

1200ekW; 480V; 60Hz; Biogas

Technical data

1200 kWel; 480 V, 60 Hz; Bio gas

Design conditions

Comb. air temperature / rel. Humidity:	[°F] / [%]	77 / 60
Altitude:	[ft]	328
Exhaust temp. after heat exchanger:	[°F]	356
NO _x Emission (tolerance - 8%):	[g/bhph]	1,10

Fuel gas data: ²⁾

Methane number:	[-]	149
Lower calorific value:	[BTU/ft ³]	482,06
Gas density:	[lb/ft ³]	0,08
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:	TCG2020V12
Speed:	[1/min] 1500
Configuration / number of cylinders:	[-] V / 12
Bore / Stroke / Displacement:	[in] / [in] / [in ³] 6,7 / 7,7 / 3241
Compression ratio:	[-] 13,5
Mean piston speed:	[ft/s] 32,2
Mean lube oil consumption at full load:	[lb/hr] 0,5
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:	[gal(US)] 15

Energy balance

Load:	[%]	100	75	50
Electrical power COP acc. ISO 8528-1:	[kW]	1200	900	600
Engine jacket water heat:	[BTU/min±8%]	35746	26638	19011
Intercooler LT heat:	[BTU/min±8%]	5863	4326	2789
Lube oil heat:	[BTU/min±8%]			
Exhaust heat with temp. after heat exchanger:	[BTU/min±8%]	35404	28972	21629
Exhaust temperature:	[°F ±43°F]	916	959	1006
Exhaust mass flow, wet:	[lb/hr]	14134	10688	7399
Combustion mass air flow:	[lb/hr]	12399	9356	6460
Radiation heat engine / generator:	[BTU/min±8%]	2334 / 1935	2220 / 1651	2163 / 1480
Fuel consumption:	[BTU/min+5%]	165864	127329	89705
Electrical / thermal efficiency:	[%]	41,2 / 42,9	40,2 / 43,7	38,1 / 45,3
Total efficiency:	[%]	84,1	83,9	83,4

System parameters ¹⁾

Ventilation air flow (comb. air incl.) with ΔT = 15K	[lb/hr]	66600
Combustion air temperature minimum / design:	[°F]	41 / 77
Exhaust back pressure from / to:	[inWC]	12 / 20
Maximum pressure loss in front of air cleaner:	[inWC]	2
Zero-pressure gas control unit selectable from / to: ²⁾	[inWC]	8 / 80
Pre-pressure gas control unit selectable from / to: ²⁾	[psi]	7 / 145
Starter battery 24V, capacity required:	[Ah]	430
Starter motor:	[kWel.] / [VDC]	15 / 24
Lube oil content engine / base frame:	[gal(US)]	54 / -
Dry weight engine / genset:	[lb]	11200 / 28330

Cooling system ⁵⁾

Glycol content engine jacket water / intercooler:	[% Vol.]	0 / 35
Water volume engine jacket / intercooler:	[gal(US)]	29 / 5,3
KVS / Cv value engine jacket water / intercooler:	[ft ³ /h]	1483 / 1059
Jacket water coolant temperature in / out:	[°F]	176 / 199
Intercooler coolant temperature in / out:	[°F]	122 / 127
Engine jacket water flow rate from / to:	[gpm]	159 / 247
Water flow rate engine jacket water / intercooler:	[gpm]	188 / 154
Water pressure loss engine jacket water / intercooler:	[psi]	15 / 20

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	132,1	15,5
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	120,8	122 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 (S₀=1m²)

⁵⁾ DIN 45635-11, Appendix A