

Technical data

1560 kWel; 480 V, 60 Hz; Landfill gas

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

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

Methane number:	[-]	134
Lower calorific value:	[kWh/Nm <sup>3</sup> ]	4,99
Gas density:	[kg/Nm <sup>3</sup> ]	1,18
Standard gas: Landfill gas		
Analysis: CO <sub>2</sub>	[Vol%]	27,00
N <sub>2</sub>	[Vol%]	23,00
O <sub>2</sub>	[Vol%]	0,00
H <sub>2</sub>	[Vol%]	0,00
CO	[Vol%]	0,00
CH <sub>4</sub>	[Vol%]	50,00
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

Genset:

Engine:	<b>CG170-16</b>	
Speed:	[1/min]	1500
Configuration / number of cylinders:	[-]	V / 16
Bore / Stroke / Displacement:	[mm]/[mm]/[dm <sup>3</sup> ]	170 / 195 / 71
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:	<b>Marelli MJB 500 MC4</b>	
Voltage / voltage range / cos Phi:	[V] / [%] / [-]	480 / ±5 / 1
Speed / frequency:	[1/min] / [Hz]	1800 / 60
Gear box:	<b>Eisenbeiss GU 320</b>	
Lube oil volume of gear box:	[dm <sup>3</sup> ]	58

Energy balance

Load:	[%]	100	75	50
Electrical power COP acc. ISO 8528-1:	[kW]	<b>1560</b>	<b>1170</b>	<b>780</b>
Engine jacket water heat:	[kW ±8%]	847	629	441
Intercooler LT heat:	[kW ±8%]	130	99	66
Lube oil heat:	[kW ±8%]			
Exhaust heat with temp. after heat exchanger:	[kW ±8%]	666	574	454
Exhaust temperature:	[°C ±25°C]	435	470	511
Exhaust mass flow, wet:	[kg/h]	8450	6366	4400
Combustion mass air flow:	[kg/h]	7577	5691	3920
Radiation heat engine / generator:	[kW ±8%]	54 / 49	52 / 42	49 / 37
Fuel consumption:	[kW+5%]	3688	2854	2026
Electrical / thermal efficiency:	[%]	42,3 / 41,0	41,0 / 42,2	38,5 / 44,2
Total efficiency:	[%]	83,3	83,2	82,7

System parameters <sup>1)</sup>

Ventilation air flow (comb. air incl.) with ΔT = 15K	[kg/h]	40400
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]	430
Starter motor:	[kWel.] / [VDC]	15 / 24,0
Lube oil content engine / base frame:	[dm <sup>3</sup> ]	265 / -
Dry weight engine / genset:	[kg]	6090 / 14850

Cooling system <sup>5)</sup>

Glycol content engine jacket water / intercooler:	[% Vol.]	0 / 35
Water volume engine jacket / intercooler:	[dm <sup>3</sup> ]	151 / 20
KVS / Cv value engine jacket water / intercooler:	[m <sup>3</sup> /h]	46 / 30
Jacket water coolant temperature in / out:	[°C]	80 / 93
Intercooler coolant temperature in / out:	[°C]	50 / 54
Engine jacket water flow rate from / to:	[m <sup>3</sup> /h]	50 / 65
Water flow rate engine jacket water / intercooler:	[m <sup>3</sup> /h]	58 / 35
Water pressure loss engine jacket water / intercooler:	[bar]	1,5 / 1,4

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 <sub>WA</sub> [dB(A)]	S [m <sup>2</sup> ]
<b>Air-borne noise <sup>3)</sup></b> L <sub>W,Totz</sub> [dB(lin)]	99,1	96,8	100,2	102,5	104,3	109,6	116,6	113,4	118,1	117,2	116,9	113,2	112,5	112,7	113,7	112,8	113,2	114,7	113	113,8	113	116	109,5	105,7	115,7	107,3	106	113,8	101,4	125,1 ±4dB(A)	137
<b>Exhaust noise <sup>4)</sup></b> L <sub>W,Totz</sub> [dB(lin)]	118,7	119,6	121,7	121,1	122,6	127,4	126,3	137,6	123,6	124,8	122,4	122,3	124	123,6	123,2	122,8	121,7	120,4	120	120	118,6	118,6	118	117,2	116,9	115,8	115,7	115	113,6	132,3 ±3dB(A)	15,5 <sup>5)</sup>

3) DIN EN ISO 3746 (d<sub>100</sub>=±4 dB)

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

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

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

5) DIN 45635-11, Appendix A