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TCG 2016 C

400 – 800 kW_{el} | 536 – 1073 bhp
at 1800 min^{-1} | rpm (60 Hz)

MWM
Energy. Efficiency. Environment.

Technical data 60 Hz – Natural gas applications

NO_X <= 500 mg /m_n^3 | 1.2 g/bhph [1)]

Minimum methane number MN 80
dry exhaust manifolds

Engine type			TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Engine power [2)]		kW | bhp	415 | 557	620 | 831	826 | 1108
Speed		min^{-1} | rpm	1800	1800	1800
Mean effective pressure		bar | psi	15.8 | 229.2	15.7 | 227.7	15.7 | 227.7
Exhaust temperature	approx.	°C | °F	494 | 921.2	490 | 914	494 | 921.2
Exhaust mass flow wet	approx.	kg/h | lb/hr	2218 | 4888	3339 | 7359	4394 | 9684
Combustion air mass flow [2)]	approx.	kg/h | lb/hr	2146 | 4730	3231 | 7121	4251 | 9369
Combustion air temperature min./design		°C | °F	20/25 | 68/77	20/25 | 68/77	20/25 | 68/77
Ventilation air flow [3)]	approx.	kg/h | lb/hr	12320 | 27153	16485 | 36333	21536 | 47465
Engine parameters					
Bore/stroke		mm | in	132/160 | 5.2/6.3	132/160 | 5.2/6.3	132/160 | 5.2/6.3
Displacement		dm^3 | cu in	17.5 | 1068	26.3 | 1605	35.0 | 2135
Compression ratio			12.0 : 1	12.0 : 1	12.0 : 1
Mean piston speed		m/s | ft/s	9.6 | 31.5	9.6 | 31.5	9.6 | 31.5
Lube oil content [4)]		dm^3 | gal	270 | 71.3	335 | 88.5	435 | 114.9
Typical mean lube oil consumption [5)]		g/kWh | lb/hr	0.20 | 0.15	0.20 | 0.15	0.20 | 0.15
Generator					
Efficiency [6)]		%	96.5	96.8	96.8
Energy balance					
Electrical power [6)]		kW_{el}	400	600	800
Jacket water heat	± 8 %	kW | MBtu/hr	190 | 648	297 | 1013	382 | 1303
Intercooler LT heat [7)]	± 8 %	kW | MBtu/hr	27 | 92	42 | 143	58 | 198
Exhaust cooled to 120 °C | 248 °F	± 8 %	kW | MBtu/hr	257 | 876	383 | 1306	510 | 1739
Engine radiation heat		kW | MBtu/hr	19 | 65	23 | 78	30 | 102
Generator radiation heat		kW | MBtu/hr	15 | 51	20 | 68	26 | 89
Fuel consumption [8)]	+ 5 %	kW | MBtu/hr	971 | 3311	1459 | 4975	1930 | 6581
Electrical efficiency		%	41.2	41.1	41.5
Thermal efficiency		%	46.0	46.6	46.2
Total efficiency		%	87.2	87.7	87.7
System parameters					
Engine jacket water flow rate min./max.		m^3/h | GPM	19/32 | 83/140	29/47 | 127/206	39/60 | 171/263
Engine K_{VS}-value [9)]		m^3/h | GPM	37 | 162	37 | 162	42.6 | 187
Intercooler coolant flow rate		m^3/h | GPM	8 | 35	10 | 44	10 | 44
Intercooler K_{VS}-value [9)]		m^3/h | GPM	10.4 | 46	10.4 | 46	10.4 | 46
Engine jacket water volume		dm^3 | gal	28 | 7.4	43 | 11.4	56 | 14.8
Intercooler coolant volume		dm^3 | gal	5 | 1.32	5 | 1.32	5 | 1.32
Engine jacket water temperature max. [10)]		°C | °F	84/92 | 183/198	84/92 | 183/198	84/92 | 183/198
– with glycol [10)]		°C | °F	(84/92 | 183/198)	(84/92 | 183/198)	(84/92 | 183/198)
Intercooler coolant temperature [10)]		°C | °F	40/43 | 104/109	40/37 | 104/111	40/45.1 | 104/113
Exhaust backpressure min./max.		mbar | psi	30/50 | 0.44/0.73	30/50 | 0.44/0.73	30/50 | 0.44/0.73
Maximum pressure loss in front of air cleaner		mbar | psi	5 | 0.073	5 | 0.073	5 | 0.073
Gas flow pressure, fixed between [11)]		mbar | psi	20...200 | 0.29...2.9	20...200 | 0.29...2.9	20...200 | 0.29...2.9
Starter battery 24 V, capacity required		Ah	143	143	286

Technical data 60 Hz – Sewage, bio and landfill gas applications

NO_X <= 500 mg/m_n^3 | 1.2 g/bhph [1)]
Sewage gas (65 % CH_4 / 35 % CO_2)
Biogas (60 % CH_4 / 32 % CO_2, rest N_2)
Landfill gas (50 % CH_4 / 27 % CO_2, rest N_2)

Minimum heating value (LHV) = 5.0 kWh/m_n^3 | 483 Btu/cu ft
dry exhaust manifolds

Engine type			TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Engine power [2)]		kW | bhp	415 | 557	620 | 831	826 | 1108
Speed		min^{-1} | rpm	1800	1800	1800
Mean effective pressure		bar | psi	15.8 | 229.2	15.7 | 227.7	15.7 | 227.7
Exhaust temperature	approx.	°C | °F	488 | 910	484 | 903	488 | 910
Exhaust mass flow wet	approx.	kg/h | lb/hr	2202 | 4853	3312 | 7300	4384 | 9662
Combustion air mass flow [2)]	approx.	kg/h | lb/hr	2029 | 4472	3053 | 6729	4041 | 8906
Combustion air temperature min./design		°C | °F	20/25 | 68/77	20/25 | 68/77	20/25 | 68/77
Ventilation air flow [3)]	approx.	kg/h | lb/hr	12121 | 26715	16181 | 35663	21157 | 46630
Engine parameters					
Bore/stroke		mm | in	132/160 | 5.2/6.3	132/160 | 5.2/6.3	132/160 | 5.2/6.3
Displacement		dm^3 | cu in	17.5 | 1068	26.3 | 1605	35.0 | 2135
Compression ratio			15.0 : 1	15.0 : 1	15.0 : 1
Mean piston speed		m/s | ft/s	9.6 | 31.5	9.6 | 31.5	9.6 | 31.5
Lube oil content [4)]		dm^3 | gal	270 | 71.3	335 | 88.5	435 | 114.9
Typical mean lube oil consumption [5)]		g/kWh | lb/hr	0.20 | 0.15	0.20 | 0.15	0.20 | 0.15
Generator					
Efficiency [6)]		%	96.5	96.8	96.8
Energy balance					
Electrical power [6)]		kW_{el}	400	600	800
Jacket water heat	± 8 %	kW | MBtu/hr	192 | 655	301 | 1026	384 | 1309
Intercooler LT heat [7)]	± 8 %	kW | MBtu/hr	26 | 89	41 | 140	58 | 198
Exhaust cooled to 150 °C | 310 °F	± 8 %	kW | MBtu/hr	232 | 791	344 | 1173	461 | 1572
Engine radiation heat		kW | MBtu/hr	19 | 65	23 | 78	30 | 102
Generator radiation heat		kW | MBtu/hr	15 | 51	20 | 68	26 | 89
Fuel consumption [8)]	+ 5 %	kW | MBtu/hr	965 | 3291	1452 | 4951	1921 | 6551
Electrical efficiency		%	41.5	41.3	41.6
Thermal efficiency		%	43.9	44.4	44.0
Total efficiency		%	85.4	85.7	85.6
System parameters					
Engine jacket water flow rate min./max.		m^3/h | GPM	19/32 | 83/140	29/47 | 127/206	39/60 | 171/263
Engine K_{VS}-value [9)]		m^3/h | GPM	37 | 162	37 | 162	42.6 | 187
Intercooler coolant flow rate		m^3/h | GPM	8 | 35	10 | 44	10 | 44
Intercooler K_{VS}-value [9)]		m^3/h | GPM	10.4 | 46	10.4 | 46	10.4 | 46
Engine jacket water volume		dm^3 | gal	28 | 7.4	43 | 11.4	56 | 14.8
Intercooler coolant volume		dm^3 | gal	5 | 1.32	5 | 1.32	5 | 1.32
Engine jacket water temperature max. [10)]		°C | °F	84/92 | 183/198	84/92 | 183/198	84/92 | 183/198
– with glycol [10)]		°C | °F	(84/92 | 183/198)	(84/92 | 183/198)	(84/92 | 183/198)
Intercooler coolant temperature [10)]		°C | °F	50/52.9 | 122/127	50/53.6 | 122/128	50/55.1 | 122/131
Exhaust backpressure min./max.		mbar | psi	30/50 | 0.44/0.73	30/50 | 0.44/0.73	30/50 | 0.44/0.73
Maximum pressure loss in front of air cleaner		mbar | psi	5 | 0.073	5 | 0.073	5 | 0.073
Gas flow pressure, fixed between [11)]		mbar | psi	20...200 | 0.29...2.9	20...200 | 0.29...2.9	20...200 | 0.29...2.9
Starter battery 24 V, capacity required		Ah	143	143	286

1) NO_X emissions:
NO_X < 0.50 g NO_2/m_n^3 | 1.2 g/bhph dry exhaust gas at 5 % O_2
2) Engine power ratings and combustion air volume flows acc. to ISO 3046/1
3) Intake air flow at delta T = 15 K including combustion air
4) Including pipes, heat exchangers and base frame.
5) This values are the mean lube oil consumption between maintenance steps which include an E 60 service. Also the procedures defined in the TPI 1111-E-06-02 and the Technical Circular TR 0199-99-2105 are to be carefully followed.
6) At 60 Hz, U = 0.48 kV, power factor = 1
7) At 40 °C | 104 °F water inlet (50 °C | 122 °F for biogas)
8) With a tolerance of + 5 %
9) The K_{VS}-value is the parameter for the pressure loss in the cooling system (= flowrate for 1 bar | 14.5 psi pressure loss).
10) Inlet/outlet
11) Consider TR 0199-99-3017

Data for special gas and dual gas operation on request.

The values given in this data sheet are for information purposes only and not binding.
The information given in the offer is decisive.

Dimensions 60 Hz Genset		TCG 2016 V08 C	TCG 2016 V12 C	TCG 2016 V16 C
Length	mm | in	3070 | 120.9	3700 | 145.7	4000 | 157.5
Width	mm | in	1480 | 58.2	1450 | 57.1	1450 | 57.1
Height	mm | in	2280 | 89.8	2200 | 86.6	2200 | 86.6
Dry weight genset	kg | lbs	5200 | 11464	5700 | 12566	6570 | 14484

Noise emissions* 60 Hz Noise frequency band	Hz	63	125	250	500	1000	2000	4000	8000
Engine type TCG 2016 V08 C									
Exhaust noise 120 dB (A)	dB (lin)	108	125	123	116	114	112	107	103
Air-borne noise 99 dB (A)	dB (lin)	86	86	92	94	90	90	93	92
Engine type TCG 2016 V12 C									
Exhaust noise 121 dB (A)	dB (lin)	106	117	122	116	116	116	110	104
Air-borne noise 99 dB (A)	dB (lin)	86	89	90	93	92	92	88	95
Engine type TCG 2016 V16 C									
Exhaust noise 116 dB (A)	dB (lin)	108	123	118	112	110	104	105	97
Air-borne noise 105 dB (A)	dB (lin)	92	96	96	97	99	97	94	100

Exhaust noise at 1 m, ∢ 45°, ± 2.5 dB (A)
Air-borne noise at 1 m from the side, ± 1 dB (A)

*Values apply to natural gas applications, measured as noise pressure level.

Your benefits

- Package of favorable investment and low operating costs.
- Low energy consumption thanks to maximum primary energy utilization.
- Long service intervals and ease of service guarantee additional cost savings.
- Efficient energy conversion with outstanding performance.
- Two-phase-intercooling permits maximum power even when using gases with low methane numbers.
- Reliable control and monitoring with high safety standards ensure optimum combustion and maximum engine protection.
- All governing, service, control and monitoring functions are easy and comfortable to operate.

Version 12/09/E

Characteristics

- State-of-the-art 08, 12 and 16 cylinder V-engines.
- Turbocharging and two-phase-intercooling.
- Single cylinder heads with four-valve technology.
- Centrally arranged industrial spark plug with intensive plug seat cooling.
- Microprocessor-controlled high-voltage ignition system.
- One ignition coil per cylinder.
- Electronic control and monitoring of genset operation through TEM.
- Exhaust emissions controlled according to combustion chamber temperature.

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