2G - Biogas 65/35 - 35°C - 50°C - NOx 500

Technical data
1200 kWel; 480 V, 60 Hz; Acc. to gas analysis

MWM
Energy. Efficiency. Environment.

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

Genset:

Engine:	**TCG2020V12**	
Speed:	[1/min]	1500
Configuration / number of cylinders:	[-]	V / 12
Bore / Stroke / Displacement:	[mm]/[mm]/[dm^3]	170 / 195 / 53
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 450 LB4**	
Voltage / voltage range / cos Phi:	[V] / [%] / [-]	480 / ±5 / 1
Speed / frequency:	[1/min] / [Hz]	1800 / 60
Gear box:	**Eisenbeiss GU 320**	
Lube oil volume of gear box:	[dm^3]	58

Fuel gas data: [2)]

Methane number:		[-]	134
Lower calorific value:		[kWh/Nm^3]	6,48
Gas density:		[kg/Nm^3]	1,16
	Acc. to gas analysis		
Analysis:	CO_2	[Vol%]	35,00
	N_2	[Vol%]	0,00
	O_2	[Vol%]	0,00
	H_2	[Vol%]	0,00
	CO	[Vol%]	0,00
	CH_4	[Vol%]	65,00
	C_2H_4	[Vol%]	0,00
	C_2H_6	[Vol%]	0,00
	C_3H_6	[Vol%]	0,00
	C_3H_8	[Vol%]	0,00
	C_4H_8	[Vol%]	0,00
	C_4H_{10}	[Vol%]	0,00
	C_5H_{12}	[Vol%]	0,00
	C_xH_y	[Vol%]	0,00
	H_2S	[Vol%]	0,00

Energy balance

Load:	[%]	**100**	**75**	**50**
Electrical power COP acc. ISO 8528-1:	[kW]	**1200**	**900**	**600**
Engine jacket water heat:	[kW ±8%]	635	471	327
Intercooler LT heat:	[kW ±8%]	96	73	50
Lube oil heat:	[kW ±8%]			
Exhaust heat with temp. after heat exchanger:	[kW ±8%]	508	437	345
Exhaust temperature:	[°C ±25°C]	435	470	510
Exhaust mass flow, wet:	[kg/h]	6466	4862	3351
Combustion mass air flow:	[kg/h]	5965	4474	3077
Radiation heat engine / generator:	[kW ±8%]	42 / 34	40 / 29	39 / 26
Fuel consumption:	[kW+5%]	2807	2170	1537
Electrical / thermal efficiency:	[%]	42,8 / 40,7	41,5 / 41,9	39,0 / 43,8
Total efficiency:	[%]	83,5	83,4	82,8

System parameters [1)]

Ventilation air flow (comb. air incl.) with ΔT = 15K	[kg/h]	30500
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]	205 / 510
Dry weight engine / genset:	[kg]	5080 / 12950

Cooling system [5)]

Glycol content engine jacket water / intercooler:	[% Vol.]	0 / 35
Water volume engine jacket / intercooler:	[dm^3]	111 / 20
KVS / Cv value engine jacket water / intercooler:	[m^3/h]	42 / 30
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]	36 / 56
Water flow rate engine jacket water / intercooler:	[m^3/h]	43 / 35
Water pressure loss engine jacket water / intercooler:	[bar]	1,0 / 1,4

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1) See also "Layout of power plants": 2) See also Techn. Circular 0199-99-3017 5) Gear oil cooling within intercooler coolant circuit

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_{WA} [dB(A)]	S [m^2]
Air-borne noise [3)] $L_{W,Terz}$ [dB(lin)]	94,1	94,8	98,2	100,6	106,2	109,1	107,7	108,6	106,1	115,4	115,2	114,9	108,7	110,3	109,6	108,9	109,3	108,3	108,2	107,7	107,1	108,7	103,6	102,4	114,3	107,1	101,5	103,9	98,3	120,8 ±4dB(A)	122
Exhaust noise [4)] $L_{W,Terz}$ [dB(lin)]	114,2	116	124,6	115,9	120	129	125,3	134,1	125,3	130	128,4	128,2	126,4	125,8	125	119	117,8	116,6	117,7	117,6	116,3	115,5	114,6	113,7	114,9	113,9	113,4	112,9	111,1	132,1 ±3dB(A)	15,5[5)]

3) DIN EN ISO 3746 (σ_{R0}=±4 dB) 4) Measured in exhaust pipe (f ≤ 250Hz: ±5dB; f > 250Hz: ±3db) L_W: Sound power level S: Area of measurement surface (S_0=1m^2) 5) DIN 45635-11, Appendix A