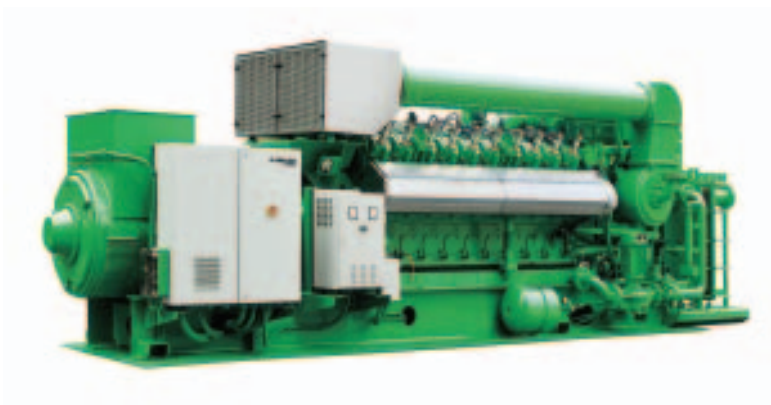


# Jenbacher type 4



## 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

**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,  
December 2002

At this landfill 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,  
October 2003

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.LC  
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.



# technical features

feature	description	advantages
<b>TecJet™ gas dosing valve</b>	Electronically controlled gas dosing valve with high degree of control accuracy	<ul style="list-style-type: none"> <li>- Very quick response time</li> <li>- Rapid adjustment of air/gas ratio</li> <li>- Large adjustable calorific value range</li> </ul>
<b>Four-valve cylinder head</b>	Optimized swirl and channel geometry using advanced calculation and simulation methods (CFD)	<ul style="list-style-type: none"> <li>- Minimized charge-exchange losses</li> <li>- Central spark-plug position resulting in optimal cooling and combustion conditions</li> </ul>
<b>Crack connecting rod</b>	Applying a technology – tried and tested in the automotive industry – in our powerful stationary engines	<ul style="list-style-type: none"> <li>- High dimensional stability and accuracy</li> <li>- Reduced connecting rod bearing wear</li> <li>- Easy to maintain</li> </ul>

# technical data

Configuration	V 70°	<b>Dimensions l x w x h (mm)</b>			
Bore (mm)	145	Generator set	J412 GS	5,400 x 1,800 x 2,200	
Stroke (mm)	185		J416 GS	6,200 x 1,800 x 2,200	
Displacement/cylinder (lit)	3.06		J420 GS	7,100 x 1,900 x 2,200	
Speed (rpm)	1,200 (60 Hz) 1,500 (50 Hz)	Cogeneration system	J412 GS	6,000 x 1,800 x 2,200	
Mean piston speed (m/s)	7.4 (1,200 rpm) 9.3 (1,500 rpm)		J416 GS	6,700 x 1,800 x 2,200	
Scope of supply	Generator set, cogeneration system, generator set/cogeneration in container		J420 GS	7,100 x 1,800 x 2,200	
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)	Container	J412 GS	12,200 x 3,000 x 2,600	
Engine type	J412 GS    J416 GS    J420 GS		J416 GS	12,200 x 3,000 x 2,600	
No. of cylinders	12    16    20		J420 GS	12,200 x 3,000 x 2,600	
Total displacement (lit)	36.7    48.9    61.1	<b>Weights empty (kg)</b>			
		Generator set	J412 GS	J416 GS	J420 GS
		Cogeneration system	10,900	12,500	14,600
		Container (generator set)	11,500	13,100	15,200
		Container (cogeneration)	28,200	30,300	35,200
			28,800	30,900	35,800

# outputs and efficiencies

Natural gas		1,200 rpm   60 Hz					1,500 rpm   50 Hz				
NOx <	Type	Pel (kW) <sub>1</sub>	ηel (%)	Pth (kW) <sub>2</sub>	ηth (%)	ηtot (%)	Pel (kW) <sub>1</sub>	ηel (%)	Pth (kW) <sub>2</sub>	ηth (%)	ηtot (%)
500 mg/Nm <sup>3</sup>	412	634	41.3	672	43.8	85.1	845	42.2	897	44.8	87.0
	412					<sup>3</sup> 845	42.7	856	43.3	86.0	
	416	850	41.5	897	43.8	85.3	1,127	42.3	1,195	44.8	87.1
	416					<sup>3</sup> 1,127	42.8	1,141	43.3	86.1	
	420	1,063	41.6	1,121	43.8	85.4	1,416	42.5	1,492	44.8	87.3
	420					<sup>3</sup> 1,416	43.0	1,426	43.3	86.3	
350 mg/Nm <sup>3</sup>	412						845	41.3	935	45.7	87.0
	416						1,127	41.4	1,247	45.7	87.1
	420						1,416	41.6	1,559	45.7	87.3
250 mg/Nm <sup>3</sup>	412	634	40.3	700	44.5	84.8	845	41.2	927	45.2	86.4
	412					<sup>3</sup> 845	41.8	895	44.2	86.0	
	416	850	40.6	934	44.5	85.1	1,127	41.3	1,236	45.2	86.5
	416					<sup>3</sup> 1,127	41.8	1,195	44.3	86.1	
	420	1,063	40.6	1,167	44.5	85.1	1,416	41.5	1,544	45.2	86.7
	420					<sup>3</sup> 1,416	42.0	1,492	44.2	86.2	
<b>Biogas</b>		1,200 rpm   60 Hz					1,500 rpm   50 Hz				
NOx <	Type	Pel (kW) <sub>1</sub>	ηel (%)	Pth (kW) <sub>2</sub>	ηth (%)	ηtot (%)	Pel (kW) <sub>1</sub>	ηel (%)	Pth (kW) <sub>2</sub>	ηth (%)	ηtot (%)
500 mg/Nm <sup>3</sup>	420						1,416	42.0	1,459	43.2	85.2

1) Electrical output based on ISO standard output and standard reference conditions according to ISO 3046/I-1991 and p.f. = 1.0/low voltage alternator according to VDE 0530 REM with respective tolerance; minimum methane number 70 for natural gas  
 2) Total heat output with a tolerance of +/- 8%, exhaust gas outlet temperature 120°C, for biogas exhaust gas outlet temperature 180°C  
 3) Minimum methane number 85 for natural gas

All data according to full load and subject to technical development and modification.