Technical datasheet of CHP unit

KE-MTUBG 1600-AS

400 V / 50 Hz	Biogas	
Electrical power	kW	1562
Total thermal output	kW	1341
Energy input	kW	3653
Fuel consumption	m_N^3/h	608,8
Electrical efficiency	%	42,8
Thermal efficiency with LT	%	45,7
Thermal efficiency without LT	%	36,7
Overall efficiency with LT	**%**	**88,5**

Engine: MTU Type: 16V4000L32FB

No. of cylinders / configuration	-	16V
Engine speed	min^{-1}	1500
Bore / stroke / displacement	mm / mm / dm^3	170/210/76,3
Compression ratio	-	13,9
Engine power max.	kW	1600
Spark plugs type	-	M18
Lube oil consumption max.	dm^3/h	0,36
Lube oil filling quantity max.	dm^3	250

Alternator: 0 Type:

Voltage / frequency	V/Hz	400/50
PF (leading / lagging)	-	0,95 / 0,8
Alternator efficiency at rated power	%	97,6
Max. ambient temperature	°C	40

Energy balance

						CHP unit performance parameters at rated load
Load	%	**100**	**75**	**50**	**100**
ISO standard engine power	kW	1600	1203	807	**1600**
Electrical power	kW	1562	1172	781	**1562**
Engine cooling thermal output	kW	648	554	462	**648**
Exhaust gas thermal output (180 °C)	kW	693	559	419	**693**
Thermal output mixture cooling - LT	kW	330	193	80	**330**
Total thermal output	kW	1341	1113	881	**1341**
Radiation heat max.	kW	74	-	-	**-**
Energy input 1)	kW	3652	2820	1992	**3653**
Fuel consumption	m_N^3/h	608,7	470,0	332,0	**608,8**
Combustion air mass flow	kg/h	7342	5561	3794	**7344**
Exhaust gas mass flow, wet	kg/h	8087	6135	4200	**8089**
Exhaust temperature after turbocharger	°C	445	464	494	**445**
Alternator efficiency at PF=1	%	97,6	97,4	96,8	**97,6**
Electrical efficiency 1)	%	42,8	41,6	39,2	**42,8**
Thermal efficiency	%	36,7	39,5	44,2	**36,7**
Overall efficiency without LT	**%**	**79,5**	**81,1**	**83,4**	**79,5**

1) According to ISO 3046.

Fuel: Biogas

Min. methane number	-	120
Lower calorific value	MJ/m_N^3	21,6
Biogas composition CH_4/CO_2	$\%_{vol.}/\%_{vol.}$	60/40
Gas pressure at gas regulation line inlet 1)	kPa	13÷20
Max. gas temperature	°C	30

1) -

Heating water circuit

Thermal output	kW	1341
Temperature gradient	°C / °C	90 / 70
Min. cooling medium volume flow	m^3/h	59,22
Max. allowable pressure loss 1)	kPa	50
Heat transfer medium	-	Treated water
Max. operating pressure	bar	6

1) Heating water circuit out of scope of supply of GENTEC CHP.

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LT mixture cooling circuit

Thermal output	kW	330
Temperature gradient	°C / °C	62,6 / 53
Cooling medium volume flow	m^3/h	32,00
Max. allowable pressure loss 1)	kPa	25
Heat transfer medium - ethylene glycol/water	$\%_{vol.}/\%_{vol.}$	40/60
Max. operating pressure	bar	6
Dry cooler acoustic sound pressure level 2)	dB(A) at 10 m	65
Max. ambient temperature	°C	35

1) Pipework between CHP unit and dry cooler.

2) The value of the sound pressure level is considered in free field.

Emergency cooler

Thermal output	kW	1341
Heat transfer medium - ethylene glycol/water	$\%_{vol.}/\%_{vol.}$	40/60
Max. allowable pressure loss 1)	kPa	15
Dry cooler acoustic sound pressure level 2)	dB(A) at 10 m	65
Max. ambient temperature	°C	35

1) Pipework between CHP unit and dry cooler.

2) The value of the sound pressure level is considered in free field

Ventilation and combustion air

Fan air volume flow 1)	m^3/h	23300
Max. allowable pressure loss of air duct 2)	Pa	50
Max. inlet air temperature	°C	35

1) At temperature 35 °C and pressure 101,3 kPa.

2) Air ducts between CHP unit and air inlet/air outlet.

Exhaust gas system

Exhaust gas mass flow, wet	kg/h	8089
Exhaust gas temperature at CHP unit outlet	°C	180
Max. allowable pressure loss 1)	mbar	15
Silencer flanges 2)	-	-
Max. allowed exhaust gas velocity donstream silencer	m/s	40

1) Exhaust gas pipe between CHP unit and outlet excluding components at GENTEC CHP scope of supply.

2) According to EN 1092-1.

Emissions

CO	mg/m_N^3 @ 5 % O_2	<650
NO_x	mg/m_N^3 @ 5 % O_2	<500

Noise level

CHP unit design without canopy	dB(A) at 1 m	98
CHP unit design with canopy	dB(A) at 1 m	80
Exhaust gas system	dB(A) at 1 m	80
Input/Output air ventilation	dB(A) at 1 m	80/80

All values of the sound pressure level is considered in free field.

Dimensions and weight

Canopy dimensions L/W/H	mm	9000/2800/2900
Dry weight of CHP unit design with canopy	kg	34500

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Standard conditions and tolerances

Atmospheric pressure	kPa	100
Air temperature	°C	25
Relative air humidity	%	30
Tolerance for the electrical power	%	±3
Tolerance for the usable thermal output	%	±8
Tolerance for the specific fuel consumption	%	+5

The energy balance parameters listed in this data sheet are related to the standard conditions.

Detailed technical specifications of components on demand.

Change of technical parameters and printing errors reserved.

All values in the data sheet related to Normal conditions assume T = 273,15 K; p = 101,325 kPa

Minimum requirements for gas quality

Parameter	**Unit**	**Limit value**	**Unit**	**Comment**
Methane number[1)]	MN	> 120	-	Consult GENTEC CHP in case of lower methane numbers
Lower calorific value	H_u	> 4,5	kWh/m_N^3	
Chlorine concentration*	Cl	< 40	mg/m_N^3	Chlorine exists as a volatile compound
Fluorine concentration*	F	< 20	mg/m_N^3	Fluorine exists as a volatile compound
Total Chlorine - Fluorine content*	Σ(Cl, F)	< 40	mg/m_N^3	
Dust content < 3 µm*		< 5	mg/m_N^3	
Oil vapour*		< 0,4	mg/m_N^3	Condensation must not occur in the mixture section
Volatile organic compounds*	VOC	-	mg/m_N^3	Without saturated hydrocarbon compounds
Silicion content[2)]*	Si	< 2	mg/m_N^3	In the case of high concentrations, please consult GENTEC CHP
Total sulphur content*	S	< 140	mg/m_N^3	Hydrogen sulfide is included in the total sulfur content
Hydrogen sulphide content[3)]*	H_2S	< 150	ppm	Consult GENTEC CHP in case of higher concentrations
		< 228	mg/m_N^3	
Ammonia content*	NH_3	< 70	ppm	
		< 53	mg/m_N^3	
Relative humidity	φ	< 80	%	Condensation must not occur in the mixture section
Temperature of the gas mixture after the gas mixer	T_G	5 ÷ 45	°C	
Hydrogen[4)]*	H_2	< 2	$\%_{vol.}$	

** If these components are also part of the intake air, they need to be allocated to the fuel gas as components. The limit values mentioned above yield a limit value for the total of components contained from intake air and fuel gas.*

1) For all fuel gases, except natural gas, please contact GENTEC CHP

2) The engine oil may contain silicon due to additives (defoamers) being added. However, silicon may also have been diffused into the engine oil in form of dust due to insufficient air filtering or gas filtering. Therefore, the concentration of silicone in the gas shall always be evaluated together with the oil analyses. Depending on the occurrence in organic or inorganic form, high concentrations of silicone in the engine oil can result in increased component wear. The contents of wear elements such as iron, chromium and aluminum shall also be included in the evaluation in case of increased silicon content in the engine oil.

3) If catalyst is used, maximum allowed hydrogen sulphide is < 3 ppm (5 mg/ m_N 3)

4) In case of higher hydrogen content, contact GENTEC CHP s.r.o.

Release date	**Created**	**Revision**	**Project / Offer**
10.03.2025	JM	2	