Technical datasheet of CHP unit

KE-MTUNG 2100-BEE

400 V / 50 Hz		Natural gas
Electrical power	kW	2145
Total thermal output	kW	2373
Energy input	kW	4990
Fuel consumption	m_N^3/h	528,4
Electrical efficiency	%	43,0
Thermal efficiency with LT	%	50,4
Thermal efficiency without LT	%	47,6
Overall efficiency with LT	**%**	**93,4**

Engine: MTU Type: 20V4000L33FN

No. of cylinders / configuration	-	20V	
Engine speed	min^{-1}	1500	
Bore / stroke / displacement	mm / mm / dm^3	170/210/95,3	
Compression ratio	-	12,8	
Engine power max.	kW	2200	
Spark plugs type	-	M18	
Lube oil consumption max.	dm^3/h	0,75	
Lube oil filling quantity max.	dm^3	350	

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	2200	1650	1105	**2200**
Electrical power	kW	2145	1609	1073	**2145**
Engine cooling thermal output	kW	1161	873	622	**1161**
Exhaust gas thermal output (120 °C)	kW	1078	900	687	**1078**
Exhaust gas thermal output (80 °C)	kW	134	101	69	**134**
Thermal output mixture cooling - LT	kW	142	98	62	**142**
Total thermal output	kW	2373	1874	1378	**2373**
Radiation heat max.	kW	113	-	-	**113**
Energy input 1)	kW	4990	3837	2700	**4990**
Fuel consumption	m_N^3/h	528,4	406,3	285,9	**528,4**
Combustion air mass flow	kg/h	10846	8210	5617	**10846**
Exhaust gas mass flow, wet	kg/h	11212	8493	5816	**11212**
Exhaust temperature after turbocharger	°C	441	470	502	**441**
Alternator efficiency at PF=1	%	97,5	97,5	97,1	**97,5**
Electrical efficiency 1)	%	43,0	41,9	39,7	**43,0**
Thermal efficiency	%	47,6	48,8	51,0	**47,6**
Overall efficiency without LT	**%**	**90,6**	**90,7**	**90,7**	**90,6**

1) According to ISO 3046.

Fuel: Natural gas

Min. methane number	-	80
Lower calorific value	MJ/m_N^3	34
Gas pressure at gas regulation line inlet 1)	kPa	18÷25
Max. gas temperature	°C	30

1) -

Heating water circuit

Thermal output	kW	2373
Temperature gradient	°C / °C	90 / 70
Min. cooling medium volume flow	m^3/h	104,80
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	43,8 / 40
Cooling medium volume flow	m^3/h	35,30
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	2373
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	35200
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	11212
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 with SCR used

CO	mg/m_N^3 @ 5 % O_2	<150
NO_x	mg/m_N^3 @ 5 % O_2	<50

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	15400/3000/2900
Dry weight CHP unit design inside container	kg	45800

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KE-MTUNG 2100-BEE

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	> 80	-	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	MO	1	