Technical datasheet of CHP unit

KE-MTUBG 800-AR

400 V / 50 Hz	Biogas	
Electrical power	kW	776
Total thermal output	kW	778
Energy input	kW	1854
Fuel consumption	m_N^3/h	309,0
Electrical efficiency	%	41,9
Thermal efficiency with LT	%	45,6
Thermal efficiency without LT	%	42,0
Overall efficiency with LT	**%**	**87,5**

Engine: MTU Type: 8V4000L32FB

No. of cylinders / configuration	-	8V
Engine speed	min^{-1}	1500
Bore / stroke / displacement	mm / mm / dm^3	170/210/38,1
Compression ratio	-	13,9
Engine power max.	kW	800
Spark plugs type	-	M18
Lube oil consumption max.	dm^3/h	0,18
Lube oil filling quantity max.	dm^3	160

Alternator: 0 Type:

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

Energy balance

					CHP unit performance parameters at rated load
Load	%	**100**	**75**	**50**	**100**
ISO standard engine power	kW	800	602	405	**800**
Electrical power	kW	776	582	388	**776**
Engine cooling thermal output	kW	418	331	246	**418**
Exhaust gas thermal output (180 °C)	kW	360	297	224	**360**
Thermal output mixture cooling - LT	kW	67	38	19	**67**
Total thermal output	kW	778	628	470	**778**
Radiation heat max.	kW	52	-	-	**52**
Energy input 1)	kW	1854	1431	1016	**1854**
Fuel consumption	m_N^3/h	309,0	238,5	169,3	**309,0**
Combustion air mass flow	kg/h	3818	2904	1995	**3818**
Exhaust gas mass flow, wet	kg/h	4192	3195	2200	**4192**
Exhaust temperature after turbocharger	°C	448	472	503	**448**
Alternator efficiency at PF=1	%	97	96,7	95,7	**97,0**
Electrical efficiency 1)	%	41,9	40,7	38,1	**41,9**
Thermal efficiency	%	42,0	43,9	46,2	**42,0**
Overall efficiency without LT	**%**	**83,9**	**84,6**	**84,3**	**83,9**

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	14÷25
Max. gas temperature	°C	30

1) -

Heating water circuit

Thermal output	kW	778
Temperature gradient	°C / °C	90 / 70
Min. cooling medium volume flow	m^3/h	34,38
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	67
Temperature gradient	°C / °C	65 / 64
Cooling medium volume flow	m^3/h	39,00
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	778
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	15200
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	4192
Exhaust gas temperature at CHP unit outlet	°C	180
Max. allowable pressure loss 1)	mbar	13
Silencer flanges 2)	-	DN400-PN10
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	<1000
NO_x	mg/m_N^3 @ 5 % O_2	<500

Noise level

CHP unit design without canopy	dB(A) at 1 m	98,1
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	6000/2400/2900
Dry weight of CHP unit design with canopy	kg	17300

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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**
25.03.2025	JM	2	