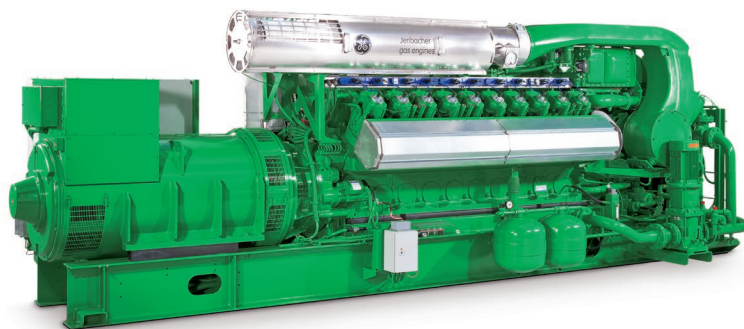


Jenbacher type 4

The new 4B version

an efficiency milestone

Based on the proven design concepts of types 3 and 6, the modern type 4 engines in the 800 to 1,500 kW power range are characterized by a high power density and outstanding efficiency. The optimized control and monitoring provides easy preventive maintenance and maximum reliability and availability.



reference installations

model, plant

key technical data

description

J416 GS

Richard van Schie,
Greenhouses Facility;
Monster, The
Netherlands

Fuel..... Natural gas
Engine type..... 2 x JMS 416 GS-N
Electrical output..... 2,260 kW
Thermal output..... 2,806 kW
Commissioning ... September 2004 (1st engine),
July 2007 (2nd engine)

At this greenhouse facility, the Jenbacher cogeneration system provides power for artificial lighting, heating and CO₂ to increase the chrysanthemum production capabilities. The CO₂ produced from the engine's exhaust gas is used for the fertilization of the greenhouses, whereas the operator gains additional economic benefit due to the supply of the generated electricity to the local grid.



J420 GS

Landfill site
Bootham Lane;
Doncaster, UK

Fuel..... Landfill gas
Engine type..... 2 x JGC 420 GS-L.L
Electrical output..... 2,666 kW
Commissioning..... May 2001 (1st engine),
December 2002 (2nd engine)

At this site, the methane content of the landfill gas can drop as low as 35%. The fluctuations in the methane content can be handled easily by the Jenbacher engines due to the patented LEANOX* lean mixture combustion system. Thus these variations do not cause any reduction in the high output level of our power systems. The installation is operated by United Utilities Green Energy Limited.



J420 GS

Hospital;
Padua, Italy

Fuel..... Natural gas
Engine type..... 2 x JMS 420 GS-N.LC
Electrical output..... 2,832 kW
Thermal output..... 2,576 kW
Commissioning..... February 2002 (1st engine),
October 2003 (2nd engine)

Two Jenbacher cogeneration systems help the Padua hospital to control its energy costs by providing power and heat at high efficiency levels. The electrical efficiency of each engine is 42.3%.



J420 GS

Containerized
solution
Biogas plant SBR;
Kogel, Germany

Fuel..... Biogas
Engine type..... 1 x JMC 420 GS-B.L
Electrical output..... 1,413 kW
Thermal output..... 751 kW
Steam production..... 1,037 kg/h at 3 bar
or 698 kW output
Commissioning..... October 2003

This biogas plant utilizes leftover food from hospitals, hotels and canteens as well as organic residual waste from the food industry for producing biogas that fuels our gas engine. The electricity generated is entirely fed into the public grid, and the exhaust gas from the engine is used for steam production. The steam serves for the pasteurization of the waste, which can then be used as sterilized fertilizer.



GE imagination at work

technical features

feature	description	advantages
Heat recovery	Flexible arrangement of heat exchanger, two stage oil plate heat exchanger on demand	- Maximum thermal efficiency, even at high and fluctuating return temperatures
Gas dosing valve	Electronically controlled gas dosing valve with high degree of control accuracy	- Very quick response time - Rapid adjustment of air/gas ratio - Large adjustable calorific value range
Four-valve cylinder head	Optimized swirl and channel geometry using advanced calculation and simulation methods (CFD)	- Minimized charge-exchange losses - Central spark-plug position resulting in optimal cooling and combustion conditions
Crack connecting rod	Applying a technology – tried and tested in the automotive industry – in our powerful stationary engines	- High dimensional stability and accuracy - Reduced connecting rod bearing wear - Easy to maintain

technical data

Configuration	V 70°			Dimensions l x w x h (mm)
Bore (mm)	145			Generator set
Stroke (mm)	185			J412 GS
Displacement/cylinder (lit)	3.06			J416 GS
Speed (rpm)	1,800 / 1,200 (60 Hz) 1,500 (50 Hz)			J420 GS
Mean piston speed (m/s)	7.4 (1,200 rpm) 9.3 (1,500 rpm)			Cogeneration system
Scope of supply	Generator set, cogeneration system, generator set/cogeneration in container			J412 GS
Applicable gas types	Natural gas, flare gas, biogas, landfill gas, sewage gas. Special gases (e.g., coal mine gas, coke gas, wood gas, pyrolysis gas)			J416 GS
Engine type	J412 GS	J416 GS	J420 GS	J420 GS
No. of cylinders	12	16	20	Container
Total displacement (lit)	36.7	48.9	61.1	J412 GS
				J416 GS
				J420 GS
				Weights empty (kg)
				Generator set
				Cogeneration system
				Container (generator set)
				Container (cogeneration)

outputs and efficiencies

Natural gas		1,500 rpm 50 Hz					1,800 rpm 60 Hz					1,200 rpm 60 Hz				
NOx <	Type	Pel (kW) ¹	η _{el} (%)	Pth (kW)	η _{th} (%)	η _{tot} (%)	Pel (kW) ¹	η _{el} (%)	Pth (kW)	η _{th} (%)	η _{tot} (%)	Pel (kW) ¹	η _{el} (%)	Pth (kW)	η _{th} (%)	η _{tot} (%)
500 mg/m ³ _N	412	889	42.8	901	43.4	86.2	850	41.1	949	45.9	87.0	634	41.8	657	43.3	85.1
	416	1,189	43.0	1,201	43.4	86.3	1,137	41.3	1,265	45.9	87.2	850	42.0	876	43.3	85.4
	420	1,487	43.0	1,502	43.4	86.4	1,426	41.4	1,582	45.9	87.4	1,063	42.0	1,094	43.3	85.3
250 mg/m ³ _N	412	889	41.5	963	45.0	86.5	850	40.0	985	46.3	86.3	599	41.1	639	43.9	85.0
	416	1,189	41.6	1,283	44.9	86.6	1,137	40.1	1,312	46.3	86.4	799	41.1	851	43.8	85.0
	420	1,487	41.7	1,604	44.9	86.6	1,426	40.3	1,641	46.3	86.6	1,004	41.4	1,065	43.9	85.2
350 mg/m ³ _N	412	889	42.1	932	44.2	86.3										
	416	1,189	42.3	1,242	44.1	86.4										
	420	1,486	42.3	1,553	44.1	86.5										
Biogas		1,500 rpm 50 Hz					1,800 rpm 60 Hz									
NOx <	Type	Pel (kW) ¹	η _{el} (%)	Pth (kW)	η _{th} (%)	η _{tot} (%)	Pel (kW) ¹	η _{el} (%)	Pth (kW)	η _{th} (%)	η _{tot} (%)					
500 mg/m ³ _N	412	889	42.0	883	41.7	83.8	850	40.0	918	43.2	83.2					
	416	1,189	42.1	1,177	41.7	83.9	1,137	40.2	1,224	43.3	83.4					
	420	1,487	42.2	1,472	41.7	83.9	1,426	40.3	1,530	43.2	83.6					
250 mg/m ³ _N	412	889	41.6	895	41.9	83.5	850	39.2	949	43.7	82.9					
	416	1,189	41.7	1,194	41.9	83.7	1,137	39.3	1,266	43.7	83.0					
	420	1,487	41.8	1,493	41.9	83.7	1,426	39.4	1,581	43.7	83.1					

1) Total heat output with a tolerance of +/- 8%, exhaust gas outlet temperature 120°C, for biogas exhaust gas outlet temperature 180°C
All data according to full load and subject to technical development and modification.