

Genset	50 Hz		03/02
ENGINE SPEED (rpm):	1000	FUEL TYPE:	Nat Gas
COMPRESSION RATIO:	10.5:1	MIN. FUEL PRESSURE (kPag):	295
AFTERCOOLER - STAGE 1 (°C)	93	MIN. RATED METHANE NUMBER:	80
AFTERCOOLER - STAGE 2 (°C)	32	RATED ALTITUDE @ 25°C (m):	500
JACKET WATER OUTLET (°C)	99	FUEL LHV (MJ/Nm ³):	35.6
IGNITION SYSTEM:	CIS/A3	ASSUMED GENERATOR EFFICIENCY (%):	97.0
EXHAUST MANIFOLD:	DRY	GENERATOR POWER FACTOR	0.8

RATING	NOTES	LOAD	100%	75%	50%
ENGINE POWER	(2)	bkW	3979	2984	1989
GENERATOR POWER	(2)	ekW	3859	2895	1930
ENGINE EFFICIENCY (ISO 3046/1)	(1)	%	41.5	40.4	38.3
ENGINE EFFICIENCY (NOMINAL)	(1)	%	40.5	39.4	37.4

ENGINE DATA					
FUEL CONSUMPTION (ISO 3046/1)	(1)	MJ/bkW-hr	8.69	8.93	9.4
FUEL CONSUMPTION (NOMINAL)	(1)	MJ/bkW-hr	8.9	9.14	9.62
AIR FLOW (@ 0°C, 101.3 kPaa)		Nm ³ /min	332	254	174
AIR MASS FLOW		kg/hr	25,746	19,726	13,471
COMPRESSOR OUTLET PRESSURE		kPa (abs)	258	201	144
COMPRESSOR OUTLET TEMPERATURE		°C	163	124	82
INLET MANIFOLD PRESSURE		kPa (abs)	248	191	136
INLET MANIFOLD TEMPERATURE		°C	42	40	38
LAMBDA			2.08	2.07	2.01
TIMING		°BTDC	18.3	18.3	18.3
EXHAUST STACK TEMPERATURE		°C	402	417	442
EXHAUST GAS FLOW (@ 0°C, 101.3 kPaa)		Nm ³ /min	356	273	186
EXHAUST GAS MASS FLOW		kg/hr	26,525	20,323	13,879

EMISSIONS					
NO _x (corr. to 5% O ₂)	(3)	mg/Nm ³	251	241	227
CO (corr. to 5% O ₂)	(3)	mg/Nm ³	1320	1264	1194
THC (corr. to 5% O ₂ , molecular weight of 15.84)	(3)	mg/Nm ³	3633	3805	3659
NMHC (corr. to 5% O ₂ , molecular weight of 15.84)	(3)	mg/Nm ³	545	571	549
EXHAUST OXYGEN		%	12.0	11.8	11.5

ENERGY BALANCE DATA					
FUEL INPUT ENERGY (LHV) (NOMINAL)	(1)	kW	9,831	7,573	5,315
WORK ENERGY (NOMINAL)	(2)	kW	3,979	2,984	1,989
HEAT REJ. TO JACKET WATER (NOMINAL)	(4)	kW	769	680	556
HEAT REJ. TO ATMOSPHERE (NOMINAL)	(5)	kW	323	279	238
HEAT REJ. TO LUBE OIL (NOMINAL)	(6)	kW	462	429	373
HEAT REJ. TO EXH. (LHV to 25°C) (NOMINAL)	(4)	kW	3,404	2,725	1,974
HEAT REJ. TO EXH. (LHV to 120°C) (NOMINAL)	(4)	kW	2,294	1,854	1,378
HEAT REJ. TO AFTERCOOLER STAGE 1 (NOMINAL)	(7) (8)	kW	429	146	(35)
HEAT REJ. TO AFTERCOOLER STAGE 2 (NOMINAL)	(6) (7)	kW	465	330	220

CONDITIONS AND DEFINITIONS

ENGINE RATING OBTAINED AND PRESENTED IN ACCORDANCE WITH ISO 3046/1 (STD. REF. CONDITIONS OF 25°C, 100 KPA, 152 m). NO OVERLOAD PERMITTED AT RATING SHOWN. CONSULT ALTITUDE CURVES FOR APPLICATIONS ABOVE MAXIMUM RATED ALTITUDE AND/OR TEMPERATURE.

NOTES

- FUEL CONSUMPTION TOLERANCE. ISO 3046/1 IS 0, + 5% OF FULL LOAD DATA. NOMINAL IS ± 2.5 % OF FULL LOAD DATA.
- ENGINE POWER AND WORK ENERGY INCLUDE 1 ENGINE DRIVEN WATER PUMP.
- EMISSION DATA SHOWN ARE DRY AND NOT TO EXCEED VALUES.
- HEAT REJECTION TO JACKET AND EXHAUST TOLERANCE IS ± 10% OF FULL LOAD DATA. (heat rate based on treated water)
- HEAT REJECTION TO ATMOSPHERE TOLERANCE IS ± 50% OF FULL LOAD DATA. (heat rate based on treated water)
- HEAT REJECTION TO LUBE OIL TOLERANCE IS ± 20% OF FULL LOAD DATA. (heat rate based on treated water)
- HEAT REJECTION TO AFTERCOOLER TOLERANCE IS ± 5% OF FULL LOAD DATA. (heat rate based on treated water)
- AFTERCOOLER HEAT STAGE 1 = (A/C HEAT STAGE 1 + 0.85 x (STAGE 1 + STAGE 2) x (ACHRF - 1)) : (heat rate based on treated water)
AFTERCOOLER HEAT STAGE 2 = (A/C HEAT STAGE 2 + 0.15 x (STAGE 1 + STAGE 2) x (ACHRF - 1)) : (heat rate based on treated water)

FUEL USAGE GUIDE									
DERATE FACTOR vs CATERPILLAR METHANE NUMBER									
Methane Number	60	65	70	75	80	85	90	95	100
Rating Factor	0.00	0.89	0.93	0.96	1.00	1.00	1.00	1.00	1.00
Minimum Methane Number for Full Rating = 80.0									
Fuel System Limit (minimum Wobbe Index) = 48.7 MJ/Nm3									

TOTAL DERATION FACTORS - ALTITUDE & COOLING															
AIR TO TURBO (°C)	50	0.98	0.95	0.92	0.89	0.87	0.84	0.81	0.79	0.76	0.74	0.71	0.69	0.67	
	45	1.00	0.97	0.94	0.91	0.88	0.85	0.83	0.80	0.77	0.75	0.73	0.70	0.68	
	40	1.00	0.98	0.95	0.92	0.89	0.87	0.84	0.81	0.79	0.76	0.74	0.71	0.69	
	35	1.00	1.00	0.97	0.94	0.91	0.88	0.85	0.83	0.80	0.77	0.75	0.72	0.70	
	30	1.00	1.00	0.98	0.95	0.92	0.89	0.87	0.84	0.81	0.79	0.76	0.74	0.71	
	25	1.00	1.00	1.00	0.97	0.94	0.91	0.88	0.85	0.83	0.80	0.77	0.75	0.72	
	20	1.00	1.00	1.00	0.99	0.96	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.74	
	15	1.00	1.00	1.00	1.00	0.97	0.94	0.91	0.88	0.85	0.83	0.80	0.77	0.75	
	10	1.00	1.00	1.00	1.00	0.99	0.96	0.93	0.90	0.87	0.84	0.81	0.79	0.76	
			0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
	ALTITUDE (METERS ABOVE SEA LEVEL)														

AFTERCOOLER HEAT REJECTION FACTORS															
AIR TO TURBO (°C)	50	1.27	1.31	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	
	45	1.21	1.25	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	
	40	1.15	1.19	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	
	35	1.09	1.13	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	
	30	1.03	1.07	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	
	25	1.00	1.02	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	
	20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
	15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
	10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
			0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
	ALTITUDE (METERS ABOVE SEA LEVEL)														

ALLOWABLE INERTS IN THE FUEL:

The maximum amount of free inerts in the fuel is limited to 5%.

FUEL SYSTEM LIMIT:

Fuels with a Wobbe index lower than the limit, require a custom fuel system and engine control system mapping from the factory. The Wobbe index is determined using the Caterpillar Methane Number Calculation program.

FUEL USAGE GUIDE:

This table shows the derate factor required for a given fuel. Note that deration occurs as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar Methane Number Calculation program.

TOTAL DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site. The total deration factor includes deration due to altitude and ambient temperature, and air inlet manifold temperature deration.

ACTUAL ENGINE RATING:

It is important to note that the Altitude/Temperature deration and the Fuel Usage Guide deration are not cumulative. They are not to be added together. To determine the actual power available, take the lowest rating between the Altitude/Temperature Deration and the Fuel Usage Guide Deration.

GENERATOR EFFICIENCY:

Generator power determined with an assumed generator efficiency of 97% [generator power=engine power x 0.97]. If the actual generator efficiency is less than 97% [and greater than 95%], the generator power [kW] listed in the technical data can still be achieved. The BSFC values must be increased by a factor. The factor is a percentage = 97% - actual generator efficiency [%].

EXHAUST STACK TEMPERATURE:

The exhaust stack temperature listed in the technical data is a nominal value with a tolerance = +35°C, -30°C (+63°F, -54°F)

AFTERCOOLER HEAT REJECTION FACTORS:

Aftercooler heat rejection is given for standard conditions of 25°C and 152 m altitude. To maintain a constant air inlet manifold temperature, as the air to turbo temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor to adjust for ambient and altitude conditions. Multiply this factor by the standard aftercooler heat rejection. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail. For 2 Stage Aftercoolers with separate circuits, the 1st stage will collect 85% of the additional heat.