficiency version.
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.

The values given in this data sheet are for information purposes only and not binding.
The information given in the offer is decisive.

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}	1,500	1,500	1,500	1,500	1,500
Mean piston speed	m/s	9.8	9.8	9.8	9.8	9.8
Length [3]	mm	5,970	5,970	6,640	6,640	7,470
Width [3]	mm	1,790	1,790	1,790	1,790	1,710
Height [3]	mm	2,210	2,210	2,210	2,210	2,190
Dry weight genset	kg	12,850	12,850	14,850	14,850	19,400

Natural gas applications

$NO_x \leq 500$ mg/m_n^3 **Dry exhaust manifolds**

Engine type		TCG 2020	V12 K [1]	V12 [2]	V16 K [1]	V16 [2]	V20 [2]
Electrical power [4]		kW	1,125	1,200	1,500	1,560	2,000
Mean effective pressure		bar	17.7	18.8	17.7	18.2	18.8
Thermal output [5]	±8 %	kW	1,261	1,196	1,686	1,589	1,983
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

$NO_x \leq 500$ mg/m_n^3
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/m_n^3
Dry exhaust manifolds

Engine type		TCG 2020	V12 [2]	V16 [2]	V20 [2]
Electrical power [6]		kW	1,200	1,560	2,000
Mean effective pressure		bar	18.8	18.2	18.8
Thermal output [5]	±8 %	kW	1,258	1,657	2,027
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) Version optimized for standalone operation and load compensation.
2) Optimized efficiency version.
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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The information given in the offer is decisive.

For additional MWM locations, scan the QR code or visit the website **www.mwm.net/en/mwm-worldwide**

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