

# 56851R1 Clear 2.0MW



## Technical data

2000 kWel; 400 V, 50 Hz; Natural gas, MN = 80

### Design conditions

Inlet air temperature / rel. Humidity:	[°C] / [%]	20 / 60
Altitude:	[m]	200
Exhaust temp. after heat exchanger:	[°C]	120
NO <sub>x</sub> raw emissions genset (tolerance -8 %):	[mg/Nm <sup>3</sup> @5%O <sub>2</sub> ]	500

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

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

### Genset:

Engine / Configuration code:	<b>TCG 3020 V20</b>	RV
Speed / Mean piston speed:	[1/min] / [m/s]	1500 / 9.8
Configuration / number of cylinders:	[-]	V / 20
Bore / Stroke / Displacement:	[mm]/[mm]/[dm <sup>3</sup> ]	170 / 195 / 89
Compression ratio:	[-]	13
Mean effective pressure:	[bar]	18,6
Mean lube oil consumption at full load:	[g/kWh]	0,15
Generator:	<b>Leroy Somer LSA 52.3 UL16 or similar (*)</b>	
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]	<b>2000</b>	<b>1500</b>	<b>1000</b>
Engine jacket water heat:	[kW ±8%]	1045	773	566
Intercooler LT heat:	[kW ±8%]	140	103	63
Lube oil heat:	[kW ±8%]			
Exhaust heat with temp. after heat exchanger:	[kW ±8%]	965	806	632
Exhaust temperature:	[°C ±25°C]	421	450	487
Exhaust mass flow   wet / dry:	[kg/h]	10474 / 9652	7955 / 7325	5562 / 5112
Combustion mass air flow:	[kg/h]	10116	7681	5365
Radiation heat engine / generator:	[kW ±8%]	67 / 54	62 / 41	60 / 32
Fuel consumption:	[kW+5%]	4577	3518	2515
Electrical / thermal efficiency:	[%]	43,7 / 43,9	42,6 / 44,9	39,8 / 47,7
Total efficiency:	[%]	87,6	87,5	87,5

### System parameters <sup>1)</sup>

Ventilation air flow (comb. air incl.) with ΔT = 15K	[kg/h]	49400
Combustion air temperature minimum / design:	[°C]	5 / 20
Exhaust back pressure from / to:	[mbar]	30 / 50
Exhaust volume flow   wet / dry:	[Nm <sup>3</sup> /h]	8216 / 7317
Maximum pressure loss in front of air cleaner:	[mbar]	5
Zero-pressure gas control unit selectable from / to: <sup>2)</sup>	[mbar]	20 <sup>3)</sup> / 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]	18 / 24
Lube oil content engine / base frame*:	[dm <sup>3</sup> ]	300 / 685*
Dry weight engine / genset:	[kg]	8170 / 16950

### Cooling system

Glycol content engine jacket water / intercooler:	[% Vol.]	33 / 33
Water volume engine jacket / intercooler:	[dm <sup>3</sup> ]	210 / 22
KVS / Cv value engine jacket water / intercooler:	[m <sup>3</sup> /h]	47 / 58
Jacket water coolant temperature in / out:	[°C]	78 / 93
Intercooler coolant temperature in / out:	[°C]	45 / 48
Engine jacket water flow rate from / to:	[m <sup>3</sup> /h]	60 / 85
Water flow rate engine jacket water / intercooler:	[m <sup>3</sup> /h]	64 / 40
Water pressure loss engine jacket water / intercooler:	[bar]	1,8 / 0,5
Engine jacket water pressure outlet min / max:	[bar rel.]	2,2 / 2,5

Page 1 / 1

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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

56851

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 <sub>WA</sub> [dB(A)]	S [m <sup>2</sup> ]
<b>Air-borne noise <sup>4)</sup></b>	94,8	96,1	97,4	101,0	103,7	107,3	112,7	118,9	115,5	115,3	112,7	110,8	112,1	111,5	108,8	108,6	109,3	108,5	108,2	108,8	106,4	104,8	103,8	102,9	106,1	116,7	104,3			121,0 ±4dB(A)	117,3
<b>Exhaust noise <sup>5)</sup></b>	117,7	117,3	120,0	124,0	125,4	126,5	130,7	142,5	127,4	126,7	131,0	125,5	125,2	125,6	126,4	125,1	124,5	123,8	124,3	124,0	122,7	122,3	119,8	118,5	116,8	115,4	115,2	113,1	110,7	135,6 ±3dB(A)	15,5 <sup>6)</sup>

4) DIN EN ISO 9614-2 (s=±4 dB)

5) 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>)

6) DIN 45635-11, Appendix A