

reference data sheet

Technical data

400 kWel; 400 V, 50 Hz; Natural gas, MN = 80

Design conditions

Inlet air temperature / rel. Humidity:	[°C] / [%]	25 / 60
Altitude:	[m]	100
Exhaust temp. after heat exchanger:	[°C]	120
NO _x Emission (tolerance - 8%):	[mg/Nm ³ @5%O ₂]	500

Fuel gas data: ²⁾

Methane number:	[-]	80
Lower calorific value:	[kWh/Nm ³]	10,17
Gas density:	[kg/Nm ³]	0,79
Standard gas:	Natural gas, MN = 80	

Genset:

Engine:	TCG 3016 V08	
Configuration code:	[-]	P
Speed:	[1/min]	1500
Configuration / number of cylinders:	[-]	V / 08
Bore / Stroke / Displacement:	[mm]/[mm]/[dm ³]	132 / 160 / 17,5
Compression ratio:	[-]	13
Mean piston speed:	[m/s]	8
Mean lube oil consumption at full load:	[g/kWh]	0,1
Generator:	Marelli MJB 355 MA4 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.

Energy balance

Load:	[%]	100	75	50
Electrical power COP acc. ISO 8528-1:	[kW]	400	300	200
Engine jacket water heat:	[kW ±8%]	212	164	120
Intercooler LT heat:	[kW ±8%]	32	22	14
Lube oil heat:	[kW ±8%]			
Exhaust heat with temp. after heat exchanger:	[kW ±8%]	195	160	120
Exhaust temperature:	[°C ±25°C]	411	433	457
Exhaust mass flow, wet:	[kg/h]	2200	1673	1163
Combustion mass air flow:	[kg/h]	2127	1617	1123
Radiation heat engine / generator:	[kW ±8%]	17 / 14	15 / 11	14 / 8
Fuel consumption:	[kW+5%]	930	718	508
Electrical / thermal efficiency:	[%]	43,0 / 43,7	41,8 / 45,1	39,3 / 47,2
Total efficiency:	[%]	86,7	86,9	86,5

System parameters ¹⁾

Ventilation air flow (comb. air incl.) with ΔT = 15K	[kg/h]	11600
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: ²⁾	[mbar]	20 / 200
Pre-pressure gas control unit selectable from / to: ²⁾	[bar]	0,5 / 10
Starter battery 24V, capacity required:	[Ah]	143
Starter motor:	[kWel.] / [VDC]	5,4 / 24
Lube oil content engine & extension / clean oil tank:	[dm ³]	320 / 250
Dry weight engine / genset:	[kg]	2080 / 5640

Cooling system

Glycol content engine jacket water / intercooler:	[% Vol.]	35 / 35
Water volume engine jacket / intercooler:	[dm ³]	28 / 5
KVS / Cv value engine jacket water / intercooler:	[m ³ /h]	30 / 14
Jacket water coolant temperature in / out:	[°C]	78 / 88
Intercooler coolant temperature in / out:	[°C]	45 / 49
Engine jacket water flow rate from / to:	[m ³ /h]	14 / 25
Water flow rate engine jacket water / intercooler:	[m ³ /h]	20 / 8
Water pressure loss engine jacket water / intercooler:	[bar]	0,4 / 0,4

1) See also "Layout of power plants":

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

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⁾	88,8	83,4	90,5	109,5	94,9	104,8	103,4	104,1	102,7	102,6	105,9	105,4	103,8	103,3	99,7	100,0	100,0	100,7	99,1	99,4	98,4	96,4	94,4	98,1	100,5	105,5	102,8	0,0	0,0	112,3	66,8
L _{W, Terz} [dB(lin)]																														±4dB(A)	
Exhaust noise ⁴⁾	104,7	104,6	111,9	135,8	115,2	111,3	134,8	118,6	142,0	121,3	118,6	123,6	116,6	118,4	115,2	114,1	115,0	112,2	112,4	112,3	111,8	108,9	107,5	105,3	104,4	100,3	94,1	96,5	92,1	130,3	14,8 ⁵⁾
L _{W, Terz} [dB(lin)]																														±3dB(A)	

3) DIN EN ISO 9614-2 (S=±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