Technical Datasheet

GB350B6

with engine
B3042Z7

Fuel
Biogas

Voltage / Frequency
480 V 60 Hz

Heating water temperature (in / out)
°F

NOx emissions ¹
< 2

Intercooler 2nd stage temperature (in)
°F

Exhaust gas temperature
°F 972

Electrical power COP, parallel to grid acc. ISO 8528-1
% 100 75 50

Electrical power PRP, prime power acc. ISO 8528-5 G1
% 100

Energy balance

Electrical power ²/³
kWe 350 262 173 280

Energy input ⁴/⁵
kBTU/hr 3245 2535 1853 2648

Thermal output total ⁶
kBTU/hr 816 672 553 682

Thermal output engine (block, lube oil, 1st stage intercooler) ⁷
kBTU/hr 816 672 553 682

Thermal exhaust gas heat exchanger (180°C) ⁸
kBTU/hr 816 672 553 682

Thermal output 2nd stage intercooler ⁹
kBTU/hr 489 369 245 393

Engine power ISO 3046-1 ⁴/⁵
bhp 489 369 245 393

Generator efficiency at power factor = 1
% 95.8 95.4 94.3 95.5

Electrical efficiency ⁴⁰/⁴¹
% 38.8 35.3 31.8 36.1

Total efficiency
% 61.9 61.8 61.6 61.8

CHP Coefficient
1.46 1.33 1.07 1.40

Power consumption ¹⁰
kW -- -- -- --

Combustion air / Exhaust gas

Combustion air volume flow ¹¹
ft³/min 868 665 468 702

Combustion air mass flow
lb/hr 4200 3219 2264 3397

Exhaust gas volume flow, wet ¹²
ft³/min 972 747 528 788

Exhaust gas volume flow, dry ⁰
ft³/min 852 653 459 689

Exhaust gas mass flow, wet
lb/hr 4702 3410 2649 4178

Exhaust temperature after turbocharger
°F 972 981 997 977

Reference Fuel

Natural gas
BTU/ft³

Sewage gas
CH4 60 Vol. %; CO2 40 Vol. %

Biogas
CH4 55 Vol. %; CO2 45 Vol. %

Landfill gas
CH4 50 Vol. %; CO2 30 Vol. %; Rest N2

CO₂ / CH₄ volume ratio
< 1

Minimum methane number
MN 120

Range of heating value: design / operation range
BTU/ft³ 483 - 628 / 483 - 676

Exhaust gas emissions ⁶

NOₓ, stated as NO₂ (dry)
g/bhp-hr < 2

CO (dry)
g/bhp-hr < 5

HCHO (dry) ⁷

VOC (dry) < 0.7

Otto-gas engine, lean burn operation with turbocharging

Number of cylinders / configuration
12 V

Engine type
B3042Z7

Engine speed
rpm 1800

Bore
in 5.12

Stroke
in 5.59

Displacement
in³ 1380

Mean piston speed
ft/sec 27.9

Compression ratio
13.5

BMEP at nominal engine speed min¹
psi 156.6

Lube oil consumption ⁸
gal/hr 0.03

Max. exhaust back pressure after genset / module
in H₂O 20.09

Generator

Rating power (F)
kVA 518

Max. allowable p.f. inductive (overexcited) / capacitive (underexcited) ¹⁶
0.8 / 1.0

Voltage tolerance / frequency tolerance
% ± 5 / ± 5

Max. ambient temperature
°F 104

Max. installation altitude
ft 3281

Engine cooling water system

Coolant temperature (in/out)
°F 180 / 190

Coolant flow rate ¹⁹/²⁰
gal/min @ psi delta p

CVs value (Block, lubeoil and 1st stage) ¹⁶

Max. operation pressure (coolant past engine)
psi 36.3

Exhaust gas heat exchanger (EGHE)

Exhaust gas temperature (out)
°F 32

Coolant temperature (in/out)
°F

Coolant volumetric flow ¹⁹/²⁰
gal/min @ psi delta p

CVs value ¹⁶

Max. operation pressure (coolant water)
psi
### Technical Datasheet

**GB350B6**

#### Oilcooler, external

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant temperature (in/out)</td>
<td>°F</td>
</tr>
<tr>
<td>Coolant volumetric flow [^{19}]</td>
<td>gal/min</td>
</tr>
<tr>
<td>CV-Value [^{20}]</td>
<td>psi delta p</td>
</tr>
<tr>
<td>Max. operation pressure</td>
<td>psi</td>
</tr>
</tbody>
</table>

#### Intercooler 2nd stage, external

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant temperature (in/out)</td>
<td>°F</td>
</tr>
<tr>
<td>Coolant volumetric flow [^{21}]</td>
<td>gal/min</td>
</tr>
<tr>
<td>CVs value [^{22}]</td>
<td>psi delta p</td>
</tr>
<tr>
<td>Max. operation pressure in front of intercooler</td>
<td>psi</td>
</tr>
</tbody>
</table>

#### Plate heat exchanger

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant temperature (in/out)</td>
<td>°F</td>
</tr>
<tr>
<td>Heating water temperature (in/out)</td>
<td>°F</td>
</tr>
<tr>
<td>Heating water volumetric flow [^{23}]</td>
<td>gal/min</td>
</tr>
<tr>
<td>CVs value [^{24}]</td>
<td>psi delta p</td>
</tr>
<tr>
<td>Max. operation pressure (heating water)</td>
<td>psi</td>
</tr>
</tbody>
</table>

#### Space ventilation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genset ventilation heat [^{25}]</td>
<td>kBTU/hr</td>
</tr>
<tr>
<td>Combustion air temperature: (min./design/max.)</td>
<td>°F</td>
</tr>
<tr>
<td>Min. engine room temperature [^{26}]</td>
<td>°F</td>
</tr>
<tr>
<td>Max. temperature difference ventilation air (in/out)</td>
<td>°F</td>
</tr>
<tr>
<td>Min. ventilation air flow in (combustion-ventilation) [^{27}]</td>
<td>ft³/min</td>
</tr>
</tbody>
</table>

#### Gearbox

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear ratio</td>
<td></td>
</tr>
<tr>
<td>Thermal output gearbox (watercooled)</td>
<td>kBTU/hr</td>
</tr>
</tbody>
</table>

#### Filling quantities

<table>
<thead>
<tr>
<th>Component</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lube oil for engine</td>
<td>gal</td>
</tr>
<tr>
<td>Coolant for engine</td>
<td>gal</td>
</tr>
<tr>
<td>Coolant for intercooler</td>
<td>gal</td>
</tr>
<tr>
<td>Heating water for plate heat exchanger</td>
<td>gal</td>
</tr>
</tbody>
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#### Engine sound level \[^{28}\] (1 meter distance, free field)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Frequency</td>
<td>Hz</td>
</tr>
<tr>
<td>Sound pressure level</td>
<td>dB</td>
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<td>Hz</td>
</tr>
<tr>
<td>Sound pressure level</td>
<td>dB</td>
</tr>
<tr>
<td>Sum of pressure levels</td>
<td>dB A</td>
</tr>
<tr>
<td>Sound power level</td>
<td>dB A</td>
</tr>
</tbody>
</table>

#### Undampened exhaust noise \[^{29}\] (1 meter distance to outlet within 90°; free field)

<table>
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<tbody>
<tr>
<td>Frequency</td>
<td>Hz</td>
</tr>
<tr>
<td>Sound pressure level</td>
<td>dB</td>
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<tr>
<td>Sum of pressure levels</td>
<td>dB A</td>
</tr>
<tr>
<td>Sound power level</td>
<td>dB A</td>
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#### Dimension

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<tbody>
<tr>
<td>Length</td>
<td>in</td>
</tr>
<tr>
<td>Width</td>
<td>in</td>
</tr>
<tr>
<td>Height</td>
<td>in</td>
</tr>
<tr>
<td>Gross weight / dry weight</td>
<td>lb</td>
</tr>
<tr>
<td>Gross weight / dry weight</td>
<td>lb</td>
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#### Power derating

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude</td>
<td></td>
</tr>
<tr>
<td>Combustion air temperature</td>
<td>°F</td>
</tr>
<tr>
<td>Intercooler 2nd stage temperature (in)</td>
<td>°F</td>
</tr>
<tr>
<td>Methane number</td>
<td></td>
</tr>
</tbody>
</table>

#### Boundary conditions and consumables

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1. Normal ft³ at p = 14.696 psi und T = 32 °F
2. Generator gross power at nominal voltage, power factor = 1 and nominal frequency
3. At standard reference conditions (ISO 3046-1); atmospheric pressure: 14.5 psi; air temperature: 77 °F; rel. air humidity 30 %
4. Thermal output at layout temperature; tolerance +/- 8 %
5. According to ISO 3046 (< 5 % tolerance), using reference fuel used at nominal voltage, power factor = 1 and nominal frequency
6. Deviations from the layout parameters respectively the reference fuel can have influence to the obtained efficiency and exhaust emissions
7. Emission values during system parallel operation - where required with Oscat
8. Reference value at nominal load (without amount of oil exchange)
9. Stated values for pure water, adaption for other cooling fluid composition necessary
10. The CVs value declares the volumetric flow in gal/min at a pressure drop of 1 psi
11. Only generator- and surface losses
12. Frost-free conditions must be guaranteed
13. Amount of ventilation air must be adapted to the gas safety concept
14. All sound pressure levels at nominal load COP
15. Power consumption of all electrical consumer, which are mounted at the module / aggregate
16. Max. allowable cos phi at nominal power (view of producer)