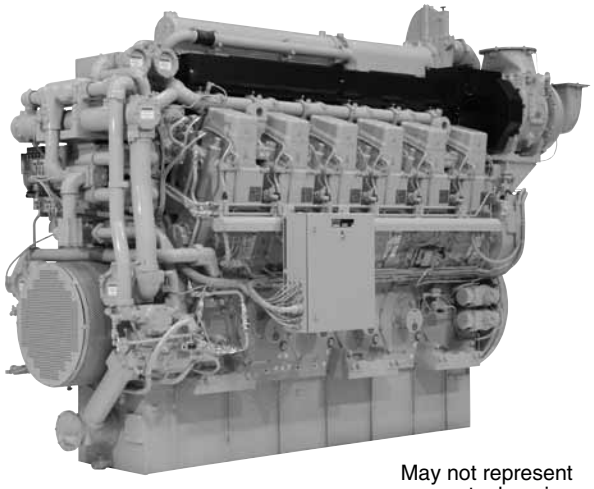
CATERPILLAR®

C280-12 MARINE AUXILIARY & DIESEL ELECTRIC PROPULSION

3520 ekW
3700 bkW (4962 bhp)
50 Hz @ 1000 rpm



May not represent actual engine

SPECIFICATIONS

V-12, 4-Stroke-Cycle-Diesel

Emissions	IMO II/EPA Tier 2 Compliant
Bore	280 mm (11.0 in.)
Stroke	300 mm (11.8 in.)
Displacement	222 L (13,546 cu. in.)
Rotation (from flywheel end)	Counterclockwise
Compression Ratio	13:1
Aspiration	Turbocharged-Aftercooled
Governor	Electronic
Low Idle Speed	350 rpm
Rated Speed	1000 rpm
Oil Change Interval*	750 hr
Serial Number Prefix	TSJ
Cooling System	Keel or Heat Exchanger
Refill Capacities	
Cooling System	1400-1575 L (370-416 gal)
Lube Oil System	910 L (240 gal)

*A new S•O•S℠ analysis must be done to determine actual oil change intervals.

STANDARD ENGINE EQUIPMENT

Air Inlet System
Aftercooler — fresh water, corrosion resistant coated (air side); air inlet shutoff; breather — crankcase, top-mounted; turbocharger — engine oil lubricated

Control System
Single ADEM™ A3 electronic control unit (ECU) with electronic unit injector fuel system, rigid wiring harness (10 amp, 24 volt power required to drive ECUs)

Cooling System
Engine coolant water drains

Exhaust System
Dry, gas tight, exhaust manifold

Fuel System
Distillate fuel (requires viscosity ranging from 1.4 cSt to 20 cSt at 38° C), fuel transfer pump (mounted on left-hand side), duplex fuel filters, electronically controlled unit injectors

Lube Oil System
Centrifugal oil filters with single shutoff, service side engine mounted on cylinder block inspection covers includes installed oil lines and single shutoff valve, filters centrifuge bypass oil from the main lubricating oil pump, can be serviced with the engine running, oil filler and dipstick valve, oil pressure regulating valves, crankcase explosion relief valves

General
Cat® yellow paint; gear-driven pumps: fuel, oil, jacket water, aftercooler/oil cooler water; service literature

Factory-designed systems built at Caterpillar ISO 9001:2000 certified facilities.

MARINE ENGINE PERFORMANCE

C280-12

DIESEL ENGINE TECHNICAL DATA

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Genset	**50 Hz**	RATING:	Marine Aux - Continuous
		CERTIFICATION:	IMO II/EPA MARINE TIER II
ENGINE SPEED (rpm):	1000	TURBOCHARGER PART #:	189-4427
COMPRESSION RATIO:	13:1	FUEL TYPE:	Distillate
AFTERCOOLER WATER (°C):	32	RATED ALTITUDE @ 25°C (m):	150
JACKET WATER OUTLET (°C):	90	ASSUMED GENERATOR EFFICIENCY (%):	96
IGNITION SYSTEM:	EUI	ASSUMED GENERATOR POWER FACTOR:	0.8
EXHAUST MANIFOLD:	DRY	MEAN PISTON SPEED (m/s):	10
FIRING PRESSURE, MAXIMUM (kPa)	17300		

RATING		NOTES	LOAD	110%	100%	75%	50%
ENGINE POWER		(2)	bkW	4070	3700	2775	1850
GENERATOR POWER		(2)	ekW	3907	3552	2664	1776
BMEP			kPa	2204	2003	1503	1002
ENGINE EFFICIENCY	**(ISO 3046/1)**	**(1)**	**%**	**42.1%**	**41.9%**	**40.4%**	**37.7%**
ENGINE EFFICIENCY	(NOMINAL)	(1)	%	40.9%	40.6%	39.2%	36.5%

ENGINE DATA							
FUEL CONSUMPTION	**(ISO 3046/1)**	**(1)**	**g/bkw-hr**	**201.0**	**202.1**	**209.6**	**225.4**
FUEL CONSUMPTION	(NOMINAL)	(1)	g/bkw-hr	204.9	206.0	213.7	229.8
FUEL CONSUMPTION	(90% CONFIDENCE)	(1)	g/bkw-hr	207.1	208.3	216.3	232.7
AIR FLOW (@ 25°C, 101.3 kPaa)			Nm3/min	410.0	386.0	313.4	236.8
AIR MASS FLOW			kg/hr	27443	25833	20976	15852
INLET MANIFOLD PRESSURE			kPa (abs)	349.5	328.7	266.3	202.6
INLET MANIFOLD TEMPERATURE			°C	45.0	43.0	39.2	36.6
EXHAUST STACK TEMPERATURE			°C	377.0	373.5	371.8	365.7
EXHAUST GAS FLOW (@ stack temp, 101.3 kPa)			m3/min	877.7	820.8	656.8	489.9
EXHAUST GAS MASS FLOW			kg/hr	28277	26596	21566	16271

EMISSIONS "NOT TO EXCEED DATA"						
NOx (as NO) + THC (molecular weight of 13.018)		g/bkW-hr	10.21	10.93	11.47	12.24
NOx (as NO)		g/bkW-hr	9.29	10.02	10.26	10.55
CO		g/bkW-hr	0.67	0.75	0.85	1.31
THC (molecular weight of 13.018)		g/bkW-hr	0.92	0.91	1.21	1.69
Particulates		g/bkW-hr	0.21	0.23	0.49	0.95

EMISSIONS "NOMINAL DATA"						
NOx (as NO) + THC (molecular weight of 13.018)		g/bkW-hr	8.79	9.41	9.85	10.48
NOx (as NO)		g/bkW-hr	8.08	8.72	8.92	9.18
CO		g/bkW-hr	0.52	0.58	0.65	1.01
THC (molecular weight of 13.018)		g/bkW-hr	0.71	0.70	0.93	1.30
Particulates		g/bkW-hr	0.15	0.16	0.35	0.68

ENERGY BALANCE DATA							
FUEL INPUT ENERGY (LHV)	(NOMINAL)	(1)	KW	9963	9106	7077	5062
HEAT REJ. TO JACKET WATER	(NOMINAL)	(3)	KW	807	760	640	505
HEAT REJ. TO ATMOSPHERE	(NOMINAL)	(4)	KW	199	182	142	101
HEAT REJ. TO OIL COOLER	(NOMINAL)	(5)	KW	399	378	328	277
HEAT REJ. TO EXH. (LHV to 25°C)	(NOMINAL)	(3)	KW	3150	2911	2379	1825
HEAT REJ. TO EXH. (LHV to 177°C)	(NOMINAL)	(3)	KW	2394	2251	1856	1470
HEAT REJ. TO AFTERCOOLER	(NOMINAL)	(6) (7)	KW	1316	1155	801	500

CONDITIONS AND DEFINITIONS

ENGINE RATING OBTAINED AND PRESENTED IN ACCORDANCE WITH ISO 3046/1 AND SAE J1995 JAN90 STANDARD REFERENCE CONDITIONS
OF 25°C, 100 KPA, 30% RELATIVE HUMIDITY AND 150M ALTITUDE AT THE STATED AFTERCOOLER WATER TEMPERATURE
CONSULT ALTITUDE CURVES FOR APPLICATIONS ABOVE MAXIMUM RATED ALTITUDE AND/OR TEMPERATURE
PERFORMANCE AND FUEL CONSUMPTION ARE BASED ON 35 API, 16°C FUEL HAVING A LOWER HEATING VALUE OF 42.780 KJ/KG
USED AT 29°C WITH A DENSITY OF 838.9 G/LITER

NOTES

1) FUEL CONSUMPTION TOLERANCE. ISO 3046/1 IS 0, + 5% OF FULL LOAD DATA. NOMINAL IS ± 3 % OF FULL LOAD DATA
2) ENGINE POWER TOLERANCE IS ± 3 % OF FULL LOAD DATA.
3) HEAT REJECTION TO JACKET AND EXHAUST TOLERANCE IS ± 10% OF FULL LOAD DATA. (heat rate based on treated water
4) HEAT REJECTION TO ATMOSPHERE TOLERANCE IS ±50% OF FULL LOAD DATA. (heat rate based on treated water
5) HEAT REJECTION TO LUBE OIL TOLERANCE IS ± 20% OF FULL LOAD DATA. (heat rate based on treated water
6) HEAT REJECTION TO AFTERCOOLER TOLERANCE IS ± 5% OF FULL LOAD DATA. (heat rate based on treated water
7) TOTAL AFTERCOOLER HEAT = AFTERCOOLER HEAT x ACHRF (heat rate based on treated water)
8) FUEL CONSUMPTION DATA IS WITHOUT SEA WATER PUMP.

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MARINE ENGINE PERFORMANCE

C280-12 DIESEL ENGINE TECHNICAL DATA

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ALTITUDE DERATION FACTORS IMO II/EPA MARINE TIER II

AIR TO TURBO (°C)	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
50	0.94	0.91	0.88	0.86	0.83	0.81	0.78	0.76	0.74	0.71	0.69	0.67	0.65
45	0.95	0.93	0.90	0.87	0.85	0.82	0.80	0.77	0.75	0.73	0.70	0.68	0.66
40	0.97	0.94	0.91	0.89	0.86	0.83	0.81	0.78	0.76	0.74	0.71	0.69	0.67
35	0.98	0.96	0.93	0.90	0.87	0.85	0.82	0.80	0.77	0.75	0.73	0.70	0.68
30	1.00	0.97	0.94	0.92	0.89	0.86	0.84	0.81	0.79	0.76	0.74	0.71	0.69
25	1.00	0.99	0.96	0.93	0.90	0.88	0.85	0.82	0.80	0.77	0.75	0.73	0.70
20	1.00	1.00	0.98	0.95	0.92	0.89	0.86	0.84	0.81	0.79	0.76	0.74	0.72
15	1.00	1.00	0.99	0.96	0.93	0.91	0.88	0.85	0.83	0.80	0.78	0.75	0.73
10	1.00	1.00	1.00	0.98	0.95	0.92	0.89	0.87	0.84	0.82	0.79	0.77	0.74

ALTITUDE (METERS ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS

AIR TO TURBO	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
50	1.23	1.27	1.30	1.34	1.38	1.42	1.45	1.49	1.53	1.56	1.60	1.64	1.67
45	1.18	1.22	1.25	1.29	1.32	1.36	1.39	1.43	1.46	1.50	1.53	1.57	1.61
40	1.13	1.17	1.20	1.23	1.27	1.30	1.34	1.37	1.40	1.44	1.47	1.50	1.54
35	1.08	1.12	1.15	1.18	1.21	1.24	1.28	1.31	1.34	1.37	1.41	1.44	1.47
30	1.03	1.06	1.10	1.13	1.16	1.19	1.22	1.25	1.28	1.31	1.34	1.37	1.40
25	1.00	1.01	1.04	1.07	1.10	1.13	1.16	1.19	1.22	1.25	1.28	1.31	1.34
20	1.00	1.00	1.00	1.02	1.05	1.07	1.10	1.13	1.16	1.19	1.21	1.24	1.27
15	1.00	1.00	1.00	1.00	1.00	1.02	1.04	1.07	1.10	1.12	1.15	1.18	1.20
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.04	1.06	1.09	1.11	1.14

ALTITUDE (METERS ABOVE SEA LEVEL)

FREE_FIELD MECHANICAL NOISE

SOUND PRESSURE LEVEL dB(A)

DISTANCE FROM THE ENGINE (M)	Overall	63	125	250	500	1000	2000	4000	8000
15M	92	79.2	85.2	84.7	85.3	84.3	82.3	81	78.6
7M	98	94.7	90.7	90.2	90.8	89.8	87.8	86.5	84.1
1M	109	96.2	102.2	101.7	102.3	101.3	99.3	98	95.6

Octave Band (Hz)

FREE_FIELD EXHAUST NOISE

SOUND PRESSURE dB(A)

DISTANCE FROM THE ENGINE (M)	Overall	63	125	250	500	1000	2000	4000	8000
15M	98	108.6	105.7	97.4	92.1	87.7	88.2	86.3	80.9
7M	104	116.4	113.0	103.7	98.9	94.0	95.0	93.6	88.2
1.5M	118	128.9	127.5	117.3	112.5	108.1	109.5	107.1	101.3

Octave Band (Hz)

TOTAL DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information 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.

AFTERCOOLER HEAT REJECTION FACTORS:

Aftercooler heat rejection is given for standard conditions of 25°C and 150 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.

GENERATOR EFFICIENCY:

Generator power determined with an assumed generator effeciency of 96% [generator power = engine power x 0.96]. If the actual generator efficiency is less than 96% [and greater than 94.5%], the generator power [ekW] listed in the technical data can still be achieved. The BSFC values must be increased by a factor.

The factor is a percentage = 96% - actual generator efficiency.

SOUND DATA:

Data determined by methods similar to ISO Standard DIS-8528-10. Accuracy Grade 3.

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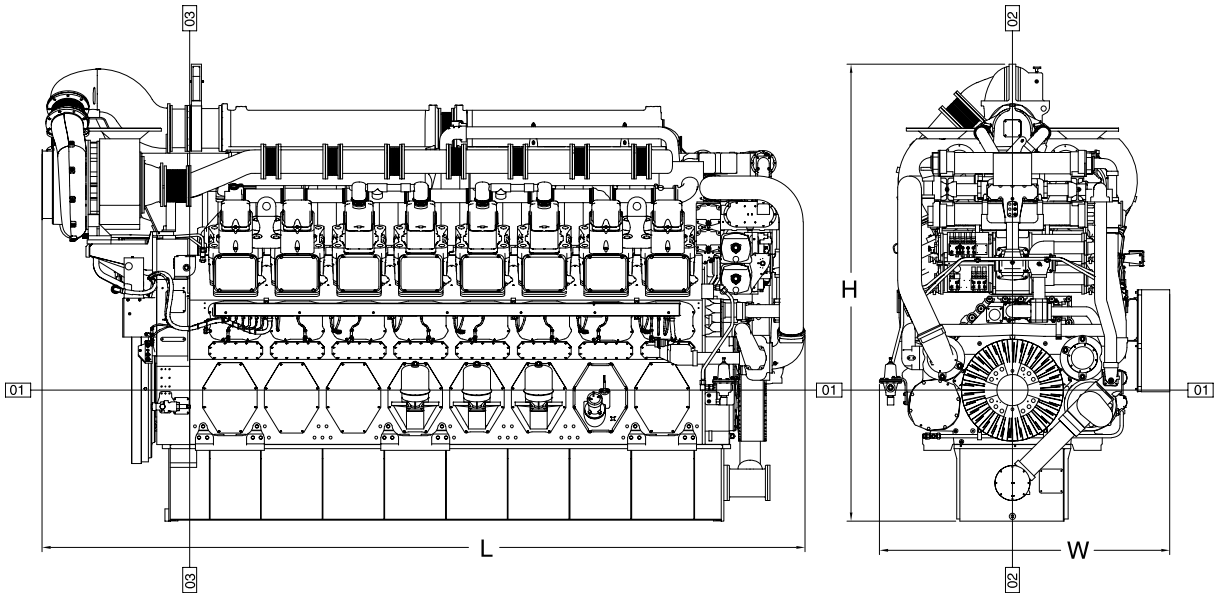
3520 ekW

DIMENSIONS



Engine Dimensions		
Length of Engine	4087 mm	161.0 in
Length with Generator	8040 mm	316.5 in
Width of Engine	2000 mm	78.7 in
Height	4085 mm	160.8 in
Engine Weight – dry (approx.)	25,980 kg	57,276 lb
Generator Weight – (approx.)	14,970 kg	33,000 lb

RATING DEFINITIONS AND CONDITIONS

Continuous Power — 8,000 hrs./yr., for applications with load factors less than or equal to 100%. 10% overload available.

Ratings are based on SAE J1995/ISO3046 standard conditions of 100 kPa (29.61 in. Hg), 25°C (77°F), and 30% relative humidity at the stated charge air cooler water temperature. Ratings also meet classification society maximum temperature requirements of 45°C (113°F) air temperature to the turbocharger and 32°C (90°F) seawater temperature without derate.

Additional ratings may be available for specific customer requirements. Consult your Cat representative for additional information.

Fuel rates are based on 35° API, 16°C (60°F) fuel used at 29°C (85°F) with a density of 838.9 g/liter (7.001 lbs/U.S. gal). Lower Heat Value (LHV) of 42 780 kJ/kg (18,390 Btu/lb). Tolerance is +5%. Includes all engine mounted pumps. BSFC without pumps is 3% less.

Marine Certification — Ratings are marine classification society approved by ABS, BV, CCS, DnV, GL, LRS, and RINA. These societies have also granted C280 factory line production approval which eliminates requirement for society surveyor witness test.

Performance data is calculated in accordance with tolerances and conditions stated in this specification sheet and is only intended for purposes of comparison with other manufacturers' engines. Actual engine performance may vary according to the particular application of the engine and operating conditions beyond Caterpillar's control.

Power produced at the flywheel will be within standard tolerances up to 49°C (120°F) combustion air temperature measured at the air cleaner inlet, and fuel temperature up to 52°C (125°F) measured at the fuel filter base. Power rated in accordance with NMMA procedure as crankshaft power. Reduce crankshaft power by 3% for propeller shaft power.

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