



Technical Description

Genset-Container

JGC 420 GS-N.L

dyn. Gridcode BDEW (DEU, DNK, AUT, BEL, GBR)

GF Genovate Ltd



Electrical output

1487 kW el.

Emission values

NOx < 250 mg/Nm³ (5% O₂)



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0.01 Technical Data (container)

Data at:

				Full load	Part Load	
				100%	75%	50%
Fuel gas LHV	kWh/Nm ³			9.5		
Energy input	kW	[2]	3,569	2,750	1,932	
Gas volume	Nm ³ /h	*)	376	289	203	
Mechanical output	kW	[1]	1,527	1,146	764	
Electrical output	kW el.	[4]	1,487	1,115	740	
Heat to be dissipated		[5]				
~ Intercooler 1st stage (Engine jacket water cooling circuit)	kW		355	173	49	
~ Intercooler 2nd stage (Low temperature circuit)	kW		117	93	64	
~ Lube oil (Engine jacket water cooling circuit)	kW		171	146	128	
~ Jacket water	kW		443	405	332	
~ Surface heat	ca. kW	[7]	120	~	~	
Spec. fuel consumption of engine electric	kWh/kWel.h	[2]	2.40	2.47	2.61	
Spec. fuel consumption of engine	kWh/kWh	[2]	2.34	2.40	2.53	
Lube oil consumption	ca. kg/h	[3]	0.46	~	~	
Electrical efficiency	%		41.7%	40.5%	38.3%	

*) 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 $\pm 8\%$ on the thermal output a further reserve of $+5\%$ is recommended for the dimensioning of the cooling requirements.



Main dimensions and weights (container)

Length	mm	~ 12,200
Width	mm	~ 3,000
Height	mm	~ 2,600
Weight empty	kg	~ 36,900
Weight filled	kg	~ 38,800

Connections

Jacket water inlet and outlet	DN/PN	80/10
Exhaust gas outlet	DN/PN	300/10
Fuel gas connection (container)	mm	100/16
Fresh oil connection	G	28x2"
Waste oil connection	G	28x2"
Cable outlet	mm	800x400
Condensate drain	mm	18

Output / fuel consumption

ISO standard fuel stop power ICFN	kW	1,527
Mean effe. press. at stand. power and nom. speed	bar	20.00
Fuel gas type		Natural gas
Based on methane number Min. methane number	MZ d)	94 70
Compression ratio	Epsilon	12.5
Min./Max. fuel gas pressure at inlet to gas train	mbar	120 - 200 c)
Allowed Fluctuation of fuel gas pressure	%	± 10
Max. rate of gas pressure fluctuation	mbar/sec	10
Maximum Intercooler 2nd stage inlet water temperature	°C	40
Spec. fuel consumption of engine	kWh/kWh	2.34
Specific lube oil consumption	g/kWh	0.30
Max. Oil temperature	°C	85
Jacket-water temperature max.	°C	95
Filling capacity lube oil (refill)	lit	~ 437

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 420 GS-B302
Working principle		4-Stroke
Configuration		V 70°
No. of cylinders		20
Bore	mm	145
Stroke	mm	185
Piston displacement	lit	61.10
Nominal speed	rpm	1,500
Mean piston speed	m/s	9.25
Length	mm	3,750
Width	mm	1,580
Height	mm	2,033
Weight dry	kg	7,200
Weight filled	kg	7,900
Moment of inertia	kgm ²	11.64
Direction of rotation (from flywheel view)		left
Radio interference level to VDE 0875		N
Starter motor output	kW	13
Starter motor voltage	V	24

Thermal energy balance

Energy input	kW	3,569
Intercooler	kW	472
Lube oil	kW	171
Jacket water	kW	443
Exhaust gas cooled to 180 °C	kW	507
Exhaust gas cooled to 100 °C	kW	709
Surface heat	kW	64

Exhaust gas data

Exhaust gas temperature at full load	°C [8]	375
Exhaust gas temperature at bmep= 15 [bar]	°C	~ 400
Exhaust gas temperature at bmep= 10 [bar]	°C	~ 423
Exhaust gas mass flow rate, wet	kg/h	8,424
Exhaust gas mass flow rate, dry	kg/h	7,869
Exhaust gas volume, wet	Nm ³ /h	6,673
Exhaust gas volume, dry	Nm ³ /h	5,982
Max.admissible exhaust back pressure after engine	mbar	60

Combustion air data

Combustion air mass flow rate	kg/h	8,177
Combustion air volume	Nm ³ /h	6,328
Max. admissible pressure drop at air-intake filter	mbar	10



Sound pressure level

Aggregate a)		dB(A) re 20µPa	97
31,5	Hz	dB	79
63	Hz	dB	87
125	Hz	dB	98
250	Hz	dB	95
500	Hz	dB	91
1000	Hz	dB	86
2000	Hz	dB	88
4000	Hz	dB	92
8000	Hz	dB	89
Exhaust gas b)		dB(A) re 20µPa	115
31,5	Hz	dB	95
63	Hz	dB	117
125	Hz	dB	115
250	Hz	dB	113
500	Hz	dB	108
1000	Hz	dB	105
2000	Hz	dB	108
4000	Hz	dB	109
8000	Hz	dB	107

Sound power level

Aggregate		dB(A) re 1pW	117
Measurement surface		m ²	110
Exhaust gas		dB(A) re 1pW	123
Measurement surface		m ²	6.28

a) average sound pressure level on measurement surface in a distance of 1m (converted to free field) according to DIN 45635, precision class 3.

b) average sound pressure level on measurement surface in a distance of 1m according to DIN 45635, precision class 2.

The spectra are valid for aggregates up to bmep=20 bar. (for higher bmep add safety margin of 1dB to all values per increase of 1 bar pressure).

Engine tolerance ± 3 dB



0.03 Technical data of generator

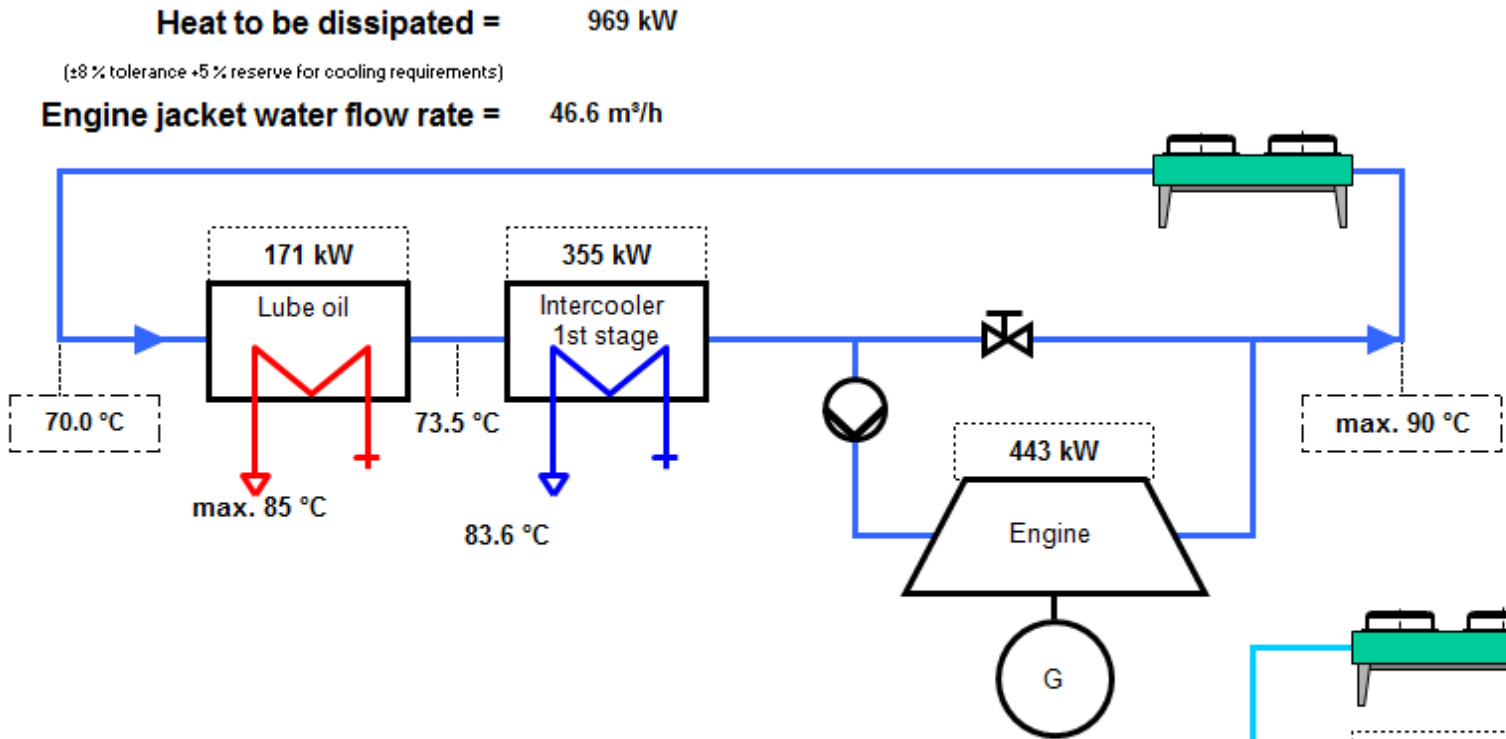
Manufacturer		Leroy-Somer e)
Type		LSA 52.2 L70 e)
Type rating	kVA	1,935
Driving power	kW	1,527
Ratings at p.f. = 1,0	kW	1,487
Ratings at p.f. = 0.8	kW	1,471
Rated output at p.f. = 0.8	kVA	1,838
Rated reactive power at p.f. = 0.8	kVar	1,103
Rated current at p.f. = 0.8	A	2,653
Frequency	Hz	50
Voltage	V	400
Speed	rpm	1,500
Permissible overspeed	rpm	1,800
Power factor (lagging - leading)		0,8 - 0,95
Efficiency at p.f. = 1,0	%	97.4%
Efficiency at p.f. = 0.8	%	96.3%
Moment of inertia	kgm ²	52.50
Mass	kg	4,400
Radio interference level to EN 55011 Class A (EN 61000-6-4)		N
Construction		B3/B14
Protection Class		IP 23
Insulation class		H
Temperature (rise at driving power)		F
Maximum ambient temperature	°C	40

Reactance and time constants (saturated)

xd direct axis synchronous reactance	p.u.	2.18
xd' direct axis transient reactance	p.u.	0.20
xd'' direct axis sub transient reactance	p.u.	0.11
x2 negative sequence reactance	p.u.	0.12
Td'' sub transient reactance time constant	ms	24
Ta Time constant direct-current	ms	45
Tdo' open circuit field time constant	s	3.23

e) GE Jenbacher reserves the right to change the generator supplier and the generator type. The contractual data of the generator may thereby change slightly. The contractual produced electrical power will not change.

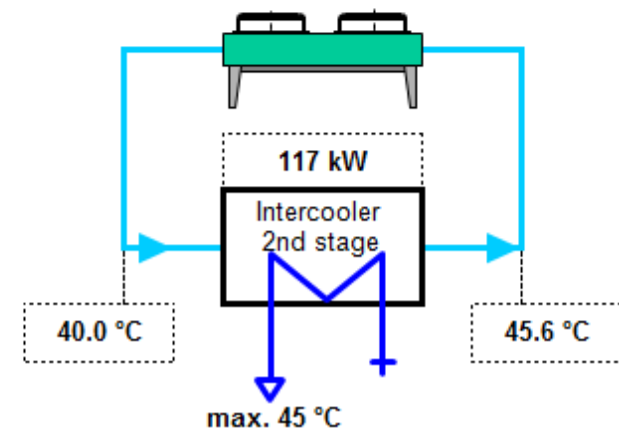
Engine jacket water cooling circuit (calculated with Glykol 37%)



Low temperature circuit (calculated with Glykol 37%)

Heat to be dissipated = 117 kW
 (±8 % tolerance +5 % reserve for cooling requirements)

Cooling water flow rate = 20.0 m³/h





0.05 Cooling water circuit

Oil - heat (Engine jacket water cooling circuit)

Nominal output	kW	171
Max. Oil temperature	°C	85
Loss of nominal pressure of engine jacket water	bar	0.50
Safety valve - max press. set point	bar	2.50

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

Nominal output	kW	443
Max. engine jacket water temperature (outlet engine)	°C	90
Engine jacket water flow rate	m ³ /h	46.6
Safety valve - max press. set point	bar	2.50

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

Nominal output	kW	355
Max. inlet cooling water temp. (intercooler)	°C	73.5
Nominal pressure of cooling water / (max. operating pressure)	PN	10
Loss of nominal pressure of engine jacket water	bar	0.30
Safety valve - max press. set point	bar	2.50

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

Nominal output	kW	117
Max. inlet cooling water temp. (intercooler)	°C	40
Aftercooler water flow rate	m ³ /h	20.0
Nominal pressure of cooling water / (max. operating pressure)	PN	10
Intercooler water pressure drop	bar	0.80
Safety valve - max press. set point	bar	2.50

The final pressure drop will be given after final order clarification and must be taken from the P&ID order documentation.



0.10 Technical parameters

All data in the technical specification are based on engine full load (unless stated otherwise) at specified temperatures and the methane number and subject to technical development and modifications.

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 (at p. f. = 0,8)
- (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:

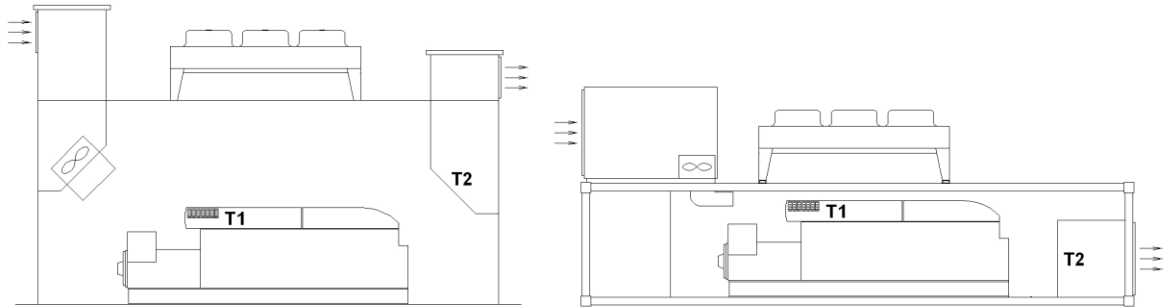
Barometric pressure:	1000 mbar (14.5 psi) or 100 m (328 ft) above sea level
Air temperature:	25°C (77°F) or 298 K
Relative humidity:	30 %
- Volume values at standard conditions (fuel gas, combustion air, exhaust gas)

Pressure:	1013 mbar (14.7 psi)
Temperature:	0°C (32°F) or 273 K

Output adjustment for turbo charged engines

Standard rating of the engines is for an installation at an altitude ≤ 0 m and combustion air temperature ≤ 35 °C (T1)

Engine room outlet temperature: 50°C (T2) -> engine stop



If the actual methane number is lower than the specified, the knock control responds. First the ignition timing is changed at full rated power. Secondly the rated power is reduced. These functions are carried out by the engine management system.

Exceedance of the voltage and frequency limits for generators according to IEC 60034-1 Zone A will lead to a derate in output.

Parameters for the operation of GE Jenbacher gas engines

The genset fulfills the limits for mechanical vibrations according to ISO 8528-9.

If possible, railway trucks must not be used for transport (**TI 1000-0046**).

The following "Technical Instruction of GE JENBACHER" forms an integral part of a contract and must be strictly observed: **TI 1100-0110, TI 1100-0111, and TI 1100-0112.**

Parameters for the operation of control unit and the electrical equipment

Relative humidity 50% by maximum temperature of 40°C.

Altitude up to 2000m above the sea level.