

2G - Biogas 50/50 - 35°C - 50°C - NOx 500



Technical data

1200 kWel; 600 V, 60 Hz; Bio gas

Design conditions

| | | |
|--|---|---------|
| Comb. 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 |

Genset:

| | | |
|---|------------------------------|----------------|
| Engine: | TCG2020V12 | |
| Speed: | [1/min] | 1500 |
| Configuration / number of cylinders: | [-] | V / 12 |
| Bore / Stroke / Displacement: | [mm]/[mm]/[dm ³] | 170 / 195 / 53 |
| 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: | Marelli MJB 450 LB4 | |
| Voltage / voltage range / cos Phi: | [V] / [%] / [-] | 600 / ±5 / 1 |
| Speed / frequency: | [1/min] / [Hz] | 1800 / 60 |
| Gear box: | Eisenbeiss GU 320 | |
| Lube oil volume of gear box: | [dm ³] | 58 |

Fuel gas data: ²⁾

| | | |
|--------------------------------|------------------------|-------|
| Methane number: | [-] | 149 |
| Lower calorific value: | [kWh/Nm ³] | 4,99 |
| Gas density: | [kg/Nm ³] | 1,35 |
| 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 |

Energy balance

| Load: | [%] | 100 | 75 | 50 |
|---|------------|-------------|-------------|-------------|
| Electrical power COP acc. ISO 8528-1: | [kW] | 1200 | 900 | 600 |
| Engine jacket water heat: | [kW ±8%] | 630 | 466 | 323 |
| Intercooler LT heat: | [kW ±8%] | 96 | 73 | 49 |
| Lube oil heat: | [kW ±8%] | | | |
| Exhaust heat with temp. after heat exchanger: | [kW ±8%] | 554 | 473 | 371 |
| Exhaust temperature: | [°C ±25°C] | 464 | 502 | 544 |
| Exhaust mass flow, wet: | [kg/h] | 6272 | 4709 | 3240 |
| Combustion mass air flow: | [kg/h] | 5506 | 4118 | 2822 |
| Radiation heat engine / generator: | [kW ±8%] | 42 / 35 | 40 / 29 | 39 / 24 |
| Fuel consumption: | [kW+5%] | 2837 | 2190 | 1549 |
| Electrical / thermal efficiency: | [%] | 42,3 / 41,7 | 41,1 / 42,9 | 38,7 / 44,8 |
| Total efficiency: | [%] | 84,0 | 84,0 | 83,5 |

System parameters ¹⁾

| | | |
|--|--------------------|--------------|
| Ventilation air flow (comb. air incl.) with ΔT = 15K | [kg/h] | 30300 |
| Combustion air temperature minimum / design: | [°C] | 5 / 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] | 430 |
| Starter motor: | [kWel.] / [VDC] | 15 / 24 |
| Lube oil content engine / base frame: | [dm ³] | 205 / 510 |
| Dry weight engine / genset: | [kg] | 5080 / 12950 |

Cooling system ⁵⁾

| | | |
|--|---------------------|-----------|
| Glycol content engine jacket water / intercooler: | [% Vol.] | 0 / 35 |
| Water volume engine jacket / intercooler: | [dm ³] | 111 / 20 |
| KVS / Cv value engine jacket water / intercooler: | [m ³ /h] | 42 / 30 |
| Jacket water coolant temperature in / out: | [°C] | 80 / 93 |
| Intercooler coolant temperature in / out: | [°C] | 50 / 53 |
| Engine jacket water flow rate from / to: | [m ³ /h] | 36 / 56 |
| Water flow rate engine jacket water / intercooler: | [m ³ /h] | 43 / 35 |
| Water pressure loss engine jacket water / intercooler: | [bar] | 1,0 / 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

3332404BC

| 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 | 120,8 | 122 |
| 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 | 132,1 | 15,5 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