



GE Jenbacher J416 1,127 kW Natural Gas Engine OEM Specification

Exact project technical data for the JGS 416 GS-S.L / J 416 GS-B91 generator configuration.

Confirmed equipment relationship

- Engine model J 416 GS-B91 is confirmed by both installed engine nameplates.
- Package output is documented at 1,127 kW, 4,160 V, 60 Hz and 1,800 RPM.
- Included source pages cover engine, fuel, heat rejection, dimensions, sound and cooling parameters.

Source and use

Source pages are from the original GE Jenbacher project technical specification dated July 29, 2011. Project/customer identifiers and original document-path footers were permanently removed from this public copy.

Site performance depends on fuel quality, altitude, ambient conditions, emissions settings and final installation engineering.

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0.01 Technical Data (at genset)

Data at:

			Full load	Part Load	
Fuel gas LHV		BTU/scft	757		
			100%	75%	50%
Energy input		MBTU/hr	[2] 9,438	7,316	5,197
Gas volume		cfhr	*) 12,470	9,664	6,879
Mechanical output		bhp	[1] 1,573	1,180	787
Electrical output		kW el.	[4] 1,127	841	554
Heat to be dissipated			[5]		
~ Intercooler 1st stage (Engine jacket water cooling circuit)		MBTU/hr	705	328	44
~ Intercooler 2nd stage (Low Temperature circuit)		MBTU/hr	223	150	109
~ Lube oil (Engine jacket water cooling circuit)		MBTU/hr	601	532	440
~ Jacket water		MBTU/hr	1,068	959	805
~ Surface heat	ca.	MBTU/hr	[7] 252	241	245
~ Balance heat		MBTU/hr	96	72	51
Spec. fuel consumption of engine		BTU/bhp.hr	[2] 6,000	6,199	6,602
Lube oil consumption	ca.	gal/hr	[3] 0.11	~	~
Electrical efficiency		%	40.8%	39.2%	36.4%

*) approximate value for pipework dimensioning

[] Explanations: see 0.10 - Technical parameters

All heat data is based on standard conditions according to attachment 0.10. Deviations from the standard conditions can result in a change of values within the heat balance, and must be taken into consideration in the layout of the cooling circuit/equipment (intercooler; emergency cooling; ...). In the specifications in addition to the general tolerance of +/- 8% on the thermal output a further reserve of 10% is recommended for the dimensioning of the cooling requirements.



Main dimensions and weights (at genset)

Length	in	~ 250
Width	in	~ 80
Height	in	~ 90
Weight empty	lbs	~ 27,240
Weight filled	lbs	~ 28,670

Connections

Jacket water inlet and outlet	in/lbs	4"/145
Exhaust gas outlet	in/lbs	12"/145
Fuel gas (at gas train)	in/lbs	5"/232
Fuel Gas (at genset)	in/lbs	5"/145
Water drain ISO 228	G	1/2"
Condensate drain	in	0.7
Safety valve - jacket water ISO 228	in/lbs	2x1 1/2"/2.5
Lube oil replenishing (pipe)	in	1.1
Lube oil drain (pipe)	in	1.1
Jacket water - filling (flex pipe)	in	0.5
Intercooler water-Inlet/Outlet 1st stage	in/lbs	4"/145
Intercooler water-Inlet/Outlet 2nd stage	in/lbs	2 1/2"/145

Output / fuel consumption

ISO standard fuel stop power ICFN	bhp	1,573
Mean effe. press. at stand. power and nom. speed	psi	232
Fuel gas type		APG
Based on methane number	MN d)	60
Compression ratio	Epsilon	11.80
Min./Max. fuel gas pressure at inlet to gas train	psi	1.8 - 2.9 c)
Allowed Fluctuation of fuel gas pressure	%	± 10
Max. rate of gas pressure fluctuation	psi/sec	0.145
Maximum Intercooler 2nd stage inlet water temperature	°F	104
Spec. fuel consumption of engine	BTU/bhp.hr	6,000
Specific lube oil consumption	g/bhp.hr	0.22
Max. Oil temperature	°F	185
Jacket-water temperature max.	°F	203
Filling capacity lube oil (refill)	gal	~ 95

c) Lower gas pressures upon inquiry

d) based on methane number calculation software AVL 3.1 (calculated without N2 and CO2)



0.02 Technical data of engine

Manufacturer		GE Jenbacher
Engine type		J 416 GS-B91
Working principle		4-Stroke
Configuration		V 70°
No. of cylinders		16
Bore	in	5.71
Stroke	in	7.28
Piston displacement	cu.in	2,983
Nominal speed	rpm	1,800
Mean piston speed	in/s	437
Length	in	144
Width	in	59
Height	in	82
Weight dry	lbs	11,453
Weight filled	lbs	12,853
Moment of inertia	lbs-ft ²	320.41
Direction of rotation (from flywheel view)		left
Flywheel connection		SAE 18"
Radio interference level to VDE 0875		N
Starter motor output	kW	7
Starter motor voltage	V	24

Thermal energy balance

Energy input	MBTU/hr	9,438
Intercooler	MBTU/hr	928
Lube oil	MBTU/hr	601
Jacket water	MBTU/hr	1,068
Exhaust gas total	MBTU/hr	2,655
Exhaust gas cooled to 356 °F	MBTU/hr	1,682
Exhaust gas cooled to 212 °F	MBTU/hr	2,187
Surface heat	MBTU/hr	96
Balance heat	MBTU/hr	96

Exhaust gas data

Exhaust gas temperature at full load	°F [8]	817
Exhaust gas mass flow rate, wet	lbs/hr	13,614
Exhaust gas mass flow rate, dry	lbs/hr	12,692
Exhaust gas volume, wet	cfhr	171,623
Exhaust gas volume, dry	cfhr	153,896
Max.admissible exhaust back pressure after engine	psi	0.870

Combustion air data

Combustion air mass flow rate	lbs/hr	13,166
Combustion air volume	CFM	2,719
Max. admissible pressure drop in front of intake-air filter	psi	0.145



Sound pressure level

Aggregate b)	dB(A) re 20μPa	96
31,5 Hz	dB	84
63 Hz	dB	88
125 Hz	dB	97
250 Hz	dB	95
500 Hz	dB	93
1000 Hz	dB	88
2000 Hz	dB	87
4000 Hz	dB	90
8000 Hz	dB	88
Exhaust gas a)	dB(A) re 20μPa	113
31,5 Hz	dB	101
63 Hz	dB	111
125 Hz	dB	116
250 Hz	dB	105
500 Hz	dB	102
1000 Hz	dB	96
2000 Hz	dB	108
4000 Hz	dB	107
8000 Hz	dB	104

Sound power level

Aggregate	dB(A) re 1pW	116
Measurement surface	ft ²	1,076
Exhaust gas	dB(A) re 1pW	121
Measurement surface	ft ²	67.60

a) average sound pressure level on measurement surface in a distance of 3.28ft according to DIN 45635, precision class 2.

b) average sound pressure level on measurement surface in a distance of 3.28ft (converted to free field) according to DIN 45635, precision class 3.

The spectra are valid for aggregates up to bmpe=275.571706 psi. (add safety margin of 1dB to all values per increase of 15 PSI pressure).

Operation with 1200 rpm see upper values, operation with 1800 rpm add 3 dB to upper values.

Engine tolerance ± 3 dB



0.05 Cooling water circuit

Oil - heat (Engine jacket water cooling circuit)

Nominal output	MBTU/hr	601
Max. Oil temperature	°F	185
Design pressure of engine jacket water	psi	145
Loss of nominal pressure of engine jacket water	psi	2.90
Safety valve - max press. set point	psi	36.26

Engine jacket water - heat (Engine jacket water cooling circuit)

Nominal output	MBTU/hr	1,068
Max. engine jacket water temperature (outlet engine)	°F	194
Engine jacket water flow rate	GPM	154.4
Safety valve - max press. set point	psi	36.26

Mixture Intercooler (1st stage) (Engine jacket water cooling circuit)

Nominal output	MBTU/hr	705
Max. inlet cooling water temp. (intercooler)	°F	167.1
Design pressure of cooling water	psi	145
Loss of nominal pressure of engine jacket water	psi	4.35
Safety valve - max press. set point	psi	36.26

Mixture Intercooler (2nd stage) (Low Temperature circuit)

Nominal output	MBTU/hr	223
Max. inlet cooling water temp. (intercooler)	°F	104
Aftercooler water flow rate	GPM	88.1
Design pressure of cooling water	psi	145
Intercooler water pressure drop	psi	11.60
Safety valve - max press. set point	psi	36.26



0.10 Technical parameters

All data in the technical specification are based on engine full load (unless stated otherwise) at specified temperatures as well as the methane number and subject to technical development and modifications. For isolated operation an output reduction may apply according to the block load diagram. Before being able to provide exact output numbers, a detailed site load profile needs to be provided (motor starting curves, etc.).

All pressure indications are to be measured and read with pressure gauges (psi.g.).

- (1) At nominal speed and standard reference conditions ICFN according to DIN-ISO 3046 and DIN 6271, respectively
- (2) According to DIN-ISO 3046 and DIN 6271, respectively, with a tolerance of + 5 %. Efficiency performance is based on a new unit (immediately upon commissioning). Effects of degradation during normal operation can be mitigated through regular service and maintenance work.
- (3) Average value between oil change intervals according to maintenance schedule, without oil change amount
- (4) At p. f. = 1.0 according to VDE 0530 REM / IEC 34.1 with relative tolerances
- (5) Total output with a tolerance of +/- 8 %
- (6) According to above parameters (1) through (5)
- (7) Only valid for engine and generator; module and peripheral equipment not considered
- (8) Exhaust temperature with a tolerance of +/- 8 %

Radio interference level

The ignition system of the gas engines complies the radio interference levels of CISPR 12 and EN 55011 class B, (30-75 MHz, 75-400 MHz, 400-1000 MHz) and (30-230 MHz, 230-1000 MHz), respectively.

Definition of output

- ISO-ICFN continuous rated power:
Net break power that the engine manufacturer declares an engine is capable of delivering continuously, at stated speed, between the normal maintenance intervals and overhauls as required by the manufacturer. Power determined under the operating conditions of the manufacturer's test bench and adjusted to the standard reference conditions.
- Standard reference conditions:

Barometric pressure:	14.5 psi (1000 mbar) or 328 ft (100 m) above sea level
Air temperature:	77°F (25°C) or 298 K
Relative humidity:	30 %
- Volume values at standard conditions (fuel gas, combustion air, exhaust gas)

Pressure:	1 atmosphere (1013.25 mbar)
Temperature:	60°F (15.56°C)

Output adjustment for turbo charged engines

NOTE: The ratings in this specification are valid for full load operation at a site installation of 2200 ft and air intake temperature up to 84°F. Thereafter a derate of 0.89%/°F will occur until an air intake temperature of 104°F. Thereafter a derate of 1.1%/°F will occur.