

16CM43C

Offshore Production Generating Set

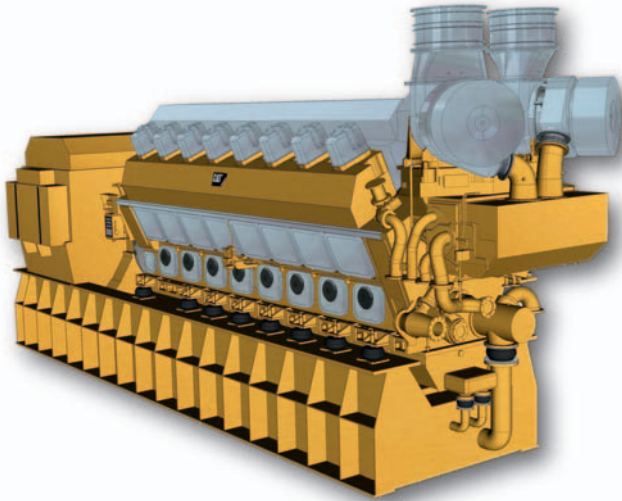
15,520 kW (19,400 kVA) • 60 Hz @ 514 rpm

15,520 kW (19,400 kVA) • 50 Hz @ 500 rpm

Engine Specifications

16CM43C, 4 Stroke Diesel Engines

Emissions	IMO Tier II
Bore	430 mm (16.93 in.)
Stroke	610 mm (24.01 in.)
Displacement	1,417 L (88,562 cu. in.)
Aspiration	Turbocharged-Aftercooled
Governor	Electronic
Rated Speed	
60 Hz	514 rpm
50 Hz	500 rpm
Module Weight, net dry (approx)	343 t (756.185 lb)
Rotation (from flywheel)	Counterclockwise
System Capacity	
Cooling System	6,000 L (1,585 gal)
Lube Oil System (refill)	
16,000 kW	16,600 L (4,386 U.S. gal)



Features

Engine Design

- World-class reliability and durability – Incorporates years of proven component reliability and durability in marine industry
- Medium speed long-stroke engine design
- Ideal configuration for dynamically positioned semi-submersible rigs and drillships
- Compact cylinder head design
- Nodular cast-iron block with integrated ducts for lubricating oil and charge air
- Segmental camshaft design
- 25° tilt capability in all directions
- Engine design based on the higher requirements of heavy fuel oil
- High efficiency turbocharger
- Cylinder liner, only cooled outside the engine block
- Engine control terminal with analog instrumentation in robust cast casing
- Connecting rod, split-off design
- Compact module for lower valve drives and injection pump drives with cam followers
- Flexible Camshaft Technology (FCT), optional

Ease of Installation

- Standard modular design allows for ease of installation and reduced complexity
- Installation-friendly, due to pumps and filters installed on the engine
- Cooling water system with simple plug-in connections
- Full range of factory-installed engine attachments allows customization and reduction in installation time

Packaging Concept

- Assembled, tested, and validated as a package to minimize package vibration and maximize component life

Improved Serviceability

- Large inspection openings allow for convenient access to core engine internals for easier serviceability
- Core engine components designed for reconditioning and reuse at overhaul
- Worldwide dealer network with factory-trained technicians means that parts and support are never out of reach
- Simplified parts spectrum by using single-pipe exhaust gas ducting

Web Site

For all your petroleum power requirements, visit www.catoilandgasinfo.com

16CM43C Offshore Production Generating Set 15,520 kW_e (19,400 kVA)

Engine

- Motor-driven barring gear, fitted on engine
- Reversing contractor and pushbutton switch with cable
- Electronic speed setting equipment with actuator and speed pick-up
- Emergency shutdown equipment with pushbutton, separate, for manual emergency stop

Engine Indicators

- Gauge board with set liquid damped pressure gauges for: fuel, lubricating oil, fresh water, starting air, and charge air.
- On-engine thermometers for fuel, lubricating oil, fresh water, and charge air
- Electric remote speed indicator
- Turbocharger and remote speed indicator
- Exhaust gas temperature indicator

Control

- Manual control on engine, including: control panel with start/stop key, speed setting device, mechanical shutdown device, change over of control functions from engine to remote control
- Starting solenoid valve on engine, 24 V DC
- Separate electronic speed governor

Monitoring for Unattended Operation

Pressure switches, mounted on engine, for:

- Lube oil pressure at full load below danger level
- Low lube oil pressure
- Lube oil pressure below danger level
- Lube oil pressure prelubrication failed
- Low fresh water pressure at engine inlet
- Fresh water pressure at engine inlet below danger level
- Low fresh water pressure in LT circuit
- Low starting air pressure
- Low control air pressure engine/shutdown air pressure
- Low fuel pressure at engine inlet

Switches for:

- High lube oil temperature at engine inlet
- Lube oil temperature at engine inlet above danger level
- High water temperature at engine inlet
- Water temperature at engine outlet above danger level
- High charge-air temperature at engine inlet
- Detection of water in charge-air duct
- Leak fuel level
- Alarm contact for high differential pressure at fuel filter
- Alarm contact for high differential pressure at lube oil back flushing filter
- Set of thermocouples after each cylinder, before and after turbocharger
- Crankcase oil mist detector

Control Cabinet with housings for wall mounting, including:

- Protection equipment designed for automatic and manual stop input signals, starting interlock input signals, monitoring for the wire break of the input signal units and the emergency shutdown solenoid
- Speed recording system for overspeed, firing speed and minimum speed
- Start/stop logic, controlled by engine automatic start (optional)
- Service hour counter
- Noris alarm system, cassette type, designed for alarm inputs for the engine including exhaust mean-value monitoring equipment as well as alarm inputs for the propulsion plant
- Group alarm panel for the bridge and with optional and acoustical alarm equipment

Starting Air System

- Separate non-return valve for the starting air pipe to the engine

Air Intake System

- Air intake filter, fitted on the turbocharger
- Air bottles, separate

Diesel Oil System

- Separate circulating pump driven by electric motor, horizontal or vertical
- Duplex filter with differential pressure indication

Exhaust System

- Turbocharger at free end with transition nozzle (0 degrees from the vertical and away from engine), with compressor cleaning device
- Expansion joint separate
- Separate silencer and spark arrester, unlagged 35 dB(A)

Fresh Cooling Water System

- HT pump, fitted on engine
- LT pump, separate, vertical design, electric motor driven
- HT thermostat, not powered and separate
- Engine preheating equipment, fitted on base frame

Lubricating Oil System

- Plate cooler, separate
- Force pump, fitted on engine
- Prelubrication pump, separate
- Boll and Kirch automatic backflushing filter, separate
- Duplex filter with differential pressure indication, separate
- Pressure control valve, separate
- Thermostat, not powered, separate

Connecting Parts – Engine

- Set of connecting parts between flange coupling and flywheel
- Flexible flange coupling between engine and generator
- Base frame with flywheel guard and incorporating lube oil sump tank, for engine and generator
- Mounting of engine and generator on the base frame
- Set of bonded rubber rails for resilient mounting of the base frame
- Set of flexible pipe connections

Tools

- Set of tools for the engine including hydraulic tightening tools and nozzle tester
- Set of tools for turbocharger
- Inside micrometer for cylinder liners
- Ruler for cylinder liner

Spare Parts

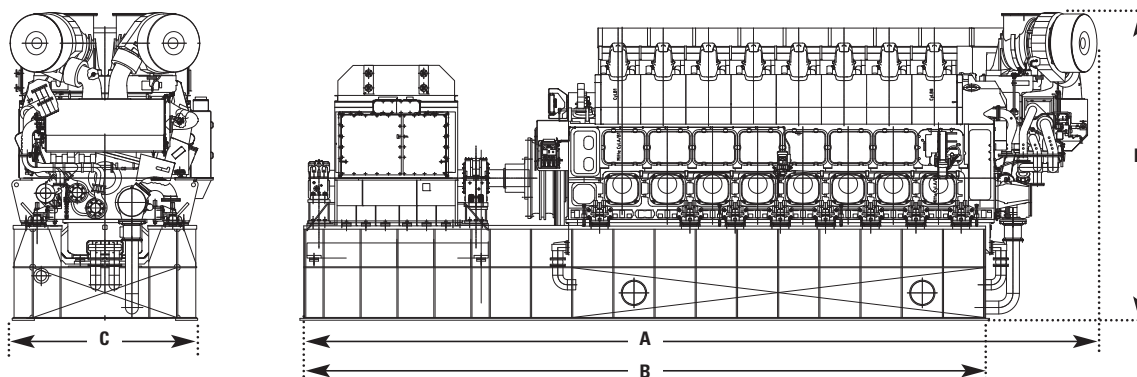
- Set of engine spare parts for unrestricted operation
- Set of spare flexible pipe connections



Technical Data 16CM43C Offshore Production Generating Set

	60 Hz	50 Hz
Engine Power	16,000 kW (21,456 bhp)	16,000 kW (21,456 bhp)
Generator Set Rating*	15,520 kWe (19,400 kVA)	15,520 kWe (19,400 kVA)
BMEP @ Rated	26.4 bar (382.9 psi)	27.1 bar (393.1 psi)
BSFC @ Rated	176 g/kWh (0.289 lbs/bhp-hr)	176 g/kWh (0.289 lbs/bhp-hr)
Maximum Allowable Fuel Temperature to Engine (MDO)	20°C (68°F)	20°C (68°F)
Air Demand Based on 20°C Inlet Temperature and 101.3 kPa Inlet Pressure	86,700 m ³ /h (51,030 cfm)	86,700 m ³ /h (51,030 cfm)
Maximum Allowable Air Temperature to Air Filters	45°C (113°F)	45°C (113°F)
Exhaust Flow Based on 300°C Stack Temperature and 105 kPa Stack Pressure	107,160 kg/h (236,247 lbs/hr)	107,160 kg/h (236,247 lbs/hr)
Maximum Allowable Backpressure	3 kPa (12 in. H ₂ O)	3 kPa (12 in. H ₂ O)
LT SCAC Heat Rejection	1,365 kW (77,625 Btu/min)	1,365 kW (77,625 Btu/min)
HT SCAC Heat Rejection	6,390 kW (363,393 Btu/min)	6,390 kW (363,393 Btu/min)
Maximum Charge Air Cooler (LT-stage) Inlet Temperature	38°C (100°F)	38°C (100°F)
JW Heat Rejection	2,200 kW (125,111 Btu/min)	2,200 kW (125,111 Btu/min)
Radiative Convective Heat Rejection	680 kW (38,670 Btu/min)	680 kW (38,670 Btu/min)

* Assumes 97% efficiency and a power factor of 0.8



Note: Do not use for installation design. See general dimension drawings for detail.

Package Dimensions		
Length (A)	16,930 mm	666.53 in.
Length (B)	14,645 mm	576.5 in.
Width (C)	3,940 mm	155.11 in.
Height (D)	6,525 mm	256.88 in.
Package Weight (dry)*	343 t	756.185 lb

* Dependent on generator type

Rating Definitions and Conditions

Engine Performance is corrected to inlet air standard conditions of 99 kPa (29.31 in. Hg) dry barometer and 25°C (77°F) temperature. These values correspond to the standard atmospheric pressure and temperature as shown in SAE J1995.

Performance measured using a standard fuel with fuel gravity of 35 degrees API having a lower heating value of 42,780 kJ/kg (18,390 BTU/lb) when used at 29°C (84.2°F) where the density is 838.9 g/L (7.001 lb/U.S. gal).

The corrected performance values shown for Cat® engines will approximate the values obtained when the observed performance data is corrected to SAE J1995, ISO 3046-2, ISO 8665, ISO 2288, ISO 9249, ISO 1585, EEC 80/1269, and DIN 70020 standard reference conditions.



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