White Harvest
ENERGY

TECHNICAL SPECIFICATION

# aura 406 NG

btw70-0 | 200 kW Combined Heat and Power Module



*Design example*

## AT A GLANCE

| | |
|---|---|
| Application | **Combined heat and power** |
| Electrical output | **200 kW** |
| Useful thermal output | **1,015 MBTU/hr** |
| Electrical service | **480 V / 60 Hz** |
| Fuel | **Natural gas, Hi = 990.37 BTU/ft³** |
| Methane number | **MN 80 / min. 70** |
| NOx (with catalyst) | **< 0.2 g/BHP-h** |
| Electrical efficiency | **36.6 %** |
| Total efficiency | **91.0 %** |
| Reference conditions | **DIN ISO 3046-1** |

### Manufacturer technical data

Prepared and issued by White Harvest Energy, an authorized 2G Energy sales distributor and service provider. Equipment data is 2G Energy manufacturer data and is subject to project-specific engineering and technical revision. Performance figures apply at the stated reference conditions and are subject to project-specific derating. Source document: 2G Doc.-ID 5308920, Rev. P (21.08.2026).

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# 1 Basic data

## 1.1 Performance data

| Parameter | 100 % | 75 % | 50 % | Unit |
|---|---|---|---|---|
| Electrical output **** | **200** | **150** | **100** | kW |
| Useful thermal output | **1,015** | **798** | **582** | MBTU/hr (2) |
| Energy input | **1,866** | **1,459** | **1,070** | MBTU/hr (1) |
| Electrical efficiency | **36.6** | **35.1** | **31.9** | % |
| Thermal efficiency | **54.4** | **54.7** | **54.4** | % |
| Total efficiency | **91.0** | **89.8** | **86.3** | % |
| Power-to-heat ratio | **0.67** | **0.64** | **0.59** | |
| Min. approved power el. abs. **** | | **70** | | kW |

**Notes**

**** Part-load operation specifications: see 2G technical advisory TA-008.

## 1.2 Exhaust gas * and sound emissions

| Emissions and noise | Value | Unit |
|---|---|---|
| NOx with catalytic converter | **< 0.2** | g/BHP-h |
| NOx without catalytic converter | **< 14.3** | g/BHP-h |
| NOx (energy-specific, without catalyst) | **< 7.2** | g/kWh |
| CO with catalytic converter | **< 0.5** | g/BHP-h |
| CO without catalytic converter | **< 9.8** | g/BHP-h |
| HCHO with catalytic converter | **< 1.4** | ppm (4), (6) |
| HCHO without catalytic converter | **n.a.** | ppm (4), (6) |
| Engine surface noise ** | **103** | dB(A) (7) |
| Engine surface noise with soundproof encapsulation *** | **70** | dB(A) (7) |
| Exhaust outlet noise ** | **113** | dB (7) |

**Notes**

* With the appropriate catalyst configuration.

** Total sound power level at engine operation at full load according to DIN EN ISO 3746.

*** Mean sound pressure level at a distance of 1 m (3.3 ft) under free-field conditions according to DIN 45635. Increased noise exposure is to be expected where combustion air is drawn from the installation room.

## 1.3 Engine

| Engine | Value | Unit |
|---|---|---|
| Engine manufacturer | **2G** | |
| Engine type | **aura 406** | |
| Model / cylinders | **R / 6** | |

| Engine | Value | Unit |
|---|---|---|
| Mode of operation | **4-stroke** | |
| Combustion process | **λ = 1** | |
| Engine displacement | **729** | in³ |
| Bore / stroke | **5.12 / 5.91** | in |
| Rated speed | **1,800** | 1/min |
| ISO coefficient of performance (mech.) | **282** | hp |
| Compression ratio | **12.5 : 1** | |
| Mean effective pressure | **170.3** | psi |
| Mean piston speed | **29.5** | ft/s |
| Flywheel body | **SAE 1** | |
| Direction of flywheel rotation | **Left** | |
| Number of crown gear teeth | **167** | |
| Dry engine weight | **2,480** | lbs |
| Mixture cooling system | **183.2** | °F |

## 1.4 Generator

| Generator | Value | Unit |
|---|---|---|
| Manufacturer | **Leroy-Somer** | |
| Type | **LSA 46.3 S4 / 4P** | |
| Generator type | **Synchronous, directly coupled** | |
| Automatic voltage regulator (AVR) | **D510 C** | |
| Rated engine speed | **1,800** | 1/min |
| Frequency | **60** | Hz |
| Mechanical input power | **210** | kW |
| Effective electrical output | **200** | kW (5) |
| Apparent electrical output (cos φ 1 / 0.8) | **200 / 250** | kVA |
| Rated generator current (cos φ 1 / 0.8) | **241 / 301** | A |
| Rated generator voltage (± 10 %) | **480** | V |
| Subtransient reactance X"ds saturated / X"d unsaturated | **10 / 12.05** | % |
| Short-circuit current Ik"3 | **2.93** | kA |
| Power factor cos φ (inductive / capacitive) | **0.8 / 0.95** | |
| Generator protection relay circuit breaker | **400** | A |
| Efficiency (full load at cos φ 1) | **95.1** | % |
| Moment of inertia | **65.5** | lb · ft² |
| Max. ambient temperature | **104** | °F |

| Generator | Value | Unit |
|---|---|---|
| Stator coupling | **Star (wye)** | |
| Protection class | **IP23** | |
| Generator weight | **1,486** | lbs |
| Power factor correction | **Not available** | |
| Engine startup | **Not available** | |

# 2 Mixture composition

## 2.1 Combustion air

| Combustion air | Value | Unit |
|---|---|---|
| Combustion air mass flow rate | **1,492** | lbs/hr |
| Combustion air volume flow rate (77 °F / 14.69 psi) | **336** | SCFM |

## 2.2 Fuel

*Fuel requirements according to 2G technical advisory TA-004 Gas.*

| Fuel | Value | Unit |
|---|---|---|
| Reference methane number / minimum methane number | **80 / 70** | |
| Fuel mass flow rate | **94.4** | lbs/hr |
| Fuel volume flow rate | **31.4** | SCFM [6] |
| Min. gas flow pressure at rated load * | **0.29** | psig |
| Max. gas flow pressure at rated load * | **1.02** | psig |
| Gas train safety pressure | **7.25** | psig |

**Notes**

* At gas train inlet.

# 3 Integrated heat extraction

## 3.1 Heating circuit

*Heating water requirements according to 2G technical advisory TA-002 Heating circuit.*

| Heating circuit | Value | Unit |
|---|---|---|
| Heating water volume flow rate (delta T = 20 K / 36 °F) | **57.8** | gpm |
| Heating water return temperature (max.) * | **158** | °F |
| Heating water supply temperature (max.) ** | **194** | °F [8] |
| Safety valve | **87** | psi |
| Min. operating pressure | **15** | psi |
| Internal pressure drop in heating circuit * | **6** | psig |
| Approx. pressure reserve * | **7** | psig |

### 3.2 Engine circuit

*Coolant requirements according to 2G technical advisory TA-001 Coolant.*

| Engine circuit | Value | Unit |
|---|---|---|
| Jacket water heat (engine) | **595** | MBTU/hr (2) |
| Engine cooling water inlet temperature (min.) | **168.8** | °F |
| Engine cooling water outlet temperature (max.) | **194** | °F |
| Max. inlet / outlet difference | **7.5 K (13.5 °F)** | |
| Recirculated engine cooling water volume (min.) | **119.2** | gpm |
| Total recirculated cooling water volume | **119.2** | gpm |
| Maximum pressure at engine outlet | **44** | psi |
| Minimal pressure at engine outlet | **15** | psi |
| Safety valve | **43.5** | psi |
| Approx. heat dump circuit pressure reserve (optional) * | **4** | psig |
| Safety temperature limiter | **230** | °F |
| Mixture heat from high temperature circuit (HT) | **51** | MBTU/hr (2) |
| Mixture coolant inlet temperature HT (max.) | **181** | °F |
| Recirculated coolant volume HT mixture (min.) | **119.2** | gpm |

**Notes**

* From / to module interface.

** Dependent on the design of the heating circuit pump group; the stated value applies to a pump group designed by 2G. Heating water supply temperature in part-load operation is limited to 90 °C (194 °F).

## 4 Exhaust system

| Exhaust system | Value | Unit |
|---|---|---|
| Exhaust gas temperature after turbine | **1,042** | °F |
| Exhaust gas temperature after exhaust gas heat exchanger | **221** | °F (3) |
| Exhaust gas heat | **368** | MBTU/hr (2) |
| Damp exhaust gas volume flow rate | **337** | SCFM (6) |
| Dry exhaust gas volume flow rate | **278** | SCFM (6) |
| Damp exhaust gas mass flow rate | **1,587** | lbs/hr |
| Dry exhaust gas mass flow rate | **1,397** | lbs/hr |
| Max. exhaust backpressure after turbocharger | **1** | psig |
| Approx. pressure reserve (with catalytic converter) * | **0.7 (0.1)** | psig |

**Notes**

* From module interface. Exhaust gas heat exchanger and catalytic converter in standard version and in new condition.

## 5 Ventilation

| Ventilation | Value | Unit |
|---|---|---|
| Radiant module heat (approx.) | **160.37** | MBTU/hr (2) |
| Min. supply air flow rate (delta t = 10 K / 18 °F) | **8,368** | SCFM |

## 6 Operating materials

*Lubricating oil approvals according to 2G technical advisory TA-003 Lubricating oil; coolant approvals according to TA-001 Coolant.*

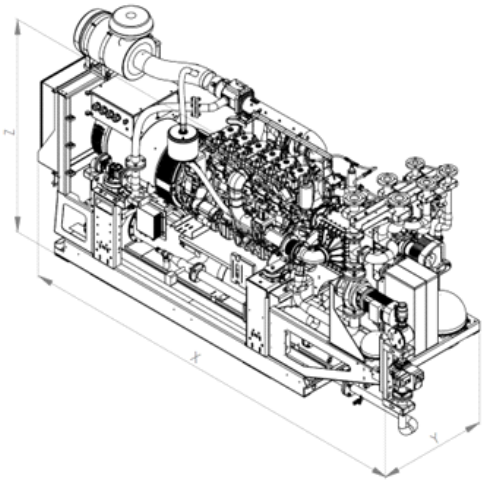
| Operating materials | Value | Unit |
|---|---|---|
| Lubricating oil consumption (avg. / max.) | **0.06 / 0.2** | g/kWh |
| Engine oil capacity (max.) | **10.6** | gallons |
| Lubricating oil refill tank capacity (optional) | **23.8** | gallons |
| Lubricating oil system with auxiliary tank (optional) | **23.8** | gallons |
| Approx. engine circuit coolant capacity (module) | **—** | gallons |
| Approx. LT mixture cooling circuit coolant capacity (module) | **—** | gallons |

## 7 Electronics and software

| Controls | Value | Unit |
|---|---|---|
| Power system protection device | **Bachmann GSP** | |
| Power system protection software status | **> 13455** | |
| Touch screen | **10** | in |
| Control cabinet protection class | **NEMA Type 12** | |
| Power distribution cabinet protection class | **NEMA Type 1** | |
| Ambient temperature of control cabinets | **32 – 95** | °F |
| Relative humidity of control cabinets (max.) | **65** | % |

# 8 Interfaces

## 8.1 Dimensions and weights



*Design example — module envelope, dimensions X / Y / Z*

| Dimensions and weights | Value | Unit |
|---|---|---|
| Module length * | **X — 157** | in |
| Module width * | **Y — 44** | in |
| Module height * | **Z — 83** | in |
| Module weight (without operating materials) | **9,667** | lbs |
| Module weight with soundproof encapsulation (optional) | **11,927** | lbs |
| Powder-coated frame | **RAL 6002** | |
| Control cabinet width | **31** | in |
| Control cabinet depth | **24** | in |
| Control cabinet height | **79** | in |
| Control cabinet weight | **441** | lbs |
| Powder-coated control cabinet | **RAL 7035** | |
| Power distribution cabinet width | **24** | in |
| Power distribution cabinet depth | **16** | in |
| Power distribution cabinet height | **75** | in |
| Power distribution cabinet weight | **331** | lbs |
| Powder-coated power distribution cabinet | **RAL 7035** | |

**Notes**

* Dimensions subject to change. Refer to the project interface drawing for exact values.

## 8.2 Water and gas interfaces

| Water and gas interfaces | Value | Unit |
|---|---|---|
| Gas interface | **40 / 10** | DN / PN |

| Water and gas interfaces | Value | Unit |
|---|---|---|
| Exhaust gas interface | **150 / 10** | DN |
| Heating circuit interface | **50 / 16** | DN / PN |
| Heat dump circuit interface | **65 / 16** | DN / PN |

**Notes**

US equivalents: DN 40 ≈ NPS 1½; DN 50 ≈ NPS 2; DN 65 ≈ NPS 2½; DN 100 ≈ NPS 4; DN 150 ≈ NPS 6. PN 10 ≈ 150 psi; PN 16 ≈ 232 psi. Flange drilling is metric unless adapters are specified.

### 8.3 Electrical connections and utility interface

| Electrical interface | Value | Unit |
|---|---|---|
| Grid connection with pre-fuse (provided by customer) | **480 V / 60 Hz** | |
| Electricity network system | **Wye (Y)** | |
| Short-circuit current rating Icc (max.) | **50** | kA |

### 8.4 Data interfaces

| Data interfaces | Value |
|---|---|
| Remote maintenance access (optional) * | **DSL / UMTS (SIM)** |
| Interfaces / data interfaces (optional) | **Profibus DP · Profinet IO · Modbus RTU · Modbus TCP · Ethernet/IP · hardware signals** |
| Virtual power plant access (optional) | **Possible after technical clarification (bus systems or hardware signals)** |

**Notes**

* Remote maintenance access must be provided by the customer.

## 9 Technical framework

Unless otherwise indicated, all data refer to engine operation at full load at the respective media temperatures and apply subject to technical innovations.

The electrical output is based on the generator output measured at the generator terminals. All output and efficiency specifications are therefore gross values.

The fuel gas quality must meet the requirements of 2G technical advisory TA-004 Gas. The equipment and peripheral systems must be configured according to the 2G technical manuals.

### 9.1 Standard reference conditions

*Standard reference conditions according to DIN ISO 3046-1.*

| Reference conditions | Value | Unit |
|---|---|---|
| Air pressure | **14.5** | psi |
| Air temperature | **77** | °F |
| Relative humidity | **30** | % |

## 9.2 Derating

Power reduction due to installation at an altitude above 300 m (984 ft) above sea level and/or a combustion air intake temperature above 40 °C (104 °F) shall be determined specifically for each project according to 2G technical information TI-049 Load reduction.

## 9.3 Notes

| Ref. | Note |
|---|---|
| (1) | Reference conditions according to DIN ISO 3046-1. At nominal output, the specific fuel consumption tolerance amounts to + 5 %. Efficiency data is based on an engine in new condition. The decrease in efficiency throughout the service life is reduced by adhering to the maintenance guidelines. |
| (2) | At nominal output, the useful thermal output tolerance amounts to ± 8 %. |
| (3) | Specifications based on new condition. The exhaust gas temperature tolerance amounts to ± 8 %. |
| (4) | In reference to a residual oxygen content in the exhaust gas of 15 %. |
| (5) | Electrical output at the generator terminals at cos φ = 1. |
| (6) | Volume specifications in standard condition: pressure 14.69 psi, temperature 32 °F. |
| (7) | Reproducibility standard deviation of 4 dB according to DIN EN ISO 3746. |
| (8) | The heating water supply temperature tolerance amounts to ± 2 °C (± 3.6 °F). |