

ENGINE SPEED (rpm):	1800	FUEL:	Nat Gas
COMPRESSION RATIO:	10.5:1	FUEL SYSTEM:	LPG IMPCO
JACKET WATER OUTLET (°F):	210	FUEL PRESSURE RANGE(psig):	1.5-5.0
ASPIRATION:	NA	FUEL METHANE NUMBER:	80
COOLING SYSTEM:	JW+OC	FUEL LHV (Btu/scf):	905
IGNITION SYSTEM:	MAG	ALTITUDE CAPABILITY AT 77°F INLET AIR TEMP. (ft):	500
EXHAUST MANIFOLD:	WC	APPLICATION:	Gas Compression
COMBUSTION:	Standard Setting		
EXHAUST OXYGEN (% O2):	2.0		

RATING	NOTES	LOAD	100%	75%	50%
ENGINE POWER (WITHOUT FAN)	(1)	bhp	95	71	48
ENGINE EFFICIENCY (ISO 3046/1)	(2)	%	33.3	32.1	25.3
ENGINE EFFICIENCY (NOMINAL)	(2)	%	33.3	32.1	25.3

ENGINE DATA						
FUEL CONSUMPTION (ISO 3046/1)	(3)	Btu/bhp-hr	7640	7917	10073	
FUEL CONSUMPTION (NOMINAL)	(3)	Btu/bhp-hr	7640	7917	10073	
AIR FLOW (77°F, 14.7 psia) (WET)	(4) (5)	scfm	150	120	93	
AIR FLOW (WET)	(4) (5)	lb/hr	667	534	414	
INLET MAN. PRESSURE	(6)	in Hg(abs)	27.2	23.7	19.4	
INLET MAN. TEMPERATURE (MEASURED IN PLENUM)	(7)	°F	104	107	104	
TIMING	(8)	°BTDC	30	30	30	
EXHAUST TEMPERATURE - ENGINE OUTLET	(9)	°F	1018	984	934	
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(10) (5)	ft3/min	459	359	271	
EXHAUST GAS MASS FLOW (WET)	(10) (5)	lb/hr	703	562	438	

EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)	(11)(12)	g/bhp-hr	21.08	16.80	19.70	
CO	(11)(13)	g/bhp-hr	1.60	1.70	1.80	
THC (mol. wt. of 15.84)	(11)(13)	g/bhp-hr	2.40	2.40	3.29	
NMHC (mol. wt. of 15.84)	(11)(13)	g/bhp-hr	0.36	0.36	0.49	
NMNEHC (VOCs) (mol. wt. of 15.84)	(11)(13)(14)	g/bhp-hr	0.24	0.24	0.33	
HCHO (Formaldehyde)	(11)(13)	g/bhp-hr	0.19	0.21	0.24	
CO2	(11)(13)	g/bhp-hr	498	517	658	
EXHAUST OXYGEN	(11)(15)	% DRY	2.0	2.3	2.3	
LAMBDA	(11)(15)		1.14	1.18	1.07	

ENERGY BALANCE DATA						
LHV INPUT	(16)	Btu/min	12097	9402	7975	
HEAT REJECTION TO JACKET WATER (JW)	(17)(21)	Btu/min	3800	3076	3292	
HEAT REJECTION TO ATMOSPHERE	(18)	Btu/min	484	376	319	
HEAT REJECTION TO LUBE OIL (OC)	(19)(21)	Btu/min	622	503	539	
HEAT REJECTION TO EXHAUST (LHV TO 77°F)	(20)	Btu/min	3163	2425	1810	
HEAT REJECTION TO EXHAUST (LHV TO 350°F)	(20)	Btu/min	2177	1645	1185	

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure, 500 ft. altitude.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3 . Part load data may require engine adjustment.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	25	30	35	40	45	50	55	60	65	70	75	80	100
SET POINT TIMING	-	15	17	18	20	21	23	24	26	27	28	30	30
DERATION FACTOR	0	1	1	1	1	1	1	1	1	1	1	1	1

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °F	130	120	110	100	90	80	70	60	50	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	0.93	0.89	0.86	0.83	0.80	0.77	0.74	0.71	0.68	0.65	0.63	0.60	0.58									
120	0.94	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.64	0.61	0.59									
110	0.96	0.92	0.89	0.86	0.82	0.79	0.76	0.73	0.70	0.68	0.65	0.62	0.60									
100	0.98	0.94	0.91	0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.63	0.61									
90	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.65	0.62									
80	1	0.98	0.94	0.90	0.87	0.84	0.80	0.77	0.74	0.71	0.69	0.66	0.63									
70	1	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.64									
60	1	1	0.98	0.94	0.90	0.87	0.84	0.80	0.77	0.74	0.71	0.68	0.66									
50	1	1	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67									

ALTITUDE (FEET ABOVE SEA LEVEL)

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM)

INLET AIR TEMP °F	130	120	110	100	90	80	70	60	50	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	970	1010	1050	1090	1140	1180	1230	1280	1330	1380	1440	1500	1560									
120	960	1000	1030	1070	1120	1160	1210	1250	1310	1360	1420	1470	1540									
110	940	980	1020	1060	1100	1140	1180	1230	1280	1330	1390	1450	1510									
100	930	960	1000	1040	1080	1120	1160	1210	1260	1310	1370	1420	1480									
90	910	940	980	1020	1060	1100	1140	1190	1240	1290	1340	1400	1460									
80	900	930	960	1000	1040	1080	1120	1170	1220	1270	1320	1370	1430									
70	900	910	950	980	1020	1060	1100	1150	1190	1240	1290	1350	1400									
60	900	900	930	960	1000	1040	1080	1130	1170	1220	1270	1320	1380									
50	900	900	910	940	980	1020	1060	1100	1150	1200	1240	1300	1350									

ALTITUDE (FEET ABOVE SEA LEVEL)

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.

ALTITUDE 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.

ACTUAL ENGINE RATING:

To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/Temperature deration factor and RPC (reference the Caterpillar Methane Program) are added together to establish air system limitations. To determine the actual power available, take the lowest rating between 1) and 2).

- 1) Fuel Usage Guide Deration
- 2) $1 - ((1 - \text{Altitude/Temperature Deration}) + (1 - \text{RPC}))$

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM):

This table shows the minimum allowable engine turndown speed where the engine will maintain the Rated Speed's Torque for the given ambient conditions.

NOTES:

1. Engine rating is with one engine driven jacket water pump. Tolerance is $\pm 3\%$ of full load.
2. ISO 3046/1 engine efficiency tolerance is $(+)0, (-)5\%$ of full load % efficiency value. Nominal engine efficiency tolerance is $\pm 5.0\%$ of full load % efficiency value.
3. ISO 3046/1 fuel consumption tolerance is $(+)5, (-)0\%$ of full load data. Nominal fuel consumption tolerance is $\pm 5.0\%$ of full load data.
4. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of $\pm 5\%$.
5. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
6. Inlet manifold pressure is a nominal value with a tolerance of $\pm 5\%$.
7. Inlet manifold temperature is a nominal value with a tolerance of $\pm 9^\circ\text{F}$.
8. Timing indicated is for use with the minimum fuel methane number specified. Consult the appropriate fuel usage guide for timing at other methane numbers.
9. Exhaust temperature is a nominal value with a tolerance of $(+)63^\circ\text{F}, (-)54^\circ\text{F}$.
10. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of $\pm 6\%$.
11. Emissions data is at engine exhaust flange prior to any after treatment.
12. NOx values are "Not to Exceed".
13. CO, CO₂, THC, NMHC, NMNEHC, and HCHO values are "Not to Exceed" levels. THC, NMHC, and NMNEHC do not include aldehydes.
14. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
15. Exhaust Oxygen tolerance is ± 0.5 .
16. LHV rate tolerance is $\pm 5.0\%$.
17. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is $\pm 10\%$ of full load data.
18. Heat rejection to atmosphere based on treated water. Tolerance is $\pm 50\%$ of full load data.
19. Lube oil heat rate based on treated water. Tolerance is $\pm 20\%$ of full load data.
20. Exhaust heat rate based on treated water. Tolerance is $\pm 10\%$ of full load data.
21. Total Jacket Water Circuit heat rejection is calculated as: $(\text{JW} \times 1.1) + (\text{OC} \times 1.2)$. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.

ENGINE POWER (bhp):	95	COOLING SYSTEM:	JW+OC
ENGINE SPEED (rpm):	1800		
EXHAUST MANIFOLD:	WC	JACKET WATER OUTLET (°F):	210

Free Field Mechanical and Exhaust Noise

SOUND PRESSURE LEVEL (dB)											
Octave Band Center Frequency (OBCF)											
100% Load Data			dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Mechanical Sound	Distance from the Engine (ft)	3.3	90.7	78.3	80.3	80.8	82.3	85.3	85.8	82.3	76.3
		23.0	79.5	75.9	79.4	72.4	72.4	74.4	73.9	70.4	63.9
		49.2	73.1	69.5	73	66	66	68	67.5	64	57.5
Exhaust Sound	Distance from the Engine (ft)	4.9	115.8	122.1	114.6	113.1	107.1	108.1	110.6	107.1	106.2
		23.0	102.4	116.2	104.7	97.7	95.2	95.2	96.2	94.2	91.2
		49.2	95.8	109.6	98.1	91.1	88.6	88.6	89.6	87.6	84.6

Sound Data
Data Variability Statement:
Sound data presented by Caterpillar has been measured in accordance with ISO 6798 in a Grade 3 test environment. Measurements made in accordance with ISO 6798 will result in some amount of uncertainty. The uncertainties depend not only on the accuracies with which sound pressure levels and measurement surface areas are determined, but also on the 'near-field error' which increases for smaller measurement distances and lower frequencies. The uncertainty for a Grade 3 test environment, that has a source that produces sounds that are uniformly distributed in frequency over the frequency range of interest, is equal to 4 dB (A-weighted). This uncertainty is expressed as the largest value of the standard deviation.