

# 2G - Biogas 65/35 - 35°C - 40°C - NOx 500

## Technical data

600 kWel; 480 V, 60 Hz; Acc. to gas analysis

### Design conditions

Comb. air temperature / rel. Humidity:	[°C] / [%]	25 / 60
Altitude:	[m]	100
Exhaust temp. after heat exchanger:	[°C]	180
NO <sub>x</sub> Emission (tolerance - 8%):	[mg/Nm <sup>3</sup> @5%O <sub>2</sub> ]	500

### Genset:

Engine:	<b>TCG 2016 V12 C</b>	
Speed:	[1/min]	1800
Configuration / number of cylinders:	[-]	V / 12
Bore / Stroke / Displacement:	[mm]/[mm]/[dm <sup>3</sup> ]	132 / 160 / 26
Compression ratio:	[-]	14,6
Mean piston speed:	[m/s]	9,6
Mean lube oil consumption at full load:	[g/kWh]	0,1
Engine-management-system:	[-]	TEM EVO
Generator:	<b>Marelli MJB 400 LA4</b>	
Voltage / voltage range / cos Phi:	[V] / [%] / [-]	480 / ±10 / 1
Speed / frequency:	[1/min] / [Hz]	1800 / 60

### Fuel gas data: <sup>2)</sup>

Methane number:	[-]	134
Lower calorific value:	[kWh/Nm <sup>3</sup> ]	6,48
Gas density:	[kg/Nm <sup>3</sup> ]	1,16
Acc. to gas analysis		
Analysis: CO <sub>2</sub>	[Vol%]	35,00
N <sub>2</sub>	[Vol%]	0,00
O <sub>2</sub>	[Vol%]	0,00
H <sub>2</sub>	[Vol%]	0,00
CO	[Vol%]	0,00
CH <sub>4</sub>	[Vol%]	65,00
C <sub>2</sub> H <sub>4</sub>	[Vol%]	0,00
C <sub>2</sub> H <sub>6</sub>	[Vol%]	0,00
C <sub>3</sub> H <sub>6</sub>	[Vol%]	0,00
C <sub>3</sub> H <sub>8</sub>	[Vol%]	0,00
C <sub>4</sub> H <sub>8</sub>	[Vol%]	0,00
C <sub>4</sub> H <sub>10</sub>	[Vol%]	0,00
C <sub>5</sub> H <sub>12</sub>	[Vol%]	0,00
C <sub>x</sub> H <sub>y</sub>	[Vol%]	0,00
H <sub>2</sub> S	[Vol%]	0,00

### Energy balance

Load:	[%]	100	75	50
Electrical power COP acc. ISO 8528-1:	[kW]	<b>600</b>	<b>450</b>	<b>300</b>
Engine jacket water heat:	[kW ±8%]	316	258	206
Intercooler LT heat:	[kW ±8%]	51	32	17
Lube oil heat:	[kW ±8%]			
Exhaust heat with temp. after heat exchanger:	[kW ±8%]	286	235	175
Exhaust temperature:	[°C ±25°C]	453	472	489
Exhaust mass flow, wet:	[kg/h]	3395	2595	1820
Combustion mass air flow:	[kg/h]	3136	2393	1675
Radiation heat engine / generator:	[kW ±8%]	22 / 20	17 / 18	13 / 16
Fuel consumption:	[kW+5%]	1449	1127	809
Electrical / thermal efficiency:	[%]	41,4 / 41,5	39,9 / 43,7	37,1 / 47,0
Total efficiency:	[%]	82,9	83,6	84,1

### System parameters <sup>1)</sup>

Ventilation air flow (comb. air incl.) with ΔT = 15K	[kg/h]	16700
Combustion air temperature minimum / design:	[°C]	20 / 25
Exhaust back pressure from / to:	[mbar]	30 / 50
Maximum pressure loss in front of air cleaner:	[mbar]	5
Zero-pressure gas control unit selectable from / to: <sup>2)</sup>	[mbar]	20 / 200
Pre-pressure gas control unit selectable from / to: <sup>2)</sup>	[bar]	0,5 / 10
Starter battery 24V, capacity required:	[Ah]	143
Starter motor:	[kWel.] / [VDC]	5,4 / 24
Lube oil volume engine / external oil tank:	[dm <sup>3</sup> ]	100 / 260
Dry weight engine / genset:	[kg]	2650 / 6250

### Cooling system

Glycol content engine jacket water / intercooler:	[% Vol.]	0 / 35
Water volume engine jacket / intercooler:	[dm <sup>3</sup> ]	43 / 5
KVS / Cv value engine jacket water / intercooler:	[m <sup>3</sup> /h]	37 / 10
Jacket water coolant temperature in / out:	[°C]	78 / 88
Intercooler coolant temperature in / out:	[°C]	40 / 45
Engine jacket water flow rate from / to:	[m <sup>3</sup> /h]	22 / 37
Water flow rate engine jacket water / intercooler:	[m <sup>3</sup> /h]	28 / 10
Water pressure loss engine jacket water / intercooler:	[bar]	0,6 / 1,0

<sup>1)</sup> See also "Layout of power plants":

<sup>2)</sup> See also Techn. Circular 0199-99-3017

Frequency band f [Hz]	25	31,5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	L <sub>WA</sub> [dB(A)]	S [m <sup>2</sup> ]
<b>Air-borne noise <sup>3)</sup></b> L <sub>W, Terz</sub> [dB(lin)]	84,8	91,1	101	105,9	99,4	106,4	110,4	107,2	112,3	116,5	111,2	111,8	112,5	107,5	107,3	108,1	104,8	106,4	105,5	105,3	105,6	103,3	102,8	103,9	109,5	101,8	97,7	95,4	92,2	118,3	81
<b>Exhaust noise <sup>4)</sup></b> L <sub>W, Octave</sub> [dB(lin)]				118	129			134			128			128			122			116					133	15,2					

<sup>3)</sup> DIN EN ISO 3746 (σ<sub>R0</sub>=±4 dB)

<sup>4)</sup> DIN 45635-11 Appendix A (±3 dB)

L<sub>W</sub>: Sound power level

S: Area of measurement surface (S<sub>0</sub>=1m<sup>2</sup>)