Technical datasheet of CHP unit

KE-MNG 350-BE

400 V / 50 Hz	Natural gas	
Electrical power	kW	356
Total thermal output	kW	443
Energy input	kW	941
Fuel consumption	m_N^3/h	99,6
Electrical efficiency	%	37,9
Thermal efficiency with LT	%	49,7
Thermal efficiency without LT	%	47,1
Overall efficiency with LT	**%**	**87,6**

Engine: MAN Type: E3268 LE212

No. of cylinders / configuration	-	8V
Engine speed	min^{-1}	1500
Bore / stroke / displacement	mm / mm / dm^3	132/157/17,19
Compression ratio	-	12
Engine power max.	kW	369
Spark plugs type	-	M18
Lube oil consumption max.	kg/h	0,14
Lube oil filling quantity max.	dm^3	95

Alternator: Leroy-Somer Type: LSA 47.3 M7

Voltage / frequency	V/Hz	400/50
PF (leading / lagging)	-	0,9 / 0,8
Alternator efficiency at rated power	%	96,6
Max. ambient temperature	°C	40

Energy balance

		CHP unit performance parameters at rated load			
Load	%	**100**	**75**	**50**	**100**
ISO standard engine power	kW	369	276	185	**369**
Electrical power	kW	356	267	178	**356**
Engine cooling thermal output	kW	187	159	127	**187**
Exhaust gas thermal output (120 °C)	kW	210	166	116	**210**
Thermal output mixture cooling - HT	kW	46	22	4	**46**
Thermal output mixture cooling - LT	kW	25	16	9	**25**
Total thermal output	kW	443	346	247	**443**
Radiation heat max.	kW	50	39	30	**50**
Energy input 1)	kW	941	718	498	**941**
Fuel consumption	m_N^3/h	99,6	76,0	52,7	**99,6**
Combustion air mass flow	kg/h	1745	1301	873	**1745**
Exhaust gas mass flow, wet	kg/h	1821	1359	914	**1821**
Exhaust temperature after turbocharger	°C	488	-	-	**488**
Alternator efficiency at PF=1	%	96,6	96,8	96,3	**96,6**
Electrical efficiency 1)	%	37,9	37,2	35,8	**37,9**
Thermal efficiency	%	47,1	48,2	49,6	**47,1**
Overall efficiency without LT	**%**	**85,0**	**85,4**	**85,4**	**85,0**

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	1,5÷10
Max. gas temperature	°C	30

1) The gas regulation line for MAN engines is standardly dimensioned at 4 ÷ 5 kPa.

Heating water circuit

Thermal output	kW	443
Temperature gradient	°C / °C	90 / 70
Min. cooling medium volume flow	m^3/h	19,57
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	25
Temperature gradient	°C / °C	46 / 42
Cooling medium volume flow	m^3/h	5,84
Max. allowable pressure loss 1)	kPa	-
Heat transfer medium - ethylene glycol/water	$\%_{vol.}/\%_{vol.}$	40/60
Max. operating pressure	bar	3
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	443
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	14700
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	1821
Exhaust gas temperature at CHP unit outlet	°C	120
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	65
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	7100/2490/3117
Dry weight CHP unit design inside container	kg	14400

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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	%	±7
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	> 5	kWh/m_N^3	
Chlorine concentration*	Cl	< 180	mg/m_N^3	Chlorine exists as a volatile compound
Fluorine concentration*	F	< 50	mg/m_N^3	Fluorine exists as a volatile compound
Total Chlorine - Fluorine content*	Σ(Cl, F)	< 180	mg/m_N^3	
Dust content < 5 µm*		< 10	mg/m_N^3	
Oil vapour*		< 900	mg/m_N^3	Condensation must not occur in the mixture section
Volatile organic compounds*	VOC	< 70	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	< 350	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	< 40	ppm	
		< 30	mg/m_N^3	
Relative humidity	φ	< 60	%	Condensation must not occur in the mixture section
Temperature of the gas mixture after the gas mixer	T_G	10 ÷ 30	°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**
16.09.2024	MO	2	