

2G - Biogas 50/50 - 35°C - 50°C - NOx 500



Technical data

2000 kWel; 480 V, 60 Hz; Bio gas

Design conditions

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

Fuel gas data: ²⁾

Methane number:	[-]	149
Lower calorific value:	[kWh/Nm ³]	4,99
Gas density:	[kg/Nm ³]	1,35
Standard gas:	Bio gas	
Analysis: CO ₂	[Vol%]	50,00
N ₂	[Vol%]	0,00
O ₂	[Vol%]	0,00
H ₂	[Vol%]	0,00
CO	[Vol%]	0,00
CH ₄	[Vol%]	50,00
C ₂ H ₄	[Vol%]	0,00
C ₂ H ₆	[Vol%]	0,00
C ₃ H ₆	[Vol%]	0,00
C ₃ H ₈	[Vol%]	0,00
C ₄ H ₈	[Vol%]	0,00
C ₄ H ₁₀	[Vol%]	0,00
C ₅ H ₁₂	[Vol%]	0,00
C _x H _y	[Vol%]	0,00
H ₂ S	[Vol%]	0,00

Genset:

Engine:	TCG2020V20
Speed:	[1/min] 1500
Configuration / number of cylinders:	[-] V / 20
Bore / Stroke / Displacement:	[mm]/[mm]/[dm ³] 170 / 195 / 89
Compression ratio:	[-] 14,0
Mean piston speed:	[m/s] 9,8
Mean lube oil consumption at full load:	[g/kWh] 0,2
Engine-management-system:	[-] TEM EVO
Generator:	Marelli MJB 560 LA4
Voltage / voltage range / cos Phi:	[V] / [%] / [-] 480 / ±5 / 1
Speed / frequency:	[1/min] / [Hz] 1800 / 60
Gear box:	Eisenbeiss GU 360
Lube oil volume of gear box:	[dm ³] 90

Energy balance

Load:	[%]	100	75	50
Electrical power COP acc. ISO 8528-1:	[kW]	2000	1500	1000
Engine jacket water heat:	[kW ±8%]	1080	803	555
Intercooler LT heat:	[kW ±8%]	132	99	70
Lube oil heat:	[kW ±8%]			
Exhaust heat with temp. after heat exchanger:	[kW ±8%]	918	786	618
Exhaust temperature:	[°C ±25°C]	462	499	541
Exhaust mass flow, wet:	[kg/h]	10463	7879	5445
Combustion mass air flow:	[kg/h]	9185	6889	4742
Radiation heat engine / generator:	[kW ±8%]	73 / 62	70 / 56	67 / 50
Fuel consumption:	[kW+5%]	4733	3663	2602
Electrical / thermal efficiency:	[%]	42,3 / 42,2	40,9 / 43,4	38,4 / 45,1
Total efficiency:	[%]	84,5	84,3	83,5

System parameters ¹⁾

Ventilation air flow (comb. air incl.) with ΔT = 15K	[kg/h]	52300
Combustion air temperature minimum / design:	[°C]	5 / 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: ²⁾	[mbar]	20 / 200
Pre-pressure gas control unit selectable from / to: ²⁾	[bar]	0,5 / 10
Starter battery 24V, capacity required:	[Ah]	430
Starter motor:	[kWel.] / [VDC]	15 / 24
Lube oil content engine / base frame:	[dm ³]	300 / 685
Dry weight engine / genset:	[kg]	8070 / 21250

Cooling system ⁵⁾

Glycol content engine jacket water / intercooler:	[% Vol.]	0 / 35
Water volume engine jacket / intercooler:	[dm ³]	210 / 25
KVS / Cv value engine jacket water / intercooler:	[m ³ /h]	58 / 52
Jacket water coolant temperature in / out:	[°C]	80 / 93
Intercooler coolant temperature in / out:	[°C]	50 / 53
Engine jacket water flow rate from / to:	[m ³ /h]	60 / 85
Water flow rate engine jacket water / intercooler:	[m ³ /h]	74 / 40
Water pressure loss engine jacket water / intercooler:	[bar]	1,6 / 0,6

1) See also "Layout of power plants":

2) See also Techn. Circular 0199-99-3017

5) Gear oil cooling within intercooler coolant circuit

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Frequency band	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 _{WA} [dB(A)]	S [m ²]		
Air-borne noise ³⁾																																	
L _{w, Terz} [dB(lin)]	97,8	99,4	102,8	106,7	107,4	113,1	112,8	119	116,5	116,3	115,8	111,5	112,1	114	112,3	111,1	112,5	111,2	111,5	111,8	109,1	107,4	107	107	109,9	119,2	107	99,2	99,5	123,7	±4dB(A)	172	
Exhaust noise ⁴⁾																																	
L _{w, Terz} [dB(lin)]	118,6	117,9	121,4	127,3	126,9	126,8	126,5	140,9	126,3	129,9	130,9	125,2	126,3	126,5	125,9	125,9	125	123,3	123,9	123,8	123,2	126,3	116,4	115,5	115,2	114,1	114,6	112,6	110,8	135,8	±3dB(A)	15,5 ⁵⁾	

3) DIN EN ISO 3746 (σ_{Ro}=±4 dB)

4) Measured in exhaust pipe (f ≤ 250Hz: ±5dB; f > 250Hz: ±3dB)

L_w: Sound power level

S: Area of measurement surface (S_c=1m²)

5) DIN 45635-11, Appendix A