

# C7.1

MARINE PROPULSION ENGINE



373, 336, 298 kW (500, 450, 400 bhp) @ 2900 rpm E Rating (High Performance)

Heat Exchanger Cooled-Sea Water Aftercooled

(Performance Data Published at Maximum Limits at Rated Speed)

## GENERAL ENGINE SPECIFICATIONS

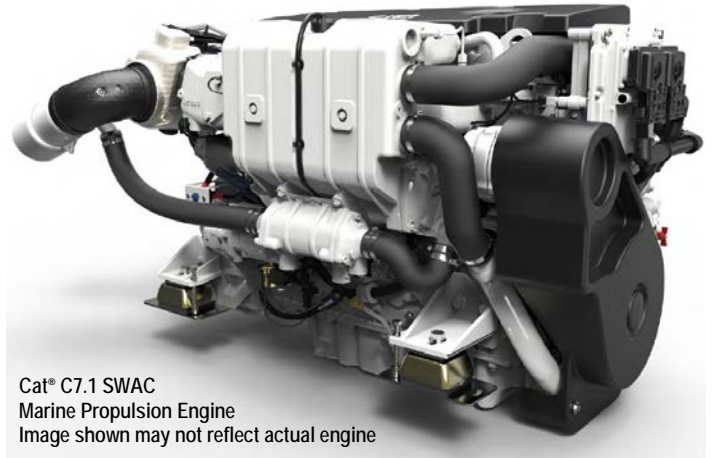
### Basic Engine Specifications

I-6, 4-Stroke-Cycle-Diesel

Displacement .....	7.01 L (428 in <sup>3</sup> )
Rated engine speed .....	2900 rpm
Target speed at sea trial .....	2882-2940 rpm
High idle speed .....	3000 rpm
Low idle speed (programmable) .....	600-800 rpm
Peak torque .....	1365 Nm @ 2200 rpm (373 kW)
.....	1007 ft-lb @ 2200 rpm (500 HP)
.....	1365 Nm @ 2200 rpm (336 kW)
.....	1007 ft-lb @ 2200 rpm (450 HP)
.....	1345 Nm @ 2000 rpm (298 kW)
.....	992 ft-lb @ 2000 rpm (400 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 (E5 Cycle – Recreational Only)  
IMO II (EPA, GL, CCS)  
Recreational Craft Directive (EU) RCD 2016

#### Commercial

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).

## AIR SYSTEM

### Combustion Air Inlet System

Intake combustion air flow.....	30.4 m <sup>3</sup> /min (373bkW), 29.6 m <sup>3</sup> /min (336bkW), 29.0 m <sup>3</sup> /min (298bkW)
Intake combustion air flow.....	1073.6 cfm (500HP), 1045.3 cfm (450HP), 1024.1 cfm (400HP)
Intake combustion air temperature up to.....	50°C (122°F)
Max. allowable intake air restriction .....	6.0 kPa (24 in H <sub>2</sub> O)

### Engine Room Ventilation Air

Heat rejection to atmosphere .....	17.5 kW (373bkW), 17.8kW (336bkW), 15.8kW (298bkW) @ 25°C ambient temperature
Heat rejection to atmosphere .....	995.2 BTU/min (500HP), 1012.3 BTU/min (450HP), 898.5 BTU/min (400HP) @ 77°F ambient temperature

## COOLING SYSTEM

### Jacket Water Cooling System

Cooling water refill capacity .....	43 L (11.4 gal)
Coolant medium .....	Cat® Extended Life Coolant (ELC) or equal
Expansion tank pressure cap.....	100 kPa (14.5 psi)

### Raw Water Cooling System (SWAC)

Heat rejection to raw water cooling system.....	345.5 kW (373bkW), 312.1 kW (336bkW), 283.8 kW (298bkW)
Heat rejection to raw water cooling system.....	19,648 BTU/min (500HP), 17,748 BTU/min (450HP), 16,139 BTU/min (400HP)
Flow raw water pump 395-1646 – max. ....	233 L/min @ 4.2 m H <sub>2</sub> O
min.....	215 L/min @ 10.3 m H <sub>2</sub> O
Raw water pump maximum inlet restriction.....	2.0 m (6.6 ft) H <sub>2</sub> O
Raw water temperature engine out to gear oil cooler (max.).....	59.0°C (373bkW), 56.4°C (336bkW), 54.2°C (298bkW)
Raw water temperature engine out to gear oil cooler (max.).....	138°F (500HP), 134°F (450HP), 130°F (400HP)
Raw water temperature from gear oil cooler 448-9439 if equipped (max.).....	59.7°C (373bkW), 57.1°C (336bkW), 54.9°C (298bkW)
Raw water temperature from gear oil cooler 448-9439 if equipped (max.).....	139°F (500HP), 135°F (450HP), 131°F (400HP)
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)

## EXHAUST SYSTEM

### Exhaust Gas Data

Exhaust gas flow (total) .....	2,018.9 kg/hr (373bkW), 1,987.1 kg/hr (336bkW), 1,934.6 kg/hr (298bkW)
Exhaust gas flow (total) .....	4,450.9 lb/hr (500HP), 4,380.8 lb/hr (450HP), 4,265.1 lb/hr (400HP)
Exhaust stack temperature .....	491°C (373bkW), 447°C (336bkW), 406°C (298bkW)
Exhaust stack temperature .....	915°F (500HP), 837°F (450HP), 763°F (400HP)
Max. allowable system backpressure .....	15 kPa (60.2 in H <sub>2</sub> 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."*

## 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 .....	103.2 L/hr (373bkW), 92.4 L/hr (336bkW), 82.4 L/hr (298bkW)
Fuel rate at rated speed .....	27.3 gal/hr (500HP), 24.4 gal/hr (450HP), 21.8 gal/hr (400HP)
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

## LUBE SYSTEM

Sump type .....	Center Sump
Sump capacity.....	20 L (5.3 gal)
Oil change interval.....	250 Hr
	<i>(may be modified by S-O-S<sup>SM</sup> 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 (24V)

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

### Electrical Starting System (12V)

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

## SOUND DATA

### Exhaust Sound Power Level Overall – Grade 3 environment

See TMI

### Mechanical Sound Pressure Level Overall – grade 3 environment

At distance 1.0 m (3.28 ft).....

See TMI

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. All power and fuel consumption declarations in this specification sheet are raw (uncorrected).

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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The International System of Units (SI) is used in this publication.