

C7.1

MARINE PROPULSION ENGINE

PRELIMINARY



317, 298, 261, 209 kW (425, 400, 350, 280 bhp) @ 2700, 2600, 2500, 2300 rpm

Heat Exchanger Cooled-Sea Water Aftercooled & Keel Cooled

(Performance Data Published at Maximum Limits at Rated Speed)

GENERAL ENGINE SPECIFICATIONS

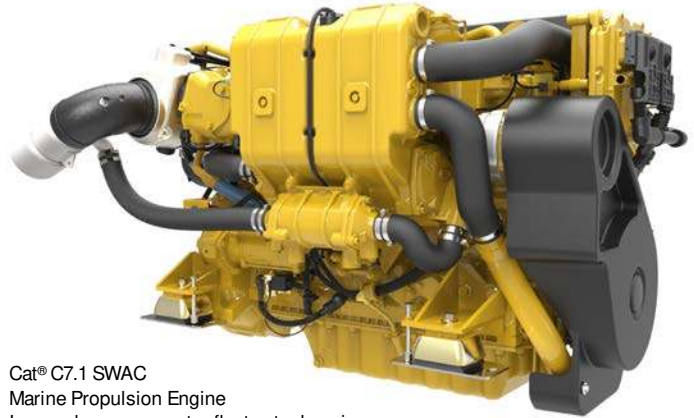
Basic Engine Specifications

I-6, 4-Stroke-Cycle-Diesel

Displacement	7.01 L (428 in ³)
Rated engine speed	2700, 2600, 2500, 2300 rpm
Target speed at sea trial	Rated Speed +/- 2% rpm
High idle speed	Rated Speed +10% rpm
Low idle speed (programmable)	600-800 rpm
Peak torque	1382 Nm @ 1900 rpm (317 kW)
.....	1019 ft-lb @ 1900 rpm (425 HP)
.....	1357 Nm @ 1900 rpm (298 kW)
.....	1001 ft-lb @ 1900 rpm (400 HP)
.....	1231 Nm @ 1800 rpm (261 kW)
.....	908 ft-lb @ 1800 rpm (350 HP)
.....	1098 Nm @ 1800 rpm (209 kW)
.....	810 ft-lb @ 1800 rpm (280 HP)
Bore	105 mm (4.13 in)
Stroke	135 mm (5.31 in)
Aspiration	Turbocharged-Aftercooled
Governor	ECU
Fuel system type	Common Rail
Length	1095 mm (43.1 in)
Width	798 mm (31.4 in)
Height	876 mm (34.5 in)
Weight, net dry (approx.)	760 kg (1676 lb)
Rotation (from flywheel end)	Counterclockwise
Flywheel housing	SAE No. 03M
Flywheel	SAE 11.5" with 126 teeth

Tolerances

Power	+/- 3%
Exhaust Stack Temperature	+/- 8%
Inlet Air Flow	+/- 5%
Intake Manifold Pressure	+/- 10%
Exhaust Flow	+/- 6%
Specific Fuel Consumption	+/- 3%
Heat Rejection	+/- 5%
Fuel Rate	+/- 5%



Cat® C7.1 SWAC
Marine Propulsion Engine
Image shown may not reflect actual engine

Emission Compliance

Recreational

EPA Tier 3 (E3 Cycle)
IMO II (EPA, GL, CCS)
Recreational Craft Directive (EU) RCD 2016

Commercial

EPA Tier 3 (E3 Cycle)
EU Stage IIIA
IMO II (EPA, GL, CCS)
CCNR Stage II through reciprocity with EU Stage IIIA

Power Output Considerations

Power produced at the flywheel will be within standard tolerances up to 50°C (122°F) combustion air temperature measured at the turbocharger air compressor inlet, sea water temperature up to 32°C (89.6°F), and fuel temperature up to 40°C (104°F) measured at the engine inlet. Power rated in accordance with NMMA procedure as crankshaft power. All power and fuel consumption declarations in this specification sheet are raw (uncorrected).

General Remarks

- For installation instructions please refer to Project Guide.
- For detailed information about fuel, oil, and cooling water treatment, please refer to "Caterpillar Commercial Diesel Engine Fluids Recommendations" (SEBU6251).

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AIR SYSTEM

Combustion Air Inlet System

Intake combustion air flow.....	21.7 m ³ /min (317bkW), 20.8 m ³ /min (298bkW), 19.7 m ³ /min (261bkW), 16.7 m ³ /min (209bkW)
Intake combustion air flow.....	766.2 cfm (425HP), 734.6 cfm (400HP), 695.7 cfm (350HP) 589.8 cfm (280HP)
Intake combustion air temperature up to.....	50°C (122°F)
Max. allowable intake air restriction	6.5 kPa (26 in H ₂ O)

Engine Room Ventilation Air

Heat rejection to atmosphere	22.8 kW (317bkW), 20.3kW (298bkW), 15.0kW (261bkW), 10.8kW (209bkW) @ 25°C ambient temperature
Heat rejection to atmosphere	1297 BTU/min (425HP), 1154 BTU/min (400HP) @ 77°F ambient temperature
Heat rejection to atmosphere	853 BTU/min (350HP), 614 BTU/min (280HP) @ 77°F ambient temperature

FUEL SYSTEM

Fuel flow supply line (max).....	270 L/hr (71.3 gal/hr)
Fuel flow return line (max).....	270 L/hr (71.3 gal/hr)
Fuel rate at rated speed	84.9 L/hr (317bkW), 79.5 L/hr (298bkW), 68.7 L/hr (261bkW), 56.3 L/hr (209bkW)
Fuel rate at rated speed	18.7 gal/hr (425HP), 17.5 gal/hr (400HP), 15.1 gal/hr (350HP), 12.4 gal/hr (280HP)
Total fuel supply restriction (max.)	30 kPa (8.9 in Hg) (4.4 psi)
Fuel restriction across primary fuel filter (clean)	3.5 kPa (1.0 in Hg) (0.5 psi)
Fuel temperature engine inlet (max.)	60°C (140°F)
Fuel return line restriction (max.)	37 kPa (10.9 in Hg) (5.4 psi)
Fuel supply/return connection	3/4"-16 SAE J514 (-8), 37° FLARE
.....	13/16"-16 STOR (optional)
Minimum fuel supply line inside diameter	SAE -8 (12.7mm) (1/2 in)
Primary fuel filter inlet/outlet connection	3/4"-16 SAE J514 (-8), 37° FLARE
Diesel fuel grade	US Diesel #2 / EN590 / Biodiesel 20% max

EXHAUST SYSTEM

Exhaust Gas Data

Exhaust gas flow (total).....	1739 kg/hr (317bkW), 1665 kg/hr (298bkW), 1577 kg/hr (261bkW), 1334 kg/hr (209bkW)
Exhaust gas flow (total).....	3826 lb/hr (425HP), 3663 lb/hr (400HP), 3469 lb/hr (350HP), 2935 lb/hr (280HP)
Exhaust stack temperature	475°C (317bkW), 457°C (298bkW), 405°C (261bkW), 403°C (209bkW)
Exhaust stack temperature	887°F (450HP), 855°F (400HP), 761°F (350HP), 757°F (280HP)
Max. allowable system backpressure	15 kPa (60.2 in H ₂ O)
Max. allowable static weight on turbine outlet.....	0 kg (0 lb)
Max. allowable static bending moment on turbine outlet.....	0 Nm (0 ft-lbs)

Specified system backpressure shall not be exceeded in any circumstances. Caterpillar advises to limit value of maximum allowable backpressure to 50% for new (clean) installations. Minimum diameter of customer piping should be according to "Customer piping diameter overview for Caterpillar engines."

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Power produced at the flywheel will be within standard tolerances up to 50°C (122°F) combustion air temperature measured at the air cleaner inlet, and fuel temperature up to 40°C (104°F) measured at the engine inlet. Power rated in accordance with NMMA procedure as crankshaft power. Reduce crankshaft power by 3% for propeller shaft power.

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Performance No : EM6000, EM6001, EM6002, EM6003, EM6004, EM6005

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COOLING SYSTEM

HTC Cooling Water System (Engine Jacket Water)

Heat rejection to HTC cooling water system	225 kW (317bkW), 213 kW (298bkW), 185 kW (261bkW), 158kW (209bkW)
Heat rejection to HTC cooling water system	12,796 BTU/min (425HP), 12,113 BTU/min (400HP), 10,521 BTU/min (350HP), 8985 BTU/min (280HP)
Flow HTC cooling water pump (nominal)	450 L/min (317bkW), 440 L/min (298bkW), 430L/min (261bkW), 395L/min (209bkW)
Flow HTC cooling water pump (nominal)	98.9 gal/min (425HP), 96.8gal/min (400HP), 94.6gal/min (350HP), 86.9gal/min (280HP)
HTC cooling water temperature engine out (max)	92°C (203°F)
HTC cooling water refill capacity (Keel Cooled Only)	38 L (10 gal)
Coolant medium	Cat® Extended Life Coolant (ELC) or equal. 50% Glycol.
Expansion tank pressure cap	100 kPa (14.5 psi)
HTC cooling water connection engine inlet	50.8 mm (2.0 in.) OD
HTC cooling water connection engine outlet	50.8 mm (2.0 in.) OD

LTC Cooling Water System (Aftercooler)

Heat rejection to LTC cooling water system	58.2kW (317bkW), 55.2kW (298bkW), 50.8kW (261bkW), 38.5kW (209bkW)
Heat rejection to LTC cooling water system	3310 BTU/min (425HP), 3139 BTU/min (400HP), 2889 BTU/min (350HP), 2189 BTU/min (280HP)
Flow LTC cooling water pump (nominal)	210 L/min (317bkW), 200 L/min (298bkW), 195 L/min (261bkW), 180L/Min (209bkW)
Flow LTC cooling water pump (nominal)	46.2 gal/min (425HP), 44.0 gal/min (400HP), 42.9 gal/min (350HP), 39.6 gal/min (280HP)
LTC water temperature engine in (27°C Sea)	44°C (317bkW), 45°C (298bkW), 46°C (261bkW), 50°C (209bkW)
LTC water temperature engine in (81°F Sea)	111°F (425HP), 113°F (400HP), 115°C (350HP), 122°C (280HP)
LTC cooling water refill capacity	5 L (1.3 gal) <i>Engine only</i>
Coolant medium	Cat Extended Life Coolant (ELC) or equal. 50% Glycol.
Expansion tank pressure cap	100 kPa (14.5 psi)
LTC cooling water connection engine inlet (138)	50.8 mm (2.0 in.) OD
LTC cooling water connection engine outlet (139)	50.8 mm (2.0 in.) OD

Raw Water Cooling System (SWAC)

Cooling water refill capacity	43 L (11.4 gal)
Coolant medium	Cat® Extended Life Coolant (ELC) or equal. 50% Glycol
Expansion tank pressure cap	100 kPa (14.5 psi)
Heat rejection to raw water cooling system	283 kW (317bkW), 268 kW (298bkW), 236 kW (261bkW), 197kW (209bkW)
Heat rejection to raw water cooling system	16,094 BTU/min (425HP), 15,241 BTU/min (400HP), 13,421 BTU/min (350HP), 11,203 BTU/min (280HP)
Flow Raw Water Pump (nominal)	210 L/min (317bkW), 200 L/min (298bkW), 195 L/min (261bkW), 180L/Min (209bkW)
Flow Raw Water Pump (nominal)	46.2 gal/min (425HP), 44.0 gal/min (400HP), 42.9 gal/min (350HP), 39.6 gal/min (280HP)
Raw water pump maximum inlet restriction.	2.0 m (6.6 ft) H ₂ O
Raw water temperature engine out to gear oil cooler (27°C Sea)	46.3°C (317bkW), 46.1°C (298bkW), 44.3°C (261bkW), 42.6°C (209bkW)
Raw water temperature engine out to gear oil cooler (81°F Sea)	115.3°F (425HP), 115.0°F (400HP), 11.7°F (350HP), 108.7°F (280HP)
Gear oil cooler 473-0282 heat rejection capability	11.2 kW (636.9 BTU/min)
Raw water connection engine inlet	50.8 mm (2.00 inch) SAE J1231 Hose Connection
Raw water connection engine outlet	45 mm (1.77 inch) SAE J1231 Hose Connection
Sea water strainer mesh hole diameter (max)	1.6 mm (0.063 in)

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LUBE SYSTEM

Sump type	Center Sump
Sump capacity	20 L (5.3 gal)
Oil change interval	500 Hr <i>(may be modified by S•O•SSM testing)</i>
Max. installation angle (fore-aft)	10 degrees
Max. operating angle (fore-aft)	20 degrees
Max. operating angle (athwart ship)	30 degrees
Quality diesel engine oil (min.)	CI-4 10W30 or 15W40 <i>(compliant with Caterpillar specification ECF-2)</i>

STARTING SYSTEM

Electrical Starting System

Electrical starting motor	24 VDC, 12 VDC
Cold starting	520 CCA (24VDC), 520 CCA (12VDC) <i>[at -5°C (23°F) ambient temperature]</i>
Recommended battery capacity	2 x 100 Ah, series (24VDC), 2 x 100Ah, parallel (12VDC)

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