

Technical data**1000 kWel; 400 V, 50 Hz; Bio gas****Design conditions**

Inlet 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
Datasheet specification considers the grid codes EU 631/2016 (NC-RfG)		

Genset:

Engine / Configuration code:	TCG 2020 V12 (1.0)	XW
Speed / Mean piston speed:	[1/min] / [m/s]	1500 / 9.8
Configuration / number of cylinders:	[-]	V / 12
Bore / Stroke / Displacement:	[mm]/[mm]/[dm ³]	170 / 195 / 53
Compression ratio:	[-]	14
Mean effective pressure:	[bar]	15,5
Mean lube oil consumption at full load:	[g/kWh]	0,15
Generator:	Marelli MJB 450 LB4 or similar (*)	
Voltage / voltage range / cos Phi:	[V] / [%] / [-]	400 / 10 / 1
Speed / frequency:	[1/min] / [Hz]	1500 / 50

*CES reserves the right to change the alternator supplier and type during offer period. The genset data may thereby change slightly.
 The power output will not change. CES will confirm the alternator type, brand and alternator data sheet with the order confirmation.

Fuel gas data: 2)

Methane number:	[-]	141
Lower calorific value:	[kWh/Nm ³]	5,48
Gas density:	[kg/Nm ³]	1,25
Standard gas:	Bio gas	
Analysis: CO ₂	[Vol%]	40,00
N ₂	[Vol%]	4,70
O ₂	[Vol%]	0,30
H ₂	[Vol%]	0,00
CO	[Vol%]	0,00
CH ₄	[Vol%]	55,00
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
H ₂ O	[Vol%]	0

Energy balance

Load:	[%]	100	75	50
Electrical power COP acc. ISO 8528-1:	[kW]	1000	750	500
Engine jacket water heat:	[kW ±8%]	539	422	315
Intercooler LT heat:	[kW ±8%]	54	45	19
Lube oil heat:	[kW ±8%]			
Exhaust heat with temp. after heat exchanger:	[kW ±8%]	465	384	294
Exhaust temperature:	[°C ±25°C]	466	489	519
Exhaust mass flow wet / dry:	[kg/h]	5253 / 4800	3983 / 3631	2770 / 2521
Combustion mass air flow:	[kg/h]	4715	3564	2473
Radiation heat engine / generator:	[kW ±8%]	38 / 27	37 / 22	36 / 19
Fuel consumption:	[kW+5%]	2361	1841	1307
Electrical / thermal efficiency:	[%]	42,4 / 42,5	40,7 / 43,8	38,2 / 46,5
Total efficiency:	[%]	84,9	84,5	84,7

System parameters 1)

Ventilation air flow (comb. air incl.) with ΔT = 15K	[kg/h]	26000
Combustion air temperature minimum / design:	[°C]	15 / 25
Exhaust back pressure from / to:	[mbar]	30 / 50
Exhaust volume flow wet / dry:	[Nm ³ /h]	4022 / 3548
Maximum pressure loss in front of air cleaner:	[mbar]	5
Zero-pressure gas control unit selectable from / to: 2)	[mbar]	20 ³⁾ / 200
Pre-pressure gas control unit selectable from / to: 2)	[bar]	0,5 / 10
Starter battery 24V, capacity required:	[Ah]	430
Starter motor:	[kW _{el}] / [VDC]	18 / 24
Lube oil content engine / base frame:	[dm ³]	205 / -
Dry weight engine / genset:	[kg]	5080 / 10850

Cooling system

Glycol content engine jacket water / intercooler:	[% Vol.]	33 / 33
Water volume engine jacket / intercooler:	[dm ³]	111 / 14
KVS / Cv value engine jacket water / intercooler:	[m ³ /h]	46 / 46
Jacket water coolant temperature in / out:	[°C]	80 / 92
Intercooler coolant temperature in / out:	[°C]	60 / 61
Engine jacket water flow rate from / to:	[m ³ /h]	36 / 56
Water flow rate engine jacket water / intercooler:	[m ³ /h]	41 / 35
Water pressure loss engine jacket water / intercooler:	[bar]	0,8 / 0,6

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1) See also "Layout of power plants":

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

3) Minimum pressure may be higher, depending on project conditions.

*) optional

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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 4) L _{W, Terz} [dB(lin)]	94,0	94,7	98,0	100,5	106,1	108,9	107,6	108,5	106,0	115,3	115,0	114,8	108,6	110,2	109,5	108,8	109,2	108,2	108,1	107,6	107,0	108,5	103,5	102,3	114,1	107,0	101,4	103,8	98,1	120,7 ±4dB(A)	114
Exhaust noise 5) L _{W, Terz} [dB(lin)]	114,2	116,0	124,6	115,9	120,0	129,0	125,3	134,1	125,3	130,0	128,4	128,2	126,4	125,8	125,0	119,0	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 ⁶⁾

4) DIN EN ISO 3746 (d₉₀±4 dB)

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

L_W: Sound power levelS: Area of measurement surface (S₀=1m²)

6) DIN 45635-11, Appendix A