Technical datasheet of CHP unit

KE-MTUNG 2000-BSE

400 V / 50 Hz	Natural gas	
Electrical power	kW	1999
Total thermal output	kW	2146
Energy input	kW	4519
Fuel consumption	m_N^3/h	478,5
Electrical efficiency	%	44,2
Thermal efficiency with LT	%	50,6
Thermal efficiency without LT	%	47,5
Overall efficiency with LT	**%**	**94,8**

Engine: MTU Type: 16V4000L64FNER

No. of cylinders / configuration	-	16V
Engine speed	min^{-1}	1500
Bore / stroke / displacement	mm / mm / dm^3	170/210/76,3
Compression ratio	-	12,5
Engine power max.	kW	2050
Spark plugs type	-	M18
Lube oil consumption max.	dm^3/h	0,35
Lube oil filling quantity max.	dm^3	330

Alternator: Stamford Type:

Voltage / frequency	V/Hz	400/50
PF (leading / lagging)	-	0,95 / 0,8
Alternator efficiency at rated power	%	97,5
Max. ambient temperature	°C	40

Energy balance

					CHP unit performance parameters at rated load
Load	%	**100**	**75**	**50**	**100**
ISO standard engine power	kW	2050	1538	1040	**2050**
Electrical power	kW	1999	1499	1009	**1999**
Engine cooling thermal output	kW	1043	780	560	**1043**
Exhaust gas thermal output (120 °C)	kW	984	804	627	**984**
Exhaust gas thermal output (80 °C)	kW	119	89	61	**119**
Thermal output mixture cooling - LT	kW	142	95	60	**142**
Total thermal output	kW	2146	1673	1248	**2146**
Radiation heat max.	kW	113	-	-	**113**
Energy input 1)	kW	4519	3451	2453	**4519**
Fuel consumption	m_N^3/h	478,5	365,4	259,7	**478,5**
Combustion air mass flow	kg/h	9611	7206	4898	**9611**
Exhaust gas mass flow, wet	kg/h	9942	7459	5078	**9942**
Exhaust temperature after turbocharger	°C	432	459	506	**432**
Alternator efficiency at PF=1	%	97,5	97,5	97	**97,5**
Electrical efficiency 1)	%	44,2	43,4	41,1	**44,2**
Thermal efficiency	%	47,5	48,5	50,9	**47,5**
Overall efficiency without LT	**%**	**91,7**	**91,9**	**92,0**	**91,7**

1) According to ISO 3046.

Fuel: Natural gas

Min. methane number	-	72
Lower calorific value	MJ/m_N^3	34
Gas pressure at gas regulation line inlet 1)	kPa	15÷25
Max. gas temperature	°C	30

1) -

Heating water circuit

Thermal output	kW	2146
Temperature gradient	°C / °C	90 / 70
Min. cooling medium volume flow	m^3/h	94,78
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	142
Temperature gradient	°C / °C	46,9 / 43
Cooling medium volume flow	m^3/h	34,30
Max. allowable pressure loss 1)	kPa	-
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	2146
Heat transfer medium - ethylene glycol/water	$\%_{vol.}/\%_{vol.}$	40/60
Max. allowable pressure loss 1)	kPa	-
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	34100
Max. allowable pressure loss of air duct 2)	Pa	-
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	9942
Exhaust gas temperature at CHP unit outlet	°C	80
Max. allowable pressure loss 1)	mbar	-
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 inside container	dB(A) at 10 m	70
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

Container dimensions L/W/H	mm	14000/2900/2900
Dry weight CHP unit design inside container	kg	37500

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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	> 72	-	Consult GENTEC CHP in case of lower methane numbers
Lower calorific value	H_u	> 8	kWh/m_N^3	
Chlorine concentration*	Cl	< 10	mg/m_N^3	Chlorine exists as a volatile compound
Fluorine concentration*	F	< 5	mg/m_N^3	Fluorine exists as a volatile compound
Total Chlorine - Fluorine content*	Σ(Cl, F)	< 10	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	< 1	mg/m_N^3	In the case of high concentrations, please consult GENTEC CHP
Total sulphur content*	S	< 30	mg/m_N^3	Hydrogen sulfide is included in the total sulfur content
Hydrogen sulphide content[3)]*	H_2S	< 3	ppm	Consult GENTEC CHP in case of higher concentrations
		< 5	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
24.07.2024	EB	1	