MARINE ENGINE SELECTION GUIDE

CATERPILLAR MARINE POWER SYSTEMS
AUGUST 2012

MAK

CAT®

Caterpillar Marine Power Systems

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For more information about Caterpillar Marine Power Systems and engines that are no longer available, please visit:

MARINE.CAT.COM

Cat Marine Power

When it comes to reliable engine power, you can't afford to compromise. You need proven power. Optimum power. Caterpillar understands how important your marine power needs are. That's why we design marine engines for superior reliability. That's why every Cat® marine engine is built to last. And why when it comes to fuel consumption, Cat engines are an efficient choice.

Cat engine reliability doesn't stop at the engine design. When you buy a Cat marine engine, you're assured of excellence in customer support. Our global dealer network offers you the expertise and parts you need to keep your engine running smoothly.

Caterpillar offers two product lines for marine applications. The MaK medium-speed product line has propulsion, auxiliary, and generator set engines in the power range from 1,020 to 18,000 kW. The Cat product line has propulsion engines from 127 to 7,682 mhp, auxiliary engines from 162 to 5,420 bkW, and generator sets from 11 to 17,280 ekW.

Marine Classification Society certification is available for most marine ratings. Caterpillar works with all major marine societies. Consult your Cat dealer for detailed information.

All Cat engines in this guide over 174 bhp/130 bkW (with the exception of the Cat 3508, 3512, and 3516 Mechanical Control System engines) meet the IMO regulation on NOx emissions (Regulation 13 of Annex VI of MARPOL). Some engines are certified to the Revised Annex VI of MARPOL (IMO II). Please review the individual engines under column EPA/IMO to see status. Caterpillar has met this goal while continuing to optimize engine performance and fuel efficiency.

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

Caterpillar: Making Sustainable Progress Possible

How To Use This Guide

For marine propulsion engine ratings, consider how your vessel is operated. Loads vary…and Cat engine ratings reflect various vessel operation needs. Review the rating definitions and engines available on pages 12-20, and decide which rating best defines your application. Once you have decided which rating (A, B, C, D, E) best meets your needs, refer to the appropriate engine model page for more information.

The essence of Caterpillar is one of progress, so it only makes sense that the development we enable strengthens economies, communities, and businesses — including our own. In short, it's progress that is sustainable. By pursuing sustainable development — and sustainable progress — in every aspect of our business, Caterpillar and the global dealer network strive to meet the emerging sustainability requirements of our worldwide customers.

Caterpillar Marine Power Systems is committed to driving sustainability in the manufacturing of products at all global facilities, as well as embedding an environmentally focused culture for all employees in their office environments and homes. By designing engines to exceed global emissions standards, embracing remanufacturing and recycling of engine components and office waste, and redesigning office spaces to reduce energy consumption, employees are constantly working to shrink their overall carbon footprint. But we're not stopping there — Caterpillar is also globally partnering with customers to help them achieve their sustainable goals, making sustainable progress possible.

Visit MARINE.CAT.COM for future updates on continual efforts by Caterpillar to lead the marine industry in the development of products and services with minimum impact on our environment.

Contents

Visit MARINE.CAT.COM for detailed specification sheets and product information.

Abbreviations

API — American Petroleum Institute
bhp — Brake Horsepower
bkW — Brake Kilowatts
BS — British Standards
CC — Combined Circuit
DIN — German Standards Organization
DF — Dual Fuel
ekW — Electrical Kilowatts
EPA — Environmental Protection Agency
EU — European Union
EUI — Electronic Unit Injectors
g/bkW-hr — Grams per Brake Kilowatt Hour
H — Height of Engine
HE — Heat Exchanger Cooled
IMO — International Maritime Organization
ISO — International Standards Organization
JW — Jacket Water Aftercooled
KC — Keel Cooled
kVA — Kilovolt-Ampere
L — Overall Engine Length
LE — Length of Engine from Front of Engine to Rear Face of Flywheel Housing
LG — Length of Engine with Gear/Generator
mhp — Metric Horsepower
NA — Naturally Aspirated
R — Radiator Cooled
regs — Regulations
SAE — Society of Automotive Engineers
SCAC — Separate Circuit Aftercooled
SWAC — Seawater Aftercooled
T — Turbocharged
TA — Turbocharged Aftercooled
TTA — Twin Turbo Aftercooled
U.S. g/h — U.S. Gallons per Hour
WE — Width of Engine

Note: For Emissions Regulations abbreviations see page 20-21.

Customer Support Programs for Cat® Marine Products

Caterpillar offers a variety of integrated solutions to help you protect your investment, minimize owning and operating costs, and maximize up-time. These solutions are specifically tailored to meet your needs.

Extended Service Coverage (ESC)

ESC is available for both propulsion and auxiliary marine engines. New ESC mirrors the standard warranty coverage and is available in annual increments for vessels still under standard warranty, with a maximum of 5 years of coverage. **Advantage ESC** coverage also mirrors standard warranty and is available for vessels less than 10 years old. Advantage ESC also requires the successful completion of an Advantage Inspection and Sea Trial to qualify for coverage. Both coverages are transferrable at no cost.

Platinum ESC for Pleasure Craft Applications is available in 300-, 500- or unlimited-hour increments per year along with varying deductible options. The coverage is also available in **Platinum Plus** to cover additional Cat engine controls and pilot house displays.

ESC for Commercial Applications is available in various levels of component coverage (Silver, Gold, Platinum, and Platinum Plus), multiple deductible options, and 500- or 1000-hour increments with a minimum of 500 hours per year. Maximum hour and age limitations apply.

Customer Support Agreements (CSAs)

Three flexible CSA options are available which can be customized to fit your needs: Inspection, Preventive Maintenance, and Total Maintenance and Repair. The more comprehensive the CSA, the greater the benefits. Caterpillar tests have proven that with CSAs, engine operating time is significantly increased. They ensure that maintenance and repairs are completed by highly skilled technicians and only use Cat and MaK parts.

Contact your nearest Cat dealer for additional details on these programs.

Cat Financial

You specify Cat or MaK power solutions because you believe in the power of Cat engines to keep you and your vessel safely on course. Cat Financial has the same commitment to your success — whether you need construction, term, or repower financing.

We know how to support customers in one country, construction in a second country, and registration in a third. We understand the marine industry — we've been lending to marine customers for nearly 25 years. And, as it has been since 1986, our service commitment is powered by Caterpillar and Cat dealers everywhere.

Global Coverage

Whether you're a German operator building at a Chinese shipyard or a U.S. citizen building a yacht in Italy, Cat Financial can help. Our customers do business around the world, and we support them wherever they go.

Our service commitment extends to all marine sectors. From production and custom yachts to workboats and tankers — we have you covered.

Local Presence

Need a local expert? We know local markets and how to navigate the legal and regulatory environments.

Cat Financial has offices in the Americas, Europe, and Asia, and financing representatives all over the world. Put our knowledge to work to power the deal.

Quick Turnaround

You deserve fast, efficient service. Your dedicated marine account manager will guide your financing request through the process.

Questions? You'll get the solutions you need, when you need them.

Exceeding Customer Expectations

The right process simplifies everything. Our process begins with understanding your critical requirements and developing a tailored solution.

We then document, close, and fund the deal to exceed the expectations of all parties involved.

One Customer Experience Worldwide

Strong relationships are the key to our success. That's why Cat Financial works across geographical boundaries to deliver the same quality experience to each customer. Wherever you're building, wherever you're operating, count on Cat Financial to deliver world-class service.

Get your project moving anywhere in the world with Cat Financial — backed by the power of Caterpillar and our unmatched dealer network.

Visit us online at **http://marine.cat.com/finance** to learn more, send us an email at **GlobalPowerFinance@cat.com**, or call one of our three regional offices today.

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CAT Financial

Commercial Account*

Cat Financial Commercial Account is a payment method that enables you to buy parts and pay for service, repairs, or rentals at any participating Cat Marine Dealer or Cat Rental Store in the United States or Canada.

Exclusive Commercial Account Features & Benefits

Maximize Your Cash Flow Potential.
Pay now or pay later. Pay only 10 percent of your parts and service balance each month (rentals are due in full) and revolve the remainder at our low interest rate. Commercial Account gives you the flexibility to pay over time and keep your cash when you need it.

Best-in-Class Interest Rate.
Commercial Account's best-in-class interest rate makes it less expensive for you to pay for parts, services, and purchases over time.

One Nationwide Account.
No matter where you go, Commercial Account is a quick and easy way for you to pay for your expenses. Use your account at any participating Cat Marine Dealer or Cat Rental Store in the U.S. or Canada for rentals, parts, and services.

Special Zero Percent Financing Options.
Your Cat Dealer may offer special financing options that you can take advantage of only with your Commercial Account. Ask your dealer about the Marine Engine Rebuild program currently being offered.

One-time Credit Approval.
Once approved, your account remains open as long as is it is in good standing.

Instant Access to Your Account Information Online 24/7.
Make payments and view account details 24/7 through our secure website.

No Collateral/Security Required.

Apply Today: In the U.S. visit www.CatFinancial.com/CommercialAccount or call 1-888-CAT-8811. In Canada visit http://CatFinance.cat.com/CommercialAccount or call 1-866-686-5024.

*Formerly Cat® AccessAccount

Controls and Displays

Specifically Designed for Cat Electronic Marine Propulsion Engines

Multi-Station Control System (MSCS)

MSCS provides engine and transmission control for single or dual engine applications with up to eight control stations installed throughout the vessel. Control of the engine and transmission can be easily transferred from one station to another. The fully redundant backup system is included to ensure propulsion system operation in the event of a failure to the primary control system.

Transmission shift logic contains anti-stall strategy to prevent stalling the engine during quick shifting maneuvers.

With fewer components and smaller, more flexible wiring, **MSCS II** is designed for vessels with one or two stations.

Three60 Precision Control

Three60 Precision Control is an integrated propulsion and maneuvering solution that revolutionizes slow speed control of traditional shaft and propeller drive line vessels. It simultaneously actuates and controls engines, transmissions, thrusters, and propellers with intuitive easy movements rivaling the performance of pod drive vessels.

Color Marine Power Display (CMPD)

CMPD can monitor and display operating parameters for two engines and transmissions including diagnostics, visual alarms, and streaming video from up to four camera inputs. The user can select from seven languages, two gauge types, and daylight or night mode screens.

Mini Marine Power Display (MPD)

The Mini MPD is a compact, self-contained engine monitoring and display system that provides the operator with engine and transmission information, including an audible alarm and diagnostic information.

Marine Analog Power Display (MAPD)

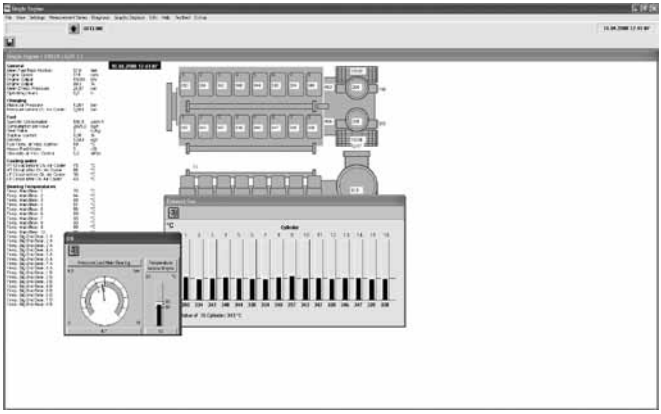
MAPD is an innovative system of electronically controlled analog gauges that monitor engine operation, offering accuracy and dependability with visual simplicity. All gauges are LED backlighted, automatically calibrated, and available in two sizes.

Diagnostic Trending Monitoring (DICARE)

With MaK DICARE, you can have an expert aboard at all times, ready to serve your needs. The latest, completely revised version combines well-established features with faster signal processing and improved usability, based on common industry standards.

Cat and MaK engines with MaK DICARE remote engine monitoring software provide reliable, condition-specific maintenance suggestions. DICARE continually compares current engine condition to the desired state and tells you when maintenance is required. You get the diagnostics you need in easy-to-understand words and graphics so you can take action to keep your engines running strong.

DICARE is only available for medium-speed engines, not for high-speed engines.



About 700 MaK engines worldwide, on vessels and in power stations ashore, are currently supervised with DICARE. Malfunctions are indicated immediately and at a glance, taking into account empirical data, plausibility considerations, and built-in expertise from decades of MaK diesel engine design. For ease of use, the initial report is subdivided into the diagnostic sectors of exhaust gas, turbocharger, fuel oil, lube oil, and cooling water, using a simple color-coding of regular versus irregular values. In a second step, the complete set of measured values and detailed troubleshooting instructions can be displayed, also with recommended actions priority-coded. Special attention is placed on monitoring the following criteria:

- Overall temperature levels to identify thermal overload at an early stage.
- Intake air pressure and temperature to identify performance drops due to fouling or wear.
- Charge air pressure, temperature, and dew point to identify fouling or misadjustment.
- Fuel temperature and viscosity to identify any malfunction of the viscosity control unit.
- Fuel rack position and power output to identify injection pump wear.
- Lube oil consumption to identify any possible wear.
- Cooling water pressure and temperature for optimum operation.
- Exhaust gas temperatures to identify deviations in the fuel or air system at an early stage.

Marine Propulsion Engines
A Rating
(Unrestricted Continuous)

A Rating (Unrestricted Continuous)

Typical applications: For vessels operating at rated load and rated speed up to 100% of the time without interruption or load cycling (80% to 100% load factor). **Typical applications could include but are not limited to vessels such as freighters, tugboats, bottom trawlers, or deep river tugboats.** Typical operation ranges from 5000 to 8000 hours per year.

For 3516B Engines Only:

- **Ahp** – Fast commercial vessels with high load factors. Requires CF-4 or superior lube oil and 30° C or colder aftercooler water.

For C280-6, C280-8, C280-12, and C280-16 Engines Only:

- **Continuous Service (CS) Rating** is suitable for continuous duty applications, including dredges, for operation without interruption or load cycling.

mhp	bhp	bkW	rpm	Model
255	250	187	2400	C7
345	340	254	1800	C12
460-608	454-600	339-447	1800	C18 ACERT
669-1014	660-1000	492-746	1600-2100	C32 ACERT
715-867	705-855	526-637	1200-1800	3508
786-1014	775-1000	578-746	1200-1800	3508B
786-1015	775-1000	578-746	1200-1600	3508C
1224-1298	1207-1280	900-954	1200-1800	3512
1115-1835	1100-1810	820-1350	1200-1800	3512B

mhp	bhp	bkW	rpm	Model
1298-1836	1280-1810	955-1350	1200-1800	3512C
1622-1734	1603-1710	1195-1275	1200-1800	3516
1673-2481	1650-2447	1230-1825	1200-1800	3516B
1673-2482	1650-2448	1230-1825	1200-1600	3516C
2721	2683	2001	1600	C175-16
2832	2792	2082	1600	C175-16

Ahp Ratings

mhp	bhp	bkW	rpm	Model
2718	2682	2000	1925	3516B

CS Ratings

mhp	bhp	bkW	rpm	Model
2352-2515	2320-2481	1730-1850	900-1000	C280-6
3127-3345	3084-3299	2300-2460	900-1000	C280-8
4704-5031	4640-4962	3460-3700	900-1000	C280-12
6255-6690	6169-6598	4600-4920	900-1000	C280-16

B Rating (Heavy Duty)

B Rating (Heavy Duty)

Typical applications: For vessels operating at rated load and rated speed up to 80% of the time, or 10 hours out of 12, with some load cycling (40% to 80% load factor). **Typical applications could include but are not limited to vessels such as mid-water trawlers, purse seiner, crew and supply boats, ferries, or towboats.** Typical operation ranges from 3000 to 5000 hours per year.

- **For 3508B, 3512B, and 3516B Engines Only:**
- **Bhp** – Fast commercial and passenger vessels including catamarans and SWATH vessels with high load factors.

mhp	bhp	bkW	rpm	Model
280	275	205	2400	C7
390	385	287	1800	C12
560-680	553-670	412-500	2100	C18 ACERT
1217-1319	1200-1300	895-970	1800-2100	C32 ACERT
816-973	805-960	600-716	1300-1800	3508
862-1065	850-1050	634-783	1200-1800	3508B
862-1065	850-1050	634-783	1200-1600	3508C
1318-1465	1301-1445	970-1077	1200-1800	3512
1171-1938	1155-1911	861-1425	1200-1800	3512B

mhp	bhp	bkW	rpm	Model
1378-2282	1359-2250	1014-1678	1200-1800	3512C
1698-1947	1676-1920	1250-1432	1200-1800	3516
1775-2611	1750-2575	1305-1920	1200-1800	3516B
1775-3046	1750-3004	1305-2240	1200-1800	3516C
2948	2907	2168	1600	C175-16

Bhp Ratings

mhp	bhp	bkW	rpm	Model
1217	1200	895	1785	3508B
1825	1800	1342	1785	3512B
2434	2400	1790	1785	3516B

C Rating (Maximum Continuous)

C Rating (Maximum Continuous)

Typical applications: For vessels operating at rated load and rated speed up to 50% of the time, or 6 hours out of 12, with cyclical load and speed (20% to 80% load factor). **Typical applications could include but are not limited to vessels such as ferries, harbor tugs, fishing boats, offshore service boats, displacement hull yachts, or short trip coastal freighters.** Typical operation ranges from 2000 to 4000 hours per year.

For 3508B, 3512B, and 3516B Engines Only:

- **Chp** – Fast commercial and passenger vessels and cruising yachts with moderate load factors.

For C280-6, C280-8, C280-12, and C280-16 Engines Only:

- **Maximum Continuous (MC) Rating** is generally used for vessel applications involving varying loads. The engine power actually produced is limited by application guidelines, leaving a power reserve for unusual operating conditions. Operating time at loads above the Continuous Service Rating for a given rpm is limited to one hour in 12 or 8.3% of total operating hours.
- **FCVR – Fast Commercial Vessel Rating:** 85% of operating hours at rated speed, 15% of hours at less than 50% rated power. TBO approximately 20,000-25,000 hours. The propulsion system design should consider heavy ship condition, sea state, hull fouling and propulsion system power losses for proper match between engine and prop/jet.

mhp	bhp	bkW	rpm	Model
127-208	125-205	93-153	2100-2600	3056
320	315	235	2400	C7
460-497	454-490	339-366	2100-2300	C12
725	715	533	1800-2100	C18 ACERT
1319-1470	1300-1450	970-1081	1800-2300	C32 ACERT
831-1014	820-1000	611-746	1300-1800	3508
913-1115	900-1100	671-820	1200-1800	3508B
913-1115	900-1100	671-820	1200-1600	3508C
1428-1521	1408-1500	1050-1118	1200-1800	3512
1227-2040	1210-2012	902-1500	1200-1800	3512B
1429-2400	1409-2365	1051-1765	1200-1800	3512C
1774-2028	1750-2000	1305-1491	1200-1800	3516
1876-2718	1850-2682	1379-2000	1200-1800	3516B
1876-3196	1850-3151	1379-2350	1200-1800	3516C

Chp Ratings

mhp	bhp	bkW	rpm	Model
1318	1300	969	1835	3508B
1977	1950	1454	1835	3512B
2636	2600	1939	1835	3516B

MC Ratings

mhp	bhp	bkW	rpm	Model
2583-2760	2548-2722	1900-2030	900-1000	C280-6
3440-3684	3393-3634	2530-2710	900-1000	C280-8
5167-5520	5096-5444	3800-4060	900-1000	C280-12
6879-7369	6785-7268	5060-5420	900-1000	C280-16

FCVR Rating

mhp	bhp	bkW	rpm	Model
7682	7577	5650	1000	C280-16

D Rating (Intermittent Duty)

D Rating (Intermittent Duty)

Typical applications: For vessels operating at rated load and rated speed up to 16% of the time, or 2 hours out of 12, (up to 50% load factor). **Typical applications could include but are not limited to vessels such as offshore patrol boats, customs boats, police boats, some fishing boats, fireboats, or harbor tugs.** Typical operation ranges from 1000 to 3000 hours per year.

For 3508B, 3512B, and 3516B Engines Only:

- **Dhp** – Patrol craft, fast passenger vessels, and cruising yachts with low load factors.

mhp	bhp	bkW	rpm	Model
375	370	276	2600	C7
510	503	375	2500	C9 ACERT
578	570	425	2300	C12
814	803	599	2100	C18 ACERT
885	873	651	2200	C18 ACERT
1622	1600	1193	2300	C32 ACERT
1166	1150	857	1800	3508
1775	1750	1305	1800	3512
2577-2587	2541-2551	1895-1902	1800	3512C
2231	2200	1640	1800	3516
2855-3434	2816-3386	2100-2525	1600-1800	3516C

Dhp Ratings

mhp	bhp	bkW	rpm	Model
1420	1400	1044	1880	3508B
2129	2100	1566	1880	3512B
2839	2800	2088	1880	3516B

E Rating (High Performance)

E Rating (High Performance)

Typical applications: For vessels operating at rated load and rated speed up to 8% of the time, or 1/2 hour out of 6, (up to 30% load factor). **Typical applications could include but are not limited to vessels such as pleasure craft, harbor patrol boats, harbor master boats, some fishing or patrol boats**. Typical operation ranges from 250 to 1000 hours per year.

For 3508B, 3512B, and 3516B Engines Only:

- **Ehp** – Fast patrol craft and fast yachts with low load factors.

mhp	bhp	bkW	rpm	Model
461	455	339	2800	C7 ACERT
575	567	423	2500	C9 ACERT
609	600	448	2300	C12
669-715	660-705	492-526	2300	C12 ACERT
930-1150	918-1136	685-847	2100-2300	C18 ACERT
1723-1925	1700-1900	1267-1417	2300	C32 ACERT

Ehp Ratings

mhp	bhp	bkW	rpm	Model
1521	1500	1118	1925	3508B
2282	2250	1678	1925	3512B
3042	3000	2237	1925	3516B

DEP Rating (Diesel Electric Propulsion)

DEP Ratings (Diesel Electric Propulsion, Electric Drive)

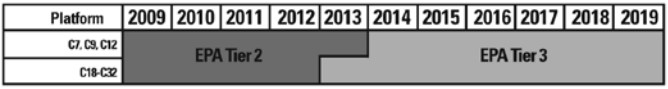
Typical applications: For all vessels operating with generator sets that provide power to the propulsion systems. All ratings are Prime Ratings according to ISO 8528-1 for unlimited usage per year at a load factor of ≤ 70%. 10% overload capability is required for a maximum of 1 hour out of every 12 and a maximum of 25 hours total per year. **Typical applications could include but are not limited to supply vessels, cruise vessels, research vessels, or any other ship using diesel electric drive systems.**

50 Hz				60 Hz			
bhp	bkW	rpm	Model	bhp	bkW	rpm	Model
253	189	1500	C9	253	189	1800	C9
288	215	1500	C9	311	232	1800	C9
404	301	1500	C18 ACERT	361	269	1800	C9
514	383	1500	C18 ACERT	499	372	1800	C18 ACERT
587	438	1500	C18 ACERT	624	465	1800	C18 ACERT
660	492	1500	C18 ACERT	916	683	1800	C32 ACERT
791	590	1500	C32 ACERT	1047	781	1800	C32 ACERT
923	688	1500	C32 ACERT	1333	994	1800	C32 ACERT
1172	874	1500	C32 ACERT	1920	1432	1800	3512C
1686	1257	1500	3512B	2183	1628	1800	3512C
2303	1717	1500	3516B	2442	1821	1800	3512C
2481	1850	1000	C280-6	2576	1921	1800	3516C
2722	2030	1000	C280-6	2809	2095	1800	3516C
3299	2460	1000	C280-8	2962	2211	1800	3516C
3634	2710	1000	C280-8	2984	2225	1800	3516C
4962	3700	1000	C280-12	3151	2350	1800	3516C
5445	4060	1000	C280-12	3176	2368	1800	3516C
6598	4920	1000	C280-16	2320	1730	900	C280-6
7268	5420	1000	C280-16	2548	1900	900	C280-6
				3084	2300	900	C280-8
				3393	2530	900	C280-8
				4640	3460	900	C280-12
				5096	3800	900	C280-12
				6169	4600	900	C280-16
				6786	5060	900	C280-16

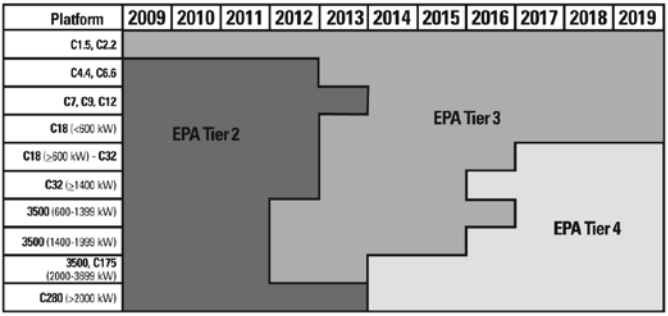
Emissions Regulations

EPA Regulations

Recreational Marine



Commercial Marine



EPA Regulations

T2C — Complies with U.S. EPA Marine Tier 2 Commercial Regulations and EPA 40 CFR Part 94.

T2R — Complies with U.S. EPA Marine Tier 2 Recreational Regulations and EPA 40 CFR Part 94.

T2CR — Complies with U.S. EPA Marine Tier 2 Commercial and Recreational Regulations and EPA 40 CFR Part 94.

NRT2 — Complies with U.S. EPA Non-Road Mobile Tier 2 Regulations. (Small generator sets are often included as "portable auxiliary engines" under this regulation. Small generator sets can be certified as a "marine engine" if permanently installed in a vessel.)

NC — Not U.S. EPA Marine Certified for use in the U.S. or Canada.

T3C — Complies with U.S. EPA Marine Tier 3 Commercial Regulations.

T3R — Complies with U.S. EPA Marine Tier 3 Recreational Regulations.

IMO/EU Regulations

Tier	Date	NOx Limit (g/kWh)		
		n < 130	130 ≤ n < 2000	n ≥ 2000
Tier I	2000	17.0	$45 \cdot n^{-0.2}$	9.8
Tier II	2011	14.4	$44 \cdot n^{-0.23}$	7.7
Tier III	2016*	3.4	$9 \cdot n^{-0.2}$	1.96

*In NOx Emission Control Areas (Tier II standards apply outside ECAs).

IMO Regulations

IMOI — Compliant with IMO emissions standards for the year 2000 as defined by Regulation 13 of Annex VI to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the protocol of 1997. Applies to specific engines in vessels with a keel lay date from Jan. 1, 2000 until Dec. 31, 2010; other rules may apply.

IMOII — Emissions data measurement is consistent with the procedures described in the NOx Technical Code 2008. The engine exhaust emissions are in compliance with the International Maritime Organization's Regulation 13 of Revised Annex VI to the MARPOL Convention. Applies to specific engines in vessels with a keel lay date from Jan. 1, 2011 until the proposed date Dec. 31, 2015.

NST — Engines ≤ 130 bkW are not subject to IMO regulations

EU Regulations

Commercial Craft Directive 97/68/EC (EU Stage IIIA)

This directive is in effect and applies to all propulsion and auxiliary engines. Caterpillar has certified some engines with a rated power of greater than 560 bkW to this standard. Most of these are to be used for inland waterway vessels. These engines also became effective by reciprocity agreement with CCNR Stage II, on July 1, 2007.

Central Commission for Navigation on the Rhine

Commercial Craft — CCNR Stage II regulated Diesel Engine Emissions limits became effective July 1, 2007; this regulation is only effective for engines with a rated power at or above 37 kW.

Engine Certification Descriptions

CC2 — Complies with CCNR Stage II

IW — Complies with EU Stage IIIA or referred to as, Inland Waterway Commercial Craft Directive, meaning the same as Commercial Craft Directive 97/68/EC (EU Stage IIIA)

NC — Not Certified for EU Regulations. Engines < 37 kW are not subject to CCNR legislation.

NST — Engines < 37 kW are not subject to CCNR legislation

RCD — Recreational Craft Directive, complies with EU 94/25/EC. This directive is in effect and applies to all recreational Engines used in the European Union areas.

Cat Marine Propulsion Engines

Rating Conditions for 3500 and Smaller Engines

Ratings are based on SAE J1228 standard conditions of 29.61 in Hg (100 kPa) and 77° F (25° C). These ratings also apply at ISO3046-1:2002E, ISO8665, DIN6271-3, and BS5514 conditions of 29.61 in Hg (100 kPa), 81° F (27° C), and 60% relative humidity.

Caterpillar maintains ISO9001:2000 certified quality management systems for engine test facilities to assure accurate calibration of test equipment. Electronically controlled engines are set at the factory at the advertised power corrected to standard ambient conditions. The published fuel consumption rates are in accordance with ISO3046-1:2002E.

Fuel rates are based on fuel oil of 35° API [60° F (16° C)] gravity having an LHV of 18,390 Btu/lb (42 780 kJ/kg) when used at 85° F (29° C) and weighing 7.001 lbs/U.S. gal (838.9 g/liter). Additional ratings may be available for specific customer requirements. Consult your Cat representative for additional information.

Rating Conditions for C280 Engines

Ratings are based on SAE J1349 standard conditions of 29.61 in Hg (100 kPa) and 77° F (25° C). These ratings also apply at ISO3046-1:2002E, ISO8665, DIN6271-3, and BS5514 standard reference conditions. Ratings also meet classification society maximum temperature requirements of 113° F (45° C) temperature to turbo and 90° F (32° C) seawater temperature without derate.

Fuel consumption is based on ISO3046/1 with +5% tolerance at rated power for fuel having an LHV of 18,390 Btu/lb (42 780 kJ/kg) and weighing 7.001 lbs/U.S. gal (838.9 g/liter). Includes engine mounted fresh water and lube oil pumps. BSFC without pumps, 2% less.

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

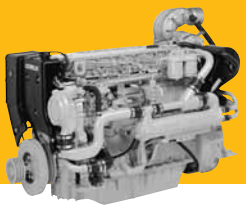
Performance Data

Performance along a typical fixed pitch propeller curve with a 3.0 exponent.

Power rated in accordance with NMMA procedure as crankshaft power. For units equipped with Caterpillar supplied marine gears, reduce crankshaft power by 3% for propeller shaft power.

3056

PROPULSION ENGINE



Mechanical
Control
System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
C	127	125	93	2600	8.2	280.0	NC - NC - NC
C	188	185	138	2100	9.7	223.2	NC - I - RCD
C	208	205	153	2500	11.2	232.5	NC - I - RCD

	LE	H	WE
min.	42.05 in/1068 mm	31.5 in/801 mm	25.4 in/645 mm
max.	42.05 in/1068 mm	31.5 in/801 mm	30.6 in/779 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	NA, TA	
Bore x Stroke	3.94 x 5.0 in	100 x 127 mm
Displacement	365 cu in	6.0 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	1312 lb	595 kg

Electronic Control System

C7

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	255	250	187	2400	12.9	220.1	NC - I - RCD
B	280	275	205	2400	14.0	217.3	NC - I - RCD
C	320	315	235	2400	17.0	230.0	NC - I - RCD
D	375	370	276	2600	20.5	235.5	NC - I - RCD

Electronic Control System

C7 ACERT

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
E	461	455	339	2800	25.1	230.5	T2CR - II - RCD

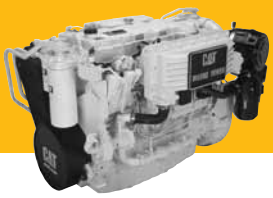
C7 ACERT began production with serial number C7D00150 (Greenville).

	LE	H	WE
min.	48.1 in/1221.8 mm	36.1 in/916.9 mm	36.2 in/919.6 mm
max.	48.1 in/1221.8 mm	36.1 in/916.9 mm	36.2 in/919.6 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	4.33 x 5.0 in	110 x 127 mm
Displacement	442 cu in	7.24 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	1760 lb	798 kg

C9 ACERT
PROPULSION ENGINE



Electronic Control System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
D	510	503	375	2500	26.0	220.3	T2CR - II - IW
E	575	567	423	2500	29.2	221.9	T2R - II - RCD

C9 ACERT E rating offered with optional attachments for use with Zeus® Pod Drive System.

	LE	H	WE
min.	47.2 in/1198 mm	38.7 in/983 mm	38.3 in/974 mm
max.	47.2 in/1198 mm	38.7 in/983 mm	38.3 in/974 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	4.41 x 5.87 in	112 x 149 mm
Displacement	538 cu in	8.8 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	2086 lb	946 kg

Electronic
Control
System

C12

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	345	340	254	1800	16.6	208.3	T2C - II - IW
B	390	385	287	1800	18.6	205.7	T2C - II - IW
C	460	454	339	2100	22.0	205.9	T2C - II - IW
C	497	490	366	2300	24.0	208.8	NC - I - RCD
D	578	570	425	2300	27.9	208.8	NC - I - RCD
E	609	600	448	2300	29.3	208.1	NC - I - RCD

Electronic
Control
System

C12 ACERT

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
E	669	660	492	2300	34.1	220.0	T2CR - II - IW
E	715	705	526	2300	36.5	220.3	T2CR - II - RCD

	LE	H	WE
min.	62 in/1574 mm	39.5 in/1005 mm	38.1 in/969 mm
max.	62 in/1574 mm	39.5 in/1005 mm	38.1 in/969 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	5.1 x 5.9 in	130 x 150 mm
Displacement	732 cu in	12 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	2588 lb	1174 kg

C18 ACERT
PROPULSION ENGINE

Electronic Control System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	460	454	339	1800	22.6	212.1	T2C - II - IW
A	485	479	357	1800	24.0	211.3	T2C - II - IW
A	608	600	447	1800	29.9	213.4	T2C - II - IW
B	560	553	412	2100	29.4	221.2	T2C - II - IW
B	680	670	500	2100	34.8	223.8	T2C - II - IW
C	725	715	533	2100	37.7	223.9	T2C - II - IW
D	885	873	651	2200	45.0	219.3	T2C - II - IW
E	930	918	685	2100	46.8	217.0	T2R - II - RCD
E	1015	1001	747	2300	53.6	227.9	T2R - II - RCD
E	1150	1136	847	2300	59.4	222.7	T2R - II - RCD

Heat Exchanger (32°C), Keel Cooled (52°C)

Preliminary EPA Tier 3 Ratings

A	463	469	350	1800	24.5	222.2	T3C - II - IW
A	608	600	447	1800	30.7	218.5	T3C - II - IW
B[1]	680	670	500	1800-2100	35.2	223.6	T3C - II - IW
C[1]	725	715	533	1800-2100	37.6	224.1	T3C - II - IW
D	814	803	599	2100	42.5	225.8	T3C - II - IW
E	1015	1001	747	2300	53.7	228.9	T3R - II - RCD
E	1150	1136	847	2300	58.6	220.1	T3R - II - RCD

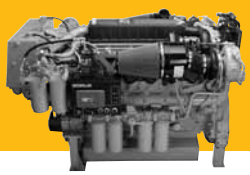
[1]Wide Operating Speed Range (WOSR)

	LE	H	WE
min.	59.2 in/1505 mm	45.0 in/1144 mm	42.1 in/1068 mm
max.	62.6 in/1591 mm	46.5 in/1182 mm	44.0 in/1118 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA, TTA	
Bore x Stroke	5.7 x 7.2 in	145 x 183 mm
Displacement	1106 cu in	18.1 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	3700-4200 lb	1678-1905 kg

Electronic Control System



C32 ACERT

PROPULSION ENGINE

COMMERCIAL APPLICATIONS

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A[1]	669	660	492	1800	32.3	208.4	T2CR - II - IW
A[1]	760	750	559	1800	36.2	205.8	T2CR - II - IW
A[1]	862	850	634	1800	41.0	205.3	T2CR - II - IW
A[1]	964	950	709	1600	45.3	202.7	T2CR - II - IW
A[1]	1014	1000	746	1800	48.1	204.9	T2CR - II - IW
B[1]	1217	1200	895	1800	59.3	205.9	NC - II - IW
B	1319	1300	970	2100	64.4	211.2	T2CR - II - IW
C	1319	1300	970	1800	62.5	204.6	T2CR - II - IW
C[1]	1470	1450	1081	2300	77.4	226.8	T2CR - II - IW
D[1]	1622	1600	1193	2300	82.1	218.2	T2CR - II - IW

[1]Wide Operating Speed Range (WOSR)
Heat Exchanger (32°C), Keel Cooled (52°C)

Preliminary EPA Tier 3 Ratings

A	760	750	559	1600-1800	37.5	213.2	T3C - II - IW
A	862	850	634	1600-1800	42.7	214.2	T3C - II - IW
A	862	850	634	1800-2100	45.4	227.9	T3C - II - IW
A	1014	1000	746	1600-1800	49.8	212.1	T3C - II - IW
B	1217	1200	895	1800-2100	62.6	222.2	T3C - II - IW
C	1319	1300	970	2100-2300	67.9	222.7	T3R - II - IW
C	1470	1450	1081	2100-2300	75.9	223.1	T3R - II - IW

All preliminary ratings are Wide Operating Speed Range (WOSR).

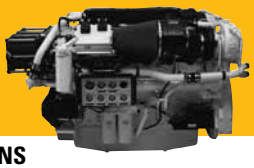
	LE	H	WE
min.	77.8 in/1976 mm	54.4 in/1381 mm	55.4 in/1408 mm
max.	81.6 in/2072 mm	59.9 in/1521 mm	56.8 in/1444 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	5.71 x 6.38 in	145 x 162 mm
Displacement	1959 cu in	32.1 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	7100-7300 lb	3221-3311 kg

C32 ACERT

PROPULSION ENGINE



Electronic Control System

PLEASURE CRAFT APPLICATIONS

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
C[1]	1470	1450	1081	2300	76.7	226.8	T2R - II - IW
D[1]	1622	1600	1193	2300	82.1	218.2	T2R - II - IW
E[1]	1723	1700	1267	2300	88.8	220.8	T2R - II - IW
E	1825	1800	1342	2300	93.2	218.2	T2R - II - IW
E	1925	1900	1417	2300	101.4	224.7	T2R - II - IW

[1]Wide Operating Speed Range (WOSR)

Preliminary EPA Tier 3 Ratings

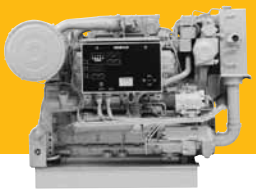
D	1622	1600	1193	2300	82.1	218.2	T3C - II - IW
E	1825	1800	1342	2300	93.2	218.2	T3R - II - RCD
E	1925	1900	1417	2300	101.4	224.7	T3R - II - RCD

	LE	H	WE
min.	77.8 in/1976 mm	54.4 in/1381 mm	55.4 in/1408 mm
max.	81.6 in/2072 mm	59.9 in/1521 mm	58.9 in/1496 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	5.71 x 6.38 in	145 x 162 mm
Displacement	1959 cu in	32.1 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	6600-6950 lb	2994-3152 kg

Mechanical
Control
System



3508

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	715	705	526	1200	35.9	216.8	NC - NC - NC
A	867	855	637	1600	41.6	207.1	NC - NC - NC
A	867	855	637	1800	43.5	216.8	NC - NC - NC
B	816	805	600	1300	41.3	218.5	NC - NC - NC
B	918	905	675	1600	43.8	206.2	NC - NC - NC
B	973	960	716	1800	48.6	215.7	NC - NC - NC
C	831	820	611	1300	42.1	218.4	NC - NC - NC
C	1014	1000	746	1800	50.6	215.5	NC - NC - NC
D	1166	1150	857	1800	58.7	217.4	NC - NC - NC

	LE	H	WE
min.	81.8 in/2077 mm	71.0 in/1803 mm	67.1 in/1703 mm
max.	81.8 in/2077 mm	71.0 in/1803 mm	67.1 in/1703 mm

Vee 8, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Displacement	2105 cu in	34.5 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	11,499 lb	5216 kg

3508B

PROPULSION ENGINE

Electronic Control System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO- EU
A	786	775	578	1200	36.9	202.5	NC - I - NC
A	867	855	637	1600	40.8	203.2	NC - I - NC
A	867	855	637	1800	42.0	209.3	NC - I - NC
A	1014	1000	746	1600	47.3	201.8	NC - I - NC
A	1014	1000	746	1800	48.7	207.3	NC - I - NC
B	862	850	634	1200	40.7	204.1	NC - I - NC
B	973	960	716	1600	45.4	201.9	NC - I - NC
B	973	960	716	1800	46.7	207.3	NC - I - NC
B	1065	1050	783	1600	49.5	200.8	NC - I - NC
B	1065	1050	783	1800	50.9	206.5	NC - I - NC
C	913	900	671	1200	43.5	205.6	NC - I - NC
C	1014	1000	746	1600	47.3	201.8	NC - I - NC
C	1115	1100	820	1600	47.3	200.9	NC - I - NC
C	1115	1100	820	1800	53.3	206.3	NC - I - NC
Bhp	1217	1200	895	1785	58.7	208.2	NC - I - NC
Chp	1318	1300	969	1835	64.1	209.9	NC - I - NC
Dhp	1420	1400	1044	1880	69.6	211.6	NC - I - NC
Ehp	1521	1500	1118	1925	75.1	213.1	NC - I - NC

	LE	H	WE
min.	90.9 in/2310 mm	71.0 in/1803 mm	67.1 in/1703 mm
max.	90.9 in/2310 mm	71.0 in/1803 mm	67.1 in/1703 mm

Vee 8, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Displacement	2105 cu in	34.5 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx.)	10,181-11,499 lb	4618-5261 kg

Electronic Control System

3508C

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

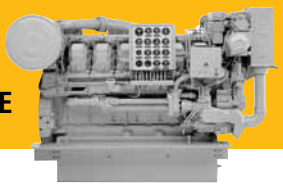
	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	786	775	578	1200	36.9	206.1	NC - II - IW
A	1015	1000	746	1600	48.9	208.3	NC - II - IW
B	862	850	634	1200	40.4	202.8	NC - II - IW
B	1065	1050	783	1600	51.6	209.4	NC - II - IW
C	913	900	671	1200	42.9	203.4	NC - II - IW
C	1115	1100	820	1600	54.2	210.1	NC - II - IW

	LE	H	WE
min.	83.4 in/2117 mm	72.0 in/1829 mm	67.0 in/1703 mm
max.	83.4 in/2117 mm	72.0 in/1829 mm	67.0 in/1703 mm

Vee 8, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Displacement	2107 cu in	34.5 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	10,935 lb	4960 kg

3512
PROPULSION ENGINE



Mechanical
Control
System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	1224	1207	900	1200	58.1	204.9	NC - NC - NC
A	1298	1280	954	1600	64.2	213.7	NC - NC - NC
A	1298	1280	954	1800	64.7	215.3	NC - NC - NC
B	1318	1301	970	1200	62.8	205.5	NC - NC - NC
B	1379	1360	1014	1600	68.3	214.0	NC - NC - NC
B	1465	1445	1077	1800	72.2	212.8	NC - NC - NC
C	1428	1408	1050	1200	68.6	207.5	NC - NC - NC
C	1430	1410	1051	1600	73.1	220.8	NC - NC - NC
C	1521	1500	1118	1800	76.3	216.6	NC - NC - NC
D	1775	1750	1305	1800	92.8	225.9	NC - NC - NC

	LE	H	WE
min.	107 in/2715 mm	80.8 in/2053 mm	67.1 in/1703 mm
max.	107 in/2715 mm	80.8 in/2053 mm	67.1 in/1703 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Displacement	3158 cu in	51.8 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	14,398-14,411 lb	6531-6537 kg

Electronic Control System

3512B

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	1115	1100	820	1200	52.0	201.5	NC - I - NC
A	1298	1280	954	1600	60.4	201.1	NC - I - NC
A	1318	1300	969	1200	62.2	203.8	NC - I - NC
A	1521	1500	1118	1600	69.8	198.3	NC - I - NC
A	1521	1500	1118	1800	72.6	205.1	NC - I - NC
A[1]	1521	1500	1118	1200	74.3	210.9	NC - I - NC
A[2]	1521	1500	1118	1800	73.5	206.0	NC - I - NC
A[1]	1699	1675	1249	1600	75.8	192.8	NC - I - NC
A[1]	1835	1810	1350	1600	88.0	207.1	NC - I - NC
B	1171	1155	861	1200	54.5	201.1	NC - I - NC
B	1278	1260	939	1200	59.7	201.8	NC - I - NC
B	1369	1350	1007	1200	64.6	203.6	NC - I - NC
B	1379	1360	1014	1600	63.4	198.6	NC - I - NC
B	1379	1360	1014	1800	65.2	205.1	NC - I - NC
B	1597	1575	1174	1600	72.9	197.1	NC - I - NC
B	1597	1575	1174	1800	75.9	205.1	NC - I - NC
B[1]	1775	1750	1305	1600	78.9	192.1	NC - I - NC
B[1]	1938	1911	1425	1600	92.8	206.9	NC - I - NC
C	1227	1210	902	1200	57.6	201.3	NC - I - NC
C	1318	1300	969	1200	61.8	202.4	NC - I - NC
C	1430	1410	1051	1600	65.7	198.3	NC - I - NC
C	1430	1410	1051	1800	67.3	204.3	NC - I - NC
C	1496	1475	1100	1200	71.3	207.2	NC - I - NC
C	1673	1650	1230	1600	76.3	196.9	NC - I - NC
C	1673	1650	1230	1800	79.3	204.7	NC - I - NC
C[1]	1876	1850	1379	1600	83.4	192.0	NC - I - NC
C[1]	2040	2012	1500	1600	97.1	205.5	NC - I - NC
Bhp	1825	1800	1342	1785	87.2	206.4	NC - I - NC
Chp	1977	1950	1454	1835	96.0	209.7	NC - I - NC
Dhp	2129	2100	1566	1880	101.3	205.4	NC - I - NC
Ehp	2282	2250	1678	1925	109.6	207.4	NC - I - NC

[1]High displacement engine (HD) [2]Wide operating speed range

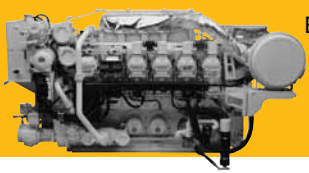
	LE	H	WE
min.	111 in/2819 mm	71.1 in/1806 mm	67.1 in/1703 mm
max.	121 in/3067 mm	82.3 in/2091 mm	70.2 in/1785 mm
HD	120 in/3039 mm	81.7 in/2074 mm	78.3 in/1988 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Bore x Stroke[2]	6.7 x 8.5 in	170 x 215 mm
Displacement	3158 cu in	51.8 liter
Displacement[2]	3576 cu in	58.6 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx.)	14,398-14,411 lb	6531-6537 kg

3512C

PROPULSION ENGINE



Electronic Control System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	1298	1280	955	1600	61.3	204.0	NC - II - IW
A	1318	1300	969	1200	64.3	201.6	NC - II - IW
A	1420	1400	1044	1600	66.6	202.5	NC - II - IW
A	1520	1500	1118	1800	70.3	200.1	NC - II - IW
A[1]	1521	1500	1118	1200	71.5	203.0	NC - II - IW
A[1]	1699	1676	1250	1600	79.7	202.6	NC - II - IW
A[1]	1836	1810	1350	1600	84.7	207.1	NC - II - IW
B	1378	1359	1014	1600	64.8	203.0	NC - II - IW
B	1420	1400	1044	1200	69.1	210.1	NC - II - IW
B	1521	1500	1118	1600	71.1	201.9	NC - II - IW
B	1597	1575	1174	1800	73.8	199.9	NC - II - IW
B[1]	1622	1600	1194	1200	76.2	202.8	NC - II - IW
B[1]	1774	1749	1305	1600	82.5	200.7	NC - II - IW
B[1]	1938	1911	1425	1600	89.0	208.5	NC - II - IW
B[1]	2282	2250	1678	1800	111.0	209.9	NC - II - IW
C	1429	1409	1051	1600	67.0	202.4	NC - II - IW
C	1521	1500	1118	1200	74.1	210.3	NC - II - IW
C	1622	1600	1194	1600	70.4	201.7	NC - II - IW
C	1673	1650	1230	1800	77.2	199.6	NC - II - IW
C[1]	1723	1700	1268	1200	83.4	204.0	NC - II - IW
C[1]	1876	1851	1380	1600	86.4	199.0	NC - II - NC
C[1]	2040	2012	1500	1600	93.7	208.8	NC - II - IW
C[1]	2400	2365	1765	1800	116.5	214.5	NC - II - IW
C[1]	2400	2365	1765	1800	119.2	214.5	NC - I - NC
D[1]	2577[2]	2541	1895	1800	128.4	215.2	NC - I - NC
D[1]	2587	2551	1902	1800	124.4	207.7	NC - II - IW

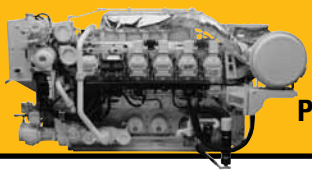
[1]High Displacement engine (HD) [2]B Series uprate

	LE	H	WE
min.	102.0 in/2590 mm	75.0 in/1904 mm	80.2 in/2037 mm
max.	105.1 in/2669 mm	88.3 in/2242 mm	87.9 in/2232 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.69 x 7.48 in	170 x 190 mm
Bore x Stroke[1]	6.69 x 8.46 in	170 x 215 mm
Displacement	3161 cu in	51.8 liter
Displacement[1]	3574 cu in	58.6 liter
Rotation (from flywheel end)	Counterclockwise or Clockwise	
Engine dry weight (approx)	14,400-16,340 lb	6532-7411 kg

Electronic Control System



3512C

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
EPA Tier 3 Ratings							
A	1359	1340	1000	1600	67.0	212.8	T3C - II - NC
A	1522	1501	1120	1600	74.6	211.5	T3C - II - NC
A	1522	1501	1120	1800	75.4	213.7	T3C - II - NC
A	1835	1810	1350	1600	88.7	208.6	T3C - II - NC
B	1597	1575	1175	1600	77.9	210.6	T3C - II - NC
B	1597	1575	1175	1800	79.0	213.6	T3C - II - NC
B	1937	1910	1425	1600	93.5	208.5	T3C - II - NC
B	2280	2249	1678	1800	114.8	217.3	T3C - II - NC
C	1672	1649	1230	1600	81.3	209.8	T3C - II - NC
C	1672	1649	1230	1800	83.0	214.3	T3C - II - NC
C	2039	2011	1500	1600	98.6	208.8	T3C - II - NC
C	2399	2366	1765	1800	120.8	217.4	T3C - II - NC

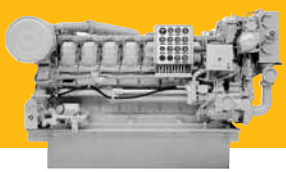
	LE	H	WE
min.	104.2 in/2645 mm	87.5 in/2222.6 mm	80.2 in/2037 mm
max.	104.2 in/2645 mm	87.5 in/2222.6 mm	80.2 in/2037 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.69 x 8.46 in	170 x 215 mm
Displacement	3574 cu in	58.6 liter
Rotation (from flywheel end)	Counterclockwise or Clockwise	
Engine dry weight (approx)	16,508 lb	7488 kg

3516

PROPULSION ENGINE



Mechanical
Control
System

RATINGS AND FUEL CONSUMPTION

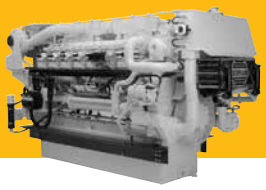
	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	1622	1603	1195	1200	76.1	201.2	NC - NC - NC
A	1734	1710	1275	1600	85.9	214.0	NC - NC - NC
A	1734	1710	1275	1800	86.5	215.5	NC - NC - NC
B	1698	1676	1250	1200	79.5	202.0	NC - NC - NC
B	1835	1810	1350	1600	91.0	214.1	NC - NC - NC
B	1947	1920	1432	1800	96.5	214.1	NC - NC - NC
C	1774	1750	1305	1200	83.3	202.8	NC - NC - NC
C	2028	2000	1491	1800	103.2	219.8	NC - NC - NC
D	2231	2200	1640	1800	113.8	220.3	NC - NC - NC

	LE	H	WE
min.	145.3 in/3690 mm	80.8 in/2053 mm	67.1 in/1703 mm
max.	145.3 in/3690 mm	80.8 in/2053 mm	67.1 in/1703 mm

Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Displacement	4210 cu in	69 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	17,699 lb	8028 kg

Electronic Control System



3516B

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	1673	1650	1230	1200	77.1	198.9	NC - I - NC
A[1]	1901	1875	1398	1200	87.9	199.8	NC - I - NC
A	2028	2000	1491	1600	95.0	200.1	NC - I - NC
A	2028	2000	1491	1800	94.0	200.1	NC - I - NC
A[2]	2028	2000	1491	1800	103.9	202.2	NC - I - NC
A[1]	2292	2260	1685	1600	102.6	193.2	NC - I - NC
A[1]	2481	2447	1825	1600	112.8	195.5	NC - I - NC
B	1775	1750	1305	1200	81.7	198.8	NC - I - NC
B	2129	2100	1566	1600	99.5	201.7	NC - I - NC
B	2129	2100	1566	1800	98.6	200.0	NC - I - NC
B[1]	2408	2375	1771	1600	106.9	191.6	NC - I - NC
B[1]	2611	2575	1920	1600	112.8	195.2	NC - I - NC
C	1876	1850	1379	1200	86.6	207.0	NC - I - NC
C	2231	2200	1640	1600	104.4	202.1	NC - I - NC
C	2231	2200	1640	1800	103.4	200.4	NC - I - NC
C[1]	2535	2500	1864	1600	111.9	190.5	NC - I - NC
C[1]	2718	2682	2000	1600	122.8	194.9	NC - I - NC
Ahp	2718	2682	2000	1925	128.9	204.7	NC - I - NC
Bhp	2434	2400	1790	1785	110.4	196.4	NC - I - NC
Chp	2636	2600	1939	1835	120.2	196.8	NC - I - NC
Dhp	2839	2800	2088	1880	132.7	201.8	NC - I - NC
Ehp	3042	3000	2237	1925	143.3	203.4	NC - I - NC

[1]High displacement engine (HD) [2]Wide operating speed range

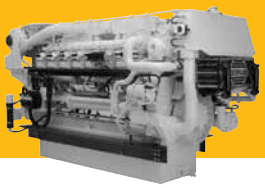
	LE	H	WE
min.	131.9 in/3349 mm	69.0 in/1753 mm	67.0 in/1703 mm
max.	146.7 in/3725 mm	82.3 in/2091 mm	80.8 in/2053 mm
HD	141.1 in/3584 mm	81.9 in/2082 mm	84.4 in/2144 mm

Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Bore x Stroke[2]	6.7 x 8.5 in	170 x 215 mm
Displacement	4210 cu in	69 liter
Displacement[2]	4766 cu in	78 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	17,185-17,699 lb	7795-8028 kg

3516C

PROPULSION ENGINE



Electronic Control System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	1673	1650	1230	1200	78.9	206.2	NC - II - IW
A	2028	2000	1492	1600	96.3	202.8	NC - II - IW
A[1]	2292	2260	1686	1600	107.5	202.4	NC - II - IW
A[1]	2482	2448	1825	1600	113.2	206.9	NC - II - IW
B	1775	1750	1305	1200	84.2	206.2	NC - II - IW
B	2130	2100	1566	1600	100.4	201.8	NC - II - IW
B[1]	2407	2375	1771	1600	112	200.8	NC - II - IW
B[1]	2611	2575	1920	1600	118.6	206.7	NC - II - IW
B[1]	3046	3004	2240	1800	148.3	210.3	NC - II - IW
C	1876	1850	1379	1200	90.0	207.0	NC - II - IW
C	2231	2200	1641	1600	104.5	201.9	NC - II - IW
C[1]	2534	2500	1864	1600	117.0	199.3	NC - II - NC
C[1]	2720	2682	2000	1600	123.4	198.5	NC - II - IW
C[1]	3196	3151	2350	1800	148.6	209.2	NC - I - NC
C[1]	3196	3151	2350	1800	154.7	200.9	NC - II - IW
D[1]	2855	2816	2100	1600	114.9	199.0	NC - II - IW
D[1]	3434	3386	2525	1800	159.8	201.0	NC - I - NC
D[1]	3434	3386	2525	1800	165.0	207.6	NC - II - IW

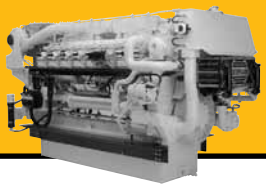
[1]High Displacement engine (HD)

	LE	H	WE
min.	143.1 in/3637 mm	77.4 in/1967 mm	80.2 in/2037 mm
max.	148.0 in/3761 mm	84.6 in/2150 mm	84.3 in/2142 mm

Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.69 x 7.48 in	170 x 190 mm
Bore x Stroke[1]	6.69 x 8.46 in	170 x 215 mm
Displacement	4211 cu in	69 liter
Displacement[1]	4765 cu in	78 liter
Rotation (from flywheel end)	Counterclockwise or Clockwise	
Engine dry weight (approx)	17,550-19,025 lb	7961-8629 kg

Electronic
Control
System



3516C

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA* - IMO - EU
EPA Tier 3 Ratings							
A	2161	2131	1590	1600	103.6	207.0	T3C - II - NC
A	2480	2446	1825	1600	118.9	206.9	T3C - II - NC
B	2270	2239	1670	1600	108.9	207.0	T3C - II - NC
B	2610	2574	1920	1600	125.0	206.7	T3C - II - NC
B	3045	3003	2240	1800	147.6	209.2	T3C - II - NC
C	2379	2346	1750	1600	114.1	207.0	T3C - II - NC
C	2712	2675	1995	1600	129.8	206.6	T3C - II - NC
C	3194	3150	2350	1800	115.4	209.9	T3C - II - NC
D	3432	3385	2525	1800	167.4	210.9	T3C - II - NC

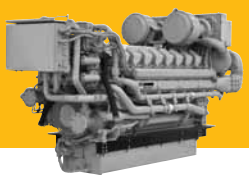
	LE	H	WE
min.	125.7 in/3192 mm	87.6 in/2225 mm	89.9 in/2284 mm
max.	125.7 in/3192 mm	87.6 in/2225 mm	89.9 in/2284 mm

Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.69 x 8.46 in	170 x 215 mm
Displacement	4765 cu in	78 liter
Rotation (from flywheel end)	Counterclockwise or Clockwise	
Engine dry weight (approx)	21,164 lb	9600 kg

C175-16

PROPULSION ENGINE



Electronic Control System

RATINGS AND FUEL CONSUMPTION

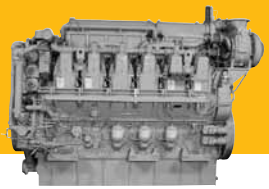
	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
A	2721	2683	2001	1600	129.9	206.2	T3C - II - IW
A	2832	2792	2082	1600	140.6	214.5	T3C - II - IW
B	2948	2907	2168	1600	146.1	214.1	T3C - II - IW

	LE	H	WE
min.	177.8 in/4515mm	97.6 in/2478 mm	72.6 in/1845 mm
max.	177.8 in/4515 mm	97.6 in/2478 mm	72.6 in/1845 mm

Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	6.88 x 8.66	175 x 220 mm
Displacement	5166.88 cu in	84.67 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	28,750 lb	13 041 kg

Electronic Control System



C280-6

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
CS	2352	2320	1730	900	106	194.7	T2C - II - NC
CS	2515	2481	1850	1000	118	202.7	T2C - II - NC
MC	2583	2548	1900	900	116	194.0	T2C - II - NC
MC	2760	2722	2030	1000	128	200.4	T2C - II - NC

C280-6 propulsion ratings listed above are also available in Tier 1 configurations.

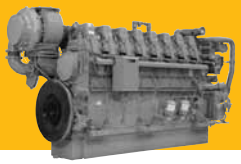
	LE	H	WE
min.	158 in/4013 mm	108 in/2743 mm	71 in/1803 mm
max.	158 in/4013 mm	108 in/2743 mm	71 in/1803 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	11.0 x 11.8 in	280 x 300 mm
Displacement	6773 cu in	111 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	34,496 lb	15 680 kg

C280-8

PROPULSION ENGINE



Electronic Control System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
CS	3127	3084	2300	900	136	187.9	T2C - II - NC
CS	3345	3299	2460	1000	153	197.7	T2C - II - NC
MC	3440	3393	2530	900	150	188.4	T2C - II - NC
MC	3684	3634	2710	1000	168	197.0	T2C - II - NC

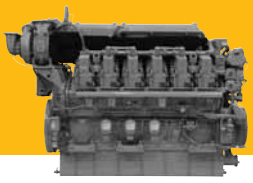
C280-8 propulsion ratings listed above are also available in Tier 1 configurations.

	LE	H	WE
min.	195 in/4953 mm	104 in/2642 mm	71 in/1803 mm
max.	195 in/4953 mm	104 in/2642 mm	71 in/1803 mm

In-line 8, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	11.0 x 11.8 in	280 x 300 mm
Displacement	9031 cu in	148 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	41,800 lb	19 000 kg

Electronic Control System



C280-12

PROPULSION ENGINE

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
CS	4704	4640	3460	900	211	193.8	T2C - II - NC
CS	5031	4962	3700	1000	236	202.7	T2C - II - NC
MC	5167	5096	3800	900	232	194.0	T2C - II - NC
MC	5520	5444	4060	1000	255	199.6	T2C - II - NC

C280-12 propulsion ratings listed above are also available in Tier 1 configurations.

	LE	H	WE
min.	182 in/4623 mm	134 in/3404 mm	80 in/2032 mm
max.	182 in/4623 mm	134 in/3404 mm	80 in/2032 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	11.0 x 11.8 in	280 x 300 mm
Displacement	13,546 cu in	222 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	57,276 lb	25 980 kg

C280-16

PROPULSION ENGINE

Electronic Control System

RATINGS AND FUEL CONSUMPTION

	mhp	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
CS	6255	6169	4600	900	272	187.9	T2C - II - NC
CS	6690	6598	4920	1000	305	197.0	T2C - II - NC
MC	6879	6785	5060	900	300	188.4	T2C - II - NC
MC	7369	7268	5420	1000	336	197.0	T2C - II - NC
FCVR	7682	7577	5650	1000	365	205.3	T2C - II - NC

Arrangements are available with front mounted turbochargers or rear mounted turbochargers.

C280-16 propulsion ratings listed above are also available in Tier 1 configurations.

	LE	H	WE
min.	224 in/5690 mm	134 in/3403 mm	80 in/2032 mm
max.	224 in/5690 mm	134 in/3403 mm	80 in/2032 mm

Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	11.0 x 11.8 in	280 x 300 mm
Displacement	18,062 cu in	296 liter
Rotation (from flywheel end)	Counterclockwise or clockwise	
Engine dry weight (approx)	62,832 lb	28 500 kg

DEP

DIESEL ELECTRIC PROPULSION – 50 HZ

RATINGS AND FUEL CONSUMPTION

	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
C9	253	189	1500	10.9	183.3	T2C - II - NC
C9	288	215	1500	14.2	209.9	T2C - II - NC
C18 ACERT	404	301	1500	19.9	210.1	T2C - II - CC2
C18 ACERT	514	383	1500	25.2	209.1	T2C - II - CC2
C18 ACERT	587	438	1500	28.7	208.2	T2C - II - CC2
C18 ACERT	660	492	1500	32.3	208.6	T2C - II - CC2
C32 ACERT	791	590	1500	37.8	203.6	T2C - II - IW
C32 ACERT	923	688	1500	44.0	203.3	T2C - II - IW
C32 ACERT	1172	874	1500	56.6	205.8	T2C - II - IW
3512B	1686	1257	1500	77.4	195.7	NC - II - NC
3516B	2303	1717	1500	108.9	201.6	NC - II - NC
C280-6	2481	1850	1000	118.9	204.3	T2C - II - NC
C280-6	2722	2030	1000	131.7	206.2	T2C - II - NC
C280-8	3299	2460	1000	153.2	197.9	T2C - II - NC
C280-8	3634	2710	1000	170.3	199.7	T2C - II - NC
C280-12	4962	3700	1000	237.7	204.2	T2C - II - NC
C280-12	5445	4060	1000	263.4	206.2	T2C - II - NC
C280-16	6598	4920	1000	306.4	197.9	T2C - II - NC
C280-16	7268	5420	1000	340.6	199.7	T2C - II - NC

DEP

DIESEL ELECTRIC PROPULSION – 60 HZ

RATINGS AND FUEL CONSUMPTION

	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
C9	253	189	1800	13.7	230.4	T2C - II - CC2
C9	311	232	1800	16.9	231.5	T2C - II - CC2
C9	361	269	1800	17.9	211.5	T2C - II - CC2
C18 ACERT	499	372	1800	25.4	217.0	T2C - II - CC2
C18 ACERT	624	465	1800	31.5	215.3	T2C - II - CC2
C32 ACERT	916	683	1800	44.4	206.6	T2C - II - IW
C32 ACERT	1047	781	1800	50.8	206.7	T2C - II - IW
C32 ACERT	1333	994	1800	64.5	206.2	T2C - II - IW
3512C	1920	1432	1800	91.9	204.0	NC - II - IW
3512C	2183	1628	1800	110.2	215.1	NC - II - IW
3512C	2442	1821	1800	119.2	208.0	T3C - II - IW
3516C	2576	1921	1800	127.4	210.8	T3C - II - NC
3516C	2809	2095	1800	132.0	200.2	T2C - II - IW
3516C	2962	2211	1800	145.5	209.1	T3C - II - NC
3516C	2984	2225	1800	140.6	200.1	NC - II - IW
3516C	3176	2368	1800	154.4	207.2	T3C - II - NC
3516C	3151	2350	1800	148.9	201.4	T2C - II - IW
C280-6	2320	1730	900	107.4	197.3	T2C - II - NC
C280-6	2548	1900	900	118.6	198.4	T2C - II - NC
C280-8	3084	2300	900	143.7	198.6	T2C - II - NC
C280-8	3393	2530	900	159.4	200.2	T2C - II - NC
C280-12	4640	3460	900	214.9	197.4	T2C - II - NC
C280-12	5096	3800	900	237.2	198.4	T2C - II - NC
C280-16	6169	4600	900	287.4	198.6	T2C - II - NC
C280-16	6786	5060	900	318.7	200.1	T2C - II - NC

Cat Marine Generator Sets and Auxiliary Engines

Caterpillar has offered packaged power systems for over 70 years. We assure power and performance ratings, as advertised, through extensive factory testing.

Cat Generator Sets typically exceed NEMA and IEEE standards for load acceptance. All rotor designs have been type tested at 150% overspeed for two hours at 338° F (170° C) ambient temperature.

Rating Definition

All Caterpillar Marine Auxiliary engines and generator sets are rated for prime power for continuous electric service according to ISO 8528-1.

Hours per Year	Unlimited
Load Factor	≤ 70%
Overload Capacity	+ 10% maximum of 1 hour in 12 maximum of 25 hours per year

Rating Conditions

Ratings are based on SAE J3046 and J1349 standard conditions of 29.61 in. Hg (100 kPa) and 77° F (25° C). These ratings also apply at ISO8665, ISO3046-1:2002E, DIN6271-3, and BS5514 standard conditions of 29.61 in. Hg (100 kPa), 81° F (27° C), and 60% relative humidity.

Fuel rates are based on fuel oil of 35° API [60° F (16° C)] gravity having an LHV of 18,390 Btu/lb (42 780 kJ/kg) when used at 85° F (29° C) and weighing 7.001 lbs/U.S. gal. (838.9 g/liter).

Marine Auxiliary Engines are mainly used as generator set engines; however, they can be used for electrically driven pumps, winches, conveyors, thrusters, when it is specified. Engines can be radiator cooled or heat exchanger/keel cooled.

60 Hz Marine Generator Set Ratings

ekW @1.0pf Single Phase Generator	kVA	Model
13.5	13.5	C1.5
21.5-29.5	21.5-29.5	C2.2

ekW @.8pf	kVA	Model
14.5	18.0	C1.5
21.0-30.0	26.5-37.5	C2.2
42-99	55-123	C4.4
113-170	141-212	C6.6 ACERT
163-250	204-313	C9
340-550	425-688	C18 ACERT
715-910	894-1138	C32 ACERT
600-910	750-1138	3508B
1030-1360	1287-1700	3512B
1550-1700	1937-2125	3512C
1285-1825	1606-2281	3516B
1650-1820	2063-2275	C280-6
2200-2420	2750-3025	C280-8
3300-3640	4125-4550	C280-12
4400-4840	5500-6050	C280-16

Power factor (pf) is the ratio between Real Power and Apparent Power. It is also the ratio between the resistive part of impedance and total impedance. Power factor can be read directly with a power factor meter. It can also be calculated from voltage, current, and power meter readings.

$$\text{Power Factor} = \frac{\text{Real Power}}{\text{Apparent Power}} = \frac{\text{Watts}}{1 \times V} = \frac{1920\ w}{5a \times 480\ v} = .8$$

50 Hz Marine Generator Set Ratings

ekW @1.0pf Single Phase Generator	kVA	Model
11.0	11.0	C1.5
18.0-24.5	18.0-24.5	C2.2

ekW @.8pf	kVA	Model
12.0	15.0	C1.5
17.5-24.5	22.0-30.5	C2.2
36-86	45-107	C4.4
93-143	116-178	C6.6 ACERT
142-200	178-250	C9
275-450	344-563	C18 ACERT
540-800	675-1000	C32 ACERT
590-800	738-1000	3508B
880-1200	1000-1500	3512B
1180-1600	1475-2000	3516B
1760-1940	2200-2425	C280-6
2350-2600	2938-3250	C280-8
3520-3880	4400-4850	C280-12
4700-5200	5875-6500	C280-16

Power factor (pf) is the ratio between Real Power and Apparent Power. It is also the ratio between the resistive part of impedance and total impedance. Power factor can be read directly with a power factor meter. It can also be calculated from voltage, current, and power meter readings.

$$\text{Power Factor} = \frac{\text{Real Power}}{\text{Apparent Power}} = \frac{\text{Watts}}{1 \times V} = \frac{1920\ w}{5a \times 480\ v} = .8$$

C1.5
GENERATOR SET

Mechanical
Control
System

RATINGS AND FUEL CONSUMPTION

Generator Set

	ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
Maximum Continuous Rating						
60 Hertz	14.5	18.0	1800	1.3	260.5	T3C - NST - IW
50 Hertz	12.0	15.0	1500	1.1	266.3	T3C - NST - IW
Continuous Rating						
60 Hertz	13.0	16.5	1800	1.2	268.2	T3C - NST - IW
50 Hertz	11.0	13.5	1500	1.0	264.1	T3C - NST - IW

Generator Set – Single Phase

	ekW @ 1.0pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
Maximum Continuous Rating						
60 Hertz	13.5	13.5	1800	1.3	279.8	T3C - NST - IW
50 Hertz	11.0	11.0	1500	1.1	290.5	T3C - NST - IW
Continuous Rating						
60 Hertz	12.0	12.0	1800	1.2	290.5	T3C - NST - IW
50 Hertz	10.0	10.0	1500	1.0	290.5	T3C - NST - IW

Maximum Continuous Power: Power available at variable load with the average not exceeding 50%. No overload is permitted.

Continuous Power: Overload of 10% is permitted for one hour in twelve hours operational. The remaining operational time should be at varying loads with the average not exceeding 80% of continuous power in one day.

	L	H	WE
Single Phase			
Open Set	37.4 in/962 mm	27.5 in/699 mm	21 in/533 mm
Enclosed Set	40 in/1021 mm	28 in/710 mm	24 in/608 mm
3 Phase			
Open Set	41.9 in/1065 mm	28.7 in/733 mm	19.8 in/504 mm
Enclosed Set	46 in/1170 mm	30.8 in/783 mm	24 in/608 mm

In-line 3, 4-Stroke-Cycle Diesel

Aspiration	NA	
Bore x Stroke	3.31 x 3.5 in	84 x 90 mm
Displacement	91 cu in	1.5 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	703/908 lb	319/412 kg

Mechanical
Control
System

C2.2
GENERATOR SET

RATINGS AND FUEL CONSUMPTION

Generator Set						
	ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
Maximum Continuous Rating						
60 Hertz	21.0	26.5	1800	1.98	273.9	T3C - NST - IW
50 Hertz	17.5	22.0	1500	1.66	275.6	T3C - NST - IW
60 Hertz	30.0	37.5	1800	2.48	240.2	T3C - NST - IW
50 Hertz	24.5	30.5	1500	2.09	247.8	T3C - NST - IW
Continuous Rating						
60 Hertz	19.5	24.0	1800	1.63	242.9	T3C - NST - IW
50 Hertz	16.0	20.0	1500	1.37	248.8	T3C - NST - IW
60 Hertz	27.0	34.0	1800	2.24	241.0	T3C - NST - IW
50 Hertz	22.5	28.0	1500	1.88	242.8	T3C - NST - IW

Generator Set – Single Phase						
	ekW @ 1.0pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
Maximum Continuous Rating						
60 Hertz	21.5	21.5	1800	1.98	267.6	T3C - NST - IW
50 Hertz	18.0	18.0	1500	1.66	267.9	T3C - NST - IW
60 Hertz	29.5	29.5	1800	2.48	244.3	T3C - NST - IW
50 Hertz	24.5	24.5	1500	2.09	247.8	T3C - NST - IW
Continuous Rating						
60 Hertz	19.0	19.0	1800	1.63	249.3	T3C - NST - IW
50 Hertz	16.0	16.0	1500	1.37	248.8	T3C - NST - IW
60 Hertz	27.0	27.0	1800	2.24	241.0	T3C - NST - IW
50 Hertz	22.5	22.5	1500	1.88	242.8	T3C - NST - IW

Maximum Continuous Power: Power available at variable load with the average not exceeding 50%. No overload is permitted.

Continuous Power: Overload of 10% is permitted for one hour in twelve hours operational. The remaining operational time should be at varying loads with the average not exceeding 80% of continuous power in one day.

	L	H	WE
Open Set	45 in/1147 mm	32 in/825 mm	20.5 in/521 mm
Enclosed Set	46 in/1170 mm	31 in/775 mm	24 in/608 mm

In-line 4, 4-Stroke-Cycle Diesel

Aspiration	NA, T	
Bore x Stroke	3.31 x 3.94 in	84 x 100 mm
Displacement	135 cu in	2.2 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	857/1027 lb	389/466 kg

C4.4
GENERATOR SET

Mechanical
Control
System

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA-IMO - EU
60 Hertz	42.0R[1]	53.0	1800	3.4	235.2	T2C-NST- NC
60 Hertz	44.0[1]	55.0	1800	3.4	224.5	T2C-NST- NC
60 Hertz	56.0R[1]	70.0	1800	4.5	233.5	T2C-NST- NC
60 Hertz	58.5[1]	73.0	1800	4.2	208.6	T2C-NST- NC
60 Hertz	72.0R[1]	90.0	1800	5.8	234.0	T2C-NST- NC
60 Hertz	76.0[1]	95.0	1800	5.8	221.7	T2C-NST- NC
60 Hertz	95.0R[1]	119.0	1800	7.3	223.3	T2C-NST- NC
60 Hertz	99.0[1]	123.0	1800	7.3	214.2	T2C-NST- NC
50 Hertz	36.0R[1]	45.0	1500	2.9	234.0	NC-NST-CCNR2
50 Hertz	38.0[1]	47.5	1500	2.9	221.7	NC-NST-CCNR2
50 Hertz	49.0R[1]	61.0	1500	3.9	231.2	NC-NST-CCNR2
50 Hertz	51.5[1]	64.5	1500	3.9	220.0	NC-NST-CCNR2
50 Hertz	65.0R[1]	81.0	1500	4.9	219.0	NC-NST-CCNR2
50 Hertz	69.0[1]	86.0	1500	4.9	206.3	NC-NST-CCNR2
50 Hertz	82.0R[1]*	103.0	1500	6.5	230.3	NC-NST- NC
50 Hertz	86.0[1]*	107.0	1500	6.5	219.6	NC-NST- NC

R – Radiator cooled only.

[1]ABS, BV, DnV, GL, LR, RINA, CCS approved generator set packages available.

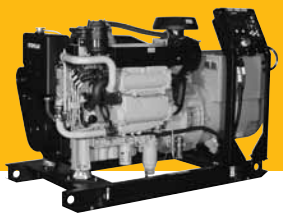
*Contact local dealer for availability.

	L	H	WE
Open Min.	55.5 in/1409 mm	51.9 in/1318 mm	28.5 in/724 mm
Open Max.	62.6 in/1590 mm	55.3 in/1405 mm	28.5 in/724 mm
Enclosed	68.9 in/1750 mm	39.4 in/1000 mm	47.8 in/1215 mm

In-line 4, 4-Stroke-Cycle Diesel

Aspiration	NA, T, TA	
Bore x Stroke	4.13 x 5.0 in	105 x 127 mm
Displacement	269 cu in	4.4 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	1775-2238 lb	805-1015 kg

Electronic Control System



C6.6 ACERT GENERATOR SET

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	113R	141	1800	8.7	223.7	T2C - II - IW
60 Hertz	125	156	1800	8.74	203.1	T2C - II - IW
60 Hertz	138R	173	1800	11.0	231.6	T2C - II - IW
60 Hertz	150	187	1800	11.0	213.1	T2C - II - IW
60 Hertz	158R	198	1800	12.0	220.7	T2C - II - IW
60 Hertz	170	212	1800	12.0	205.1	T2C - II - IW
50 Hertz	93R	116	1500	7.1	221.8	T2C - II - IW
50 Hertz	100	125	1500	7.1	206.3	T2C - II - IW
50 Hertz	118R	148	1500	9.1	224.1	T2C - II - IW
50 Hertz	125	156	1500	9.1	211.5	T2C - II - IW
50 Hertz	136R	170	1500	10.7	228.6	T2C - II - IW
50 Hertz	143	178	1500	10.7	217.4	T2C - II - IW

R – Radiator cooled only.

MCS approved packages available.

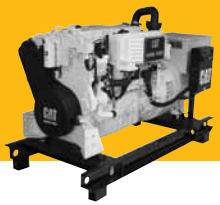
	LG	H	WE
min.	75.0-1905.0 mm	37.8 in/961 mm	51.8 in/1315 mm
max.	104.7 in/2660 mm	37.8 in/961 mm	55.7 in/1416 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	4.13 x 5.0 in	105 x 127 mm
Displacement	402.7 cu in	6.6 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	2972-3675 lb	1348-1667 kg

C9

GENERATOR SET



Electronic Control System

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	163R	204	1800	13.6	228.8	T2C - II - CC2
60 Hertz	175	219	1800	13.7	228.8	T2C - II - CC2
60 Hertz	203R	254	1800	16.8	229.5	T2C - II - CC2
60 Hertz	215	269	1800	16.9	229.5	T2C - II - CC2
60 Hertz	238R	298	1800	17.9	211.7	T2C - II - CC2
60 Hertz	250	313	1800	17.9	213.9	T2C - II - CC2
50 Hertz	142R	178	1500	10.8	212.2	T2C - II - NC
50 Hertz	150	188	1500	10.9	212.1	T2C - II - NC
50 Hertz	167R	208	1500	12.4	209.0	T2C - II - NC
50 Hertz	175	219	1500	12.9	209.0	T2C - II - NC
50 Hertz	192R	240	1500	14.2	206.6	T2C - II - NC
50 Hertz	200	250	1500	14.2	206.6	T2C - II - NC

R – Radiator cooled only.

	LG	H	WE
min.	82.9 in/2106 mm	46.0 in/1169 mm	39.2 in/996.8 mm
max.	87.2 in/2216 mm	46.0 in/1169 mm	39.2 in/996.8 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	4.41 x 5.87 in	112 x 149 mm
Displacement	538 cu in	8.8 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	3865-4195 lb	1753-1903 kg

Electronic Control System

HEAT EXCHANGER/KEEL COOLED

C18 ACERT GENERATOR SET

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	340	425	1800	25.4	217.0	T2C - II - CC2
60 Hertz	425	531	1800	31.5	215.2	T2C - II - CC2
60 Hertz	500[1]	625	1800	35.2	205.1	T2C - II - CC2
60 Hertz	550[1]	688	1800	38.3	203.7	T2C - II - CC2
50 Hertz	275	344	1500	19.9	209.5	T2C - II - CC2
50 Hertz	350	438	1500	25.2	209.0	T2C - II - CC2
50 Hertz	400	500	1500	28.7	208.0	T2C - II - CC2
50 Hertz	450	563	1500	32.3	208.8	T2C - II - CC2

[1]Keel cooling not available.

Heat Exchanger (32°C), Keel Cooled (52°C)

Preliminary EPA Tier 3 Ratings

60 Hertz	425*	531	1800	32.8	224.0	T3C - II - CC2
60 Hertz	550*	688	1800	40.2	213.4	T3C - II - CC2

*DEP cycle not compliant for EPA Tier 3

	LG	H	W
min.	119.7 in/3040 mm	61.3 in/1557.5 mm	45.3 in/1150.9 mm
max.	121.1 in/3075.5 mm	61.3 in/1557.5 mm	51.2 in/1300.9 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA, TTA	
Bore x Stroke	5.7 x 7.2 in	145 x 183 mm
Displacement	1106 cu in	18.1 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	9280-10,275 lb	4209-4661 kg

C32 HEAT EXCHANGER/KEEL COOLED ACERT GENERATOR SET

Electronic Control System

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	715	894	1800	51.8	210.4	T2C - II - IW
60 Hertz	910	1138	1800	64.9	207.2	T2C - II - IW
50 Hertz	540	675	1500	37.9	203.7	T2C - II - IW
50 Hertz	800	1000	1500	57.0	207.0	T2C - II - IW

Heat Exchanger (32°C), Keel Cooled (52°C)

Preliminary EPA Tier 3 Ratings

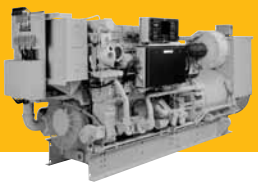
60 Hertz	730	894	1800	53.0	200.6	T3C - II - IW
60 Hertz	940	1138	1800	67.3	254.8	T3C - II - IW

	LG	H	W
min.	168.34 in/4275.9 mm	86.83 in/2205.7 mm	65.79 in/1671.1 mm
max.	169.7 in/4309.3 mm	86.83 in/2205.7 mm	65.79 in/1671.1 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	5.7 x 6.4 in	145 x 162 mm
Displacement	1959 cu in	32.1 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	15,721 lb	7131 kg

Electronic
Control
System



3508B
GENERATOR SET

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	600	750	1200	42.6	213.2	NC - I - NC
60 Hertz	715	894	1800	49.3	208.7	NC - I - NC
60 Hertz	910*[1]	1138	1800	66.9	204.4	NC - I - NC
50 Hertz	590	738	1000	41.9	206.4	NC - I - NC
50 Hertz	630	788	1500	44.2	202.0	NC - I - NC
50 Hertz	800[1]	1000	1500	57.4	195.8	NC - I - NC

*Only certified for D2 standard generator set operation.

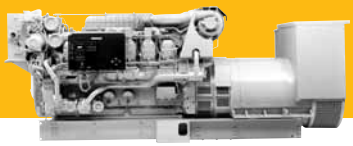
[1]ABS, BV, DnV, GL, LR approved generator set packages available.

	LE	LG	H	WE
min.	82.7 in/2101 mm	145.8 in/3704 mm	71.1 in/1806 mm	67.1 in/1703 mm
max.	82.7 in/2101 mm	167.5 in/4256 mm	71.9 in/1826 mm	67.1 in/1703 mm

Vee 8, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Displacement	2105 cu in	34.5 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	16,940-19,640 lb	7684-8909 kg

3512B
GENERATOR SET



Electronic Control System

RATINGS AND FUEL CONSUMPTION

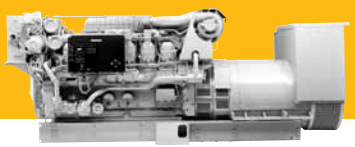
	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	1030	1287	1200	69.2	205.2	NC - I -NC
60 Hertz	1070	1338	1800	73.4	208.3	NC - I -NC
60 Hertz	1360	1700	1800	90.9	202.5	NC - I -NC
50 Hertz	880	1000	1000	60.3	208.0	NC - I -NC
50 Hertz	965	1212	1500	64.2	200.7	NC - I -NC
50 Hertz	1200	1500	1500	77.6	195.6	NC - II -NC

	LE	LG	H	WE
min.	104.0 in/2641 mm	178.6 in/4536 mm	80.8 in/2053 mm	67.1 in/1703 mm
max.	104.0 in/2641 mm	189.1 in/4804 mm	81.6 in/2072 mm	84.4 in/2144 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Displacement	3158 cu in	51.8 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	22,120-24,661 lb	10 034-11 186 kg

Electronic
Control
System



3512C
GENERATOR SET

RATINGS AND FUEL CONSUMPTION

	Generator Set					
	ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz[1]	1550	1937	1800	102.2	199.0	NC - II - NC
60 Hertz[1]	1700	2125	1800	113.0	200.3	NC - II - NC

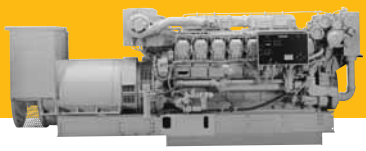
[1]High Displacement engine (HD)

	LG	H	W
min.	200.2 in/5085.3 mm	83.9 in/2131.1 mm	84.3 in/2142.1 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 x 8.46 in	170 x 215 mm
Displacement	3574 cu in	58.56 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	28,136 lb	12,762 kg

3516B
GENERATOR SET



Electronic Control System

RATINGS AND FUEL CONSUMPTION

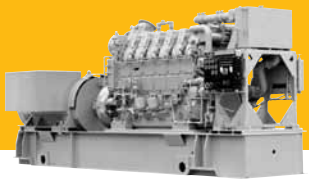
	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	1285	1606	1200	80.5	208.6	NC - I - NC
60 Hertz	1825	2281	1800	125.3	198.8	NC - I - NC
50 Hertz	1180	1475	1000	80.6	203.1	NC - I - NC
50 Hertz	1460	1825	1500	102.2	203.4	NC - I - NC
50 Hertz	1600	2000	1500	111.9	208.4	NC - II - NC

	LE	LG	H	WE
min.	125.2 in/3181 mm	199.8 in/5076 mm	80.8 in/2053 mm	67.1 in/1703 mm
max.	125.2 in/3181 mm	220.9 in/5611 mm	82.7 in/2100 mm	84.4 in/2144 mm

Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TTA	
Bore x Stroke	6.7 X 7.5 in	170 x 190 mm
Displacement	4210 cu in	69.0 liter
Rotation (from flywheel end)	Counterclockwise	
Generator set weight (approx)	25,030-29,845 lb	11 354-13 538 kg

Electronic
Control
System



C280-6
GENERATOR SET

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	1650	2063	900	106.4	195.5	T2C - II - NC
60 Hertz	1820	2275	900	116.9	195.5	T2C - II - NC
50 Hertz	1760	2200	1000	116.4	200.0	T2C - II - NC
50 Hertz	1940	2425	1000	127.7	200.0	T2C - II - NC

C280-6 ratings listed above are also available in Tier 1 configurations.

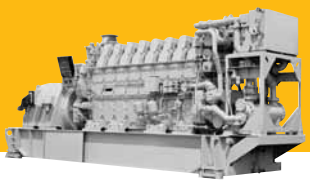
	LE	LG	H	WE
min.	145 in/3691 mm	280.3 in/7120 mm	154.9 in/3934 mm	77.2 in/1961 mm
max.	145 in/3691 mm	280.3 in/7120 mm	154.9 in/3934 mm	77.2 in/1961 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	11.0 x 11.8 in	280 x 300 mm
Displacement	6773 cu in	111 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	34,500 lb	15 680 kg
Generator weight (approx)	18,000 lb	8165 kg

C280-8

GENERATOR SET



Electronic Control System

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	2200	2750	900	136.5	188.6	T2C - II - NC
60 Hertz	2420	3025	900	150.1	188.5	T2C - II - NC
50 Hertz	2350	2938	1000	148.2	191.5	T2C - II - NC
50 Hertz	2600	3250	1000	161.4	189.3	T2C - II - NC

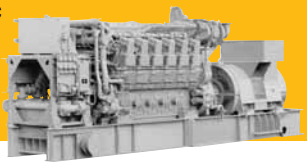
C280-8 ratings listed above are also available in Tier 1 configurations.

	LE	LG	H	WE
min.	178 in/4511 mm	316.5 in/8040 mm	155.0 in/3937 mm	77.2 in/1961 mm
max.	178 in/4511 mm	316.5 in/8040 mm	155.0 in/3937 mm	77.2 in/1961 mm

In-line 8, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	11.0 x 11.8 in	280 x 300 mm
Displacement	9031 cu in	148 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	41,800 lb	19 000 kg
Generator weight (approx)	25,000 lb	11 340 kg

Electronic Control System



C280-12

GENERATOR SET

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	3300	4125	900	212.7	195.4	T2C - II - NC
60 Hertz	3640	4550	900	233.8	195.5	T2C - II - NC
50 Hertz	3520	4400	1000	232.7	199.9	T2C - II - NC
50 Hertz	3880	4850	1000	255.5	200.0	T2C - II - NC

C280-12 ratings listed above are also available in Tier 1 configurations.

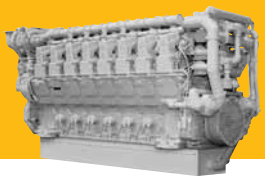
	LE	LG	H	WE
min.	161 in/4087 mm	316.5 in/8040 mm	160.8 in/4085 mm	78.7 in/2000 mm
max.	161 in/4087 mm	316.5 in/8040 mm	160.8 in/4085 mm	78.7 in/2000 mm

Vee 12, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	11.0 x 11.8 in	280 x 300 mm
Displacement	13,546 cu in	222 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	57,276 lb	25 980 kg
Generator weight (approx)	33,000 lb	14 970 kg

C280-16

GENERATOR SET



Electronic Control System

RATINGS AND FUEL CONSUMPTION

	Generator Set ekW @ .8pf	kVA	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
60 Hertz	4400	5500	900	272.9	188.5	T2C - II -NC
60 Hertz	4840	6050	900	300.2	188.6	T2C - II -NC
50 Hertz	4700	5875	1000	296.4	191.5	T2C - II -NC
50 Hertz	5200	6500	1000	322.8	189.3	T2C - II -NC

C280-16 ratings listed above are also available in Tier 1 configurations.

	LE	LG	H	WE
min.	197 in/5007 mm	366.7 in/9314 mm	164.1 in/4167 mm	78.3 in/1990 mm
max.	197 in/5007 mm	366.7 in/9314 mm	164.1 in/4167 mm	78.3 in/1990 mm

Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	11.0 x 11.8 in	280 x 300 mm
Displacement	18,062 cu in	296 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	68,343 lb	31 000 kg
Generator weight (approx)	40,000 lb	18 145 kg

ELECTRONIC CONTROL SYSTEM

HEAT EXCHANGER/ KEEL COOLED **C9**

GENERATOR SET ENGINE

RATINGS AND FUEL CONSUMPTION

	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
C9	253	189	1800	13.7	228.8	T2C - II - CC2
C9	311	232	1800	16.9	229.5	T2C - II - CC2
C9	361	269	1800	17.9	211.7	T2C - II - CC2
C9	217	162	1500	10.9	212.1	T2C - II - NC
C9	253	189	1500	12.9	209.0	T2C - II - NC
C9	288	215	1500	14.2	206.6	T2C - II - NC

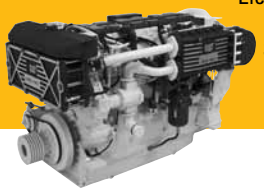
	LE	H	WE
min.	43.9 in/1116.5 mm	43.8 in/1113.7 mm	38.3 in/973.5 mm
max.	43.9 in/1116.5 mm	43.8 in/1113.7 mm	38.3 in/973.5 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	4.41 x 5.87 in	112 x 149 mm
Displacement	538 cu in	8.8 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	2088 lb	947 kg

C18 HEAT EXCHANGER

GENERATOR SET ENGINE /AUXILIARY



Electronic Control System

RATINGS AND FUEL CONSUMPTION

	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
C18	499	372	1800	25.4	217.0	T2C - II - CC2
C18	624	465	1800	31.5	215.2	T2C - II - CC2
C18	733*	547	1800	35.2	205.1	T2C - II - NC
C18	806*	601	1800	38.3	203.7	T2C - II - NC
C18	404	301	1500	19.9	209.5	T2C - II - CC2
C18	514	383	1500	25.2	209.0	T2C - II - CC2
C18	587	438	1500	28.7	208.0	T2C - II - CC2
C18	660	492	1500	32.3	208.8	T2C - II - CC2

*Keel cooling not available.

Preliminary EPA Tier 3 Ratings

C18[1]	803	599	1800	40.2	213.4	T3C - II - IW
C18	624	465	1800	32.8	224.0	T3C - II - IW

[1]DEP cycle not compliant for EPA Tier 3.

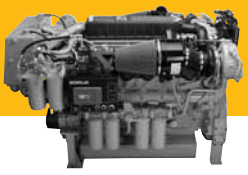
	LE	H	WE
min.	59.23 in/1506 mm	45.08 in/1145 mm	41.2 in/1047 mm
max.	81.03 in/2058 mm	47.2 in/1273 mm	42.9 in/1090 mm

In-line 6, 4-Stroke-Cycle Diesel

Aspiration	TA, TTA	
Bore x Stroke	5.7 x 7.2 in	145 x 183 mm
Displacement	1106 cu in	18.1 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	3900-4200 lb	1769-1905 kg

Electronic Control System

HEAT EXCHANGER/KEEL COOLED



C32

GENERATOR SET ENGINE /AUXILIARY

RATINGS AND FUEL CONSUMPTION

	bhp	bkW	rpm	U.S. g/h	g/bkw-hr	EPA - IMO - EU
C32	791	590	1500	37.8	203.8	T2C - II - IW
C32	923	688	1500	44.0	203.0	T2C - II - IW
C32	1172	874	1500	56.6	207.0	T2C - II - IW
C32	916	683	1800	44.4	210.8	T2C - II - IW
C32	1047	781	1800	50.8	210.4	T2C - II - IW
C32	1333	994	1800	64.5	207.2	T2C - II - IW

Preliminary EPA Tier 3 Ratings

C32	1047	781	1800	NA	NA	T3C - II -IW
C32	1333	994	1800	NA	NA	T3C - II -IW

	LE	H	WE
min.	81.6 in/2072.6 mm	59.9 in/1521.5 mm	56.8-58.9 in/1442.7-1496.1 mm
max.	81.6 in/2072.6 mm	59.9 in/1521.5 mm	56.8-58.9 in/1442.7-1496.1 mm

Vee 12, 4-Stroke-Cycle Diesel

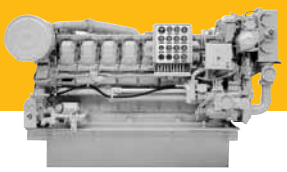
Aspiration	TTA	
Bore x Stroke	5.7 x 6.4 in	145 x 162 mm
Displacement	1959 cu in	32.1 liter
Rotation (from flywheel end)	Counterclockwise	
Engine dry weight (approx)	7100-7300 lb	3221-3311 kg

HEAT EXCHANGER COOLED

Mechanical Control System

3500 Series

AUXILIARY



RATINGS

	bhp	bkW	ekW	rpm	EPA - IMO - EU
3508	804	599	560	1200	NC - NC - NC
3508	1019	760	715	1800	NC - NC - NC
3512	1281	955	910	1200	NC - NC - NC
3512	1509	1125	1070	1800	NC - NC - NC
3516	1650	1230	1170	1200	NC - NC - NC
3516	2026	1511	1440	1800	NC - NC - NC
3508	598	446	415	1000	NC - NC - NC
3508	903	673	630	1500	NC - NC - NC
3512	1153	860	815	1000	NC - NC - NC
3512	1368	1020	965	1500	NC - NC - NC
3516	1475	1100	1040	1000	NC - NC - NC
3516	1817	1355	1285	1500	NC - NC - NC

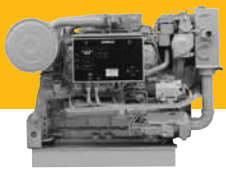
		LE	H	WE
3508	**min.**	92.2 in/2350 mm	71.9 in/1826 mm	67.1 in/1703 mm
	max.	92.2 in/2350 mm	71.9 in/1826 mm	67.1 in/1703 mm
3512	**min.**	113.8 in/2890 mm	81.6 in/2072 mm	67.1 in/1703 mm
	max.	113.8 in/2890 mm	81.6 in/2072 mm	67.1 in/1703 mm
3516	**min.**	146.9 in/3730 mm	81.8 in/2078 mm	67.1 in/1703 mm
	max.	146.9 in/3730 mm	81.8 in/2078 mm	67.1 in/1703 mm

Vee 8, Vee 12, Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	6.7 x 7.5 in	170 x 190 mm
Displacement	**3508** — 2105 cu in	34.5 liter
	3512 — 3158 cu in	51.8 liter
	3516 — 4210 cu in	69 liter
Engine dry weight (approx)	**3508** — 11,350 lb	5148 kg
	3512 — 14,250 lb	6464 kg
	3516 — 17,550 lb	7961 kg

Electronic Control System

HEAT EXCHANGER/RADIATOR COOLED



3500B Series

GENERATOR SET ENGINE/AUXILIARY

RATINGS

	bhp	bkW	ekW	rpm	EPA - IMO - EU
3508B	915	682	600	1200	NC - I - NC
3508B	1019	760	715	1800	NC - I - NC
3508B	1298	968	910	1800	NC - I - NC
3512B	1478	1102	1030	1200	NC - I - NC
3512B	1509	1125	1070	1800	NC - I - NC
3512B	1910	1424	1360	1800	NC - I - NC
3516B	1855	1383	1285	1200	NC - I - NC
3516B	2549	1901	1825	1800	NC - I - NC
3508B	870	649	590	1000	NC - I - NC
3508B	903	673	630	1500	NC - I - NC
3508B	1148	856	800	1500	NC - I - NC
3512B	1251	933	880	1000	NC - I - NC
3512B	1368	1020	965	1500	NC - I - NC
3512B	1686	1257	1200	1500	NC - II - NC
3516B	1726	1287	1180	1000	NC - I - NC
3516B	2100	1566	1460	1500	NC - I - NC
3516B	2303	1717	1600	1500	NC - II - NC

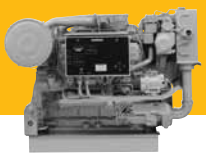
		LE	H	WE
3508B	**min.**	90.9 in/2310 mm	71.1 in/1806 mm	67.1 in/1703 mm
	max.	92.5 in/2350 mm	71.9 in/1826 mm	67.1 in/1703 mm
3512B	**min.**	114 in/2890 mm	80.8 in/2053 mm	67.1 in/1703 mm
	max.	120 in/3038 mm	81.7 in/2073 mm	78.3 in/1988 mm
3516B	**min.**	125.2 in/3181 mm	80.8 in/2053 mm	67.1 in/1703 mm
	max.	125.2 in/3181 mm	82.7 in/2100 mm	84.4 in/2144 mm

Vee 8, Vee 12, Vee 16, 4-Stroke-Cycle Diesel

Aspiration		TA	
Bore x Stroke		6.7 x 7.5 in	170 x 190 mm
Displacement	**3508B**	2105 cu in	34.5 liter
	3512B	3158 cu in	51.8 liter
	3516B	4210 cu in	69 liter
Engine dry weight (approx)	**3508B**	11,276-11,500 lb	5115-5216 kg
	3512B	14,250-15,345 lb	6464-6960 kg
	3516B	17,537-17,700 lb	7955-8029 kg

3500C Series

Electronic Control System



GENERATOR SET ENGINE/AUXILIARY

HEAT EXCHANGER/RADIATOR COOLED

RATINGS

	bhp	bkW	ekW*	rpm	EPA - IMO - EU
3512C	1920	1432	1360	1800	NC - II - NC
3512C[1]	2183	1628	1550	1800	NC - II - NC
3512C[1]	2394	1786	1700	1800	NC - II - NC
3516C[1]	3151	2350	2250	1800	NC - II - NC

[1]Ratings are high displacement (HD)

*ekW is based on a 95% generator efficiency.

Preliminary EPA Tier 3 Ratings

3512C	2442	1821	1730	1800	T3C - II - NC
3516C	2576	1921	1825	1800	T3C - II - NC
3516C	2965	2211	2100	1800	T3C - II - NC
3516C	3176	2368	2250	1800	T3C - II - NC

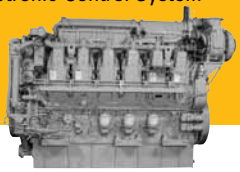
		LE	H	WE
3512C	**min.**	104.1 in/2644 mm	83.2 in/2113 mm	80.2 in/2036 mm
	max.	128.8 in/3272 mm	84.8 in/2154 mm	85.0 in/2160 mm
3516C	**min.**	125.4 in/3185 mm	83.9 in/2130 mm	84.3 in/2142 mm
	max.	125.4 in/3185 mm	83.9 in/2130 mm	84.3 in/2142 mm

Vee 12, Vee 16, 4-Stroke-Cycle Diesel

Aspiration	TA	
Bore x Stroke	6.69 x 8.46 in	170 x 215 mm
Displacement	**3512C** — 3574 cu in	58.57 liter
	3516C — 4765 cu in	78.09 liter
Engine dry weight (approx)	**3512C** — 17,261-17,386 lb	7829-7886 kg
	3516C — 17,550-21,164 lb	7961-9600 kg

Electronic Control System

HEAT EXCHANGER/KEEL COOLED



C280 Series

AUXILIARY

RATINGS AND FUEL CONSUMPTION

	bhp	bkW	rpm	U.S. g/h	g/bkW-hr	EPA - IMO - EU
C280-6	2320	1730	900	107.4	197.3	T2C - II - NC
C280-6	2481	1850	1000	118.9	204.4	T2C - II - NC
C280-6	2548	1900	900	118.6	198.4	T2C - II - NC
C280-6	2722	2030	1000	131.7	206.2	T2C - II - NC
C280-8	3084	2300	900	143.7	198.6	T2C - II - NC
C280-8	3299	2460	1000	153.2	197.9	T2C - II - NC
C280-8	3393	2530	900	159.4	200.2	T2C - II - NC
C280-8	3634	2710	1000	170.3	199.7	T2C - II - NC
C280-12	4640	3460	900	214.9	197.5	T2C - II - NC
C280-12	4962	3700	1000	237.7	204.2	T2C - II - NC
C280-12	5096	3800	900	237.2	198.2	T2C - II - NC
C280-12	5444	4060	1000	263.4	206.2	T2C - II - NC
C280-16	6169	4600	900	287.4	198.6	T2C - II - NC
C280-16	6598	4920	1000	306.4	197.9	T2C - II - NC
C280-16	6785	5060	900	318.7	200.2	T2C - II - NC
C280-16	7268	5420	1000	340.6	199.7	T2C - II - NC

		L	LE	H	WE
C280-6	**min.**	168 in/4276 mm	145 in/3691 mm	108 in/2733 mm	68 in/1722 mm
	max.	168 in/4276 mm	145 in/3691 mm	108 in/2733 mm	68 in/1722 mm
C280-8	**min.**	219 in/5561 mm	178 in/4511 mm	104 in/2641 mm	68 in/1722 mm
	max.	219 in/5561 mm	178 in/4511 mm	104 in/2641 mm	68 in/1722 mm
C280-12	**min.**	191 in/4861 mm	161 in/4087 mm	140 in/3550 mm	69 in/1741 mm
	max.	191 in/4861 mm	161 in/4087 mm	140 in/3550 mm	69 in/1741 mm
C280-16	**min.**	216 in/5482 mm	197 in/5007 mm	125 in/3171 mm	67 in/1704 mm
	max.	216 in/5482 mm	197 in/5007 mm	125 in/3171 mm	67 in/1704 mm

In-line 6, Vee 8, Vee 12, Vee 16, 4-Stroke-Cycle Diesel

Aspiration		TA	
Bore x Stroke		11.0 x 11.8 in	280 x 300 mm
Displacement	**C280-6** — 6773 cu in		111 liter
	C280-8 — 9031 cu in		148 liter
	C280-12 — 13,546 cu in		222 liter
	C280-16 — 18,062 cu in		296 liter
Engine dry weight (approx)	**C280-6** — 34,496 lb		15 680 kg
	C280-8 — 41,800 lb		19 000 kg
	C280-12 — 57,276 lb		25 980 kg
	C280-16 — 62,832 lb		28 500 kg

MaK Marine Propulsion Engines

MaK Marine Propulsion Engines

With the objective of extending its diesel engine product line in the upper range, Caterpillar acquired MaK Motoren GmbH & Co. KG in 1997. The excellent reputation of the MaK brand is based on more than 80 years of experience in the development, manufacture, and service of diesel engines.

The current MaK product line is comprised of four medium-speed four-stroke diesel engine models ranging in power from 1,020 to 18,000 kW. MaK diesel engines feature a high level of reliability, low operating costs, simple installation and maintenance, and compliance with the majority of environmental emissions regulations.

Cat® Technology for Emissions Reduction in Medium-Speed Marine Engines

Besides offering the right technology for emission regulation compliance for IMO Tier II and certain EPA Tier 2, Caterpillar offers options for further performance improvement of medium speed marine engines:

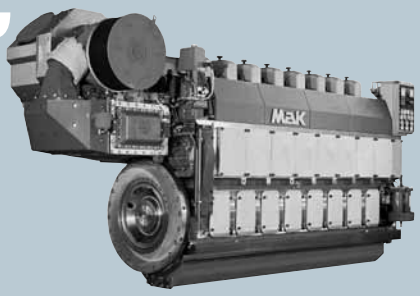
FCT achieves synergy between flexible fuel systems and advanced air systems at the same time as it exploits current MaK engine design to the fullest. At part load, visible smoke is eliminated and performance and load pick-up are improved. Invisible smoke is a clear advantage for all applications.

Cat® Common Rail (Cat CR) offers a direction for future regulatory compliance. Building upon the ACERT™ system integration concept, Cat CR is a fully flexible fuel system offering the potential to cope with strict soot reduction necessities. And Cat CR uses injection maps, a technology to fine-tune injection characteristics for every single engine operating point. Injection mapping guarantees optimum injection pressure and timing at a given load even in transient operation. As a result, both soot and NOx emissions are significantly reduced.

In general, Cat CR permits vessel operation without visible soot throughout the whole of the operating range. Furthermore, during normal load, fuel consumption can be reduced without sacrificing NOx emissions. Cat CR is suitable for Heavy Fuel Oil (HFO), Marine Diesel Oil (MDO) and Diesel Oil (DO) operations.

IMO II technology, Flexible Camshaft Technology and Cat CR can be retrofitted to MaK C-engine series.

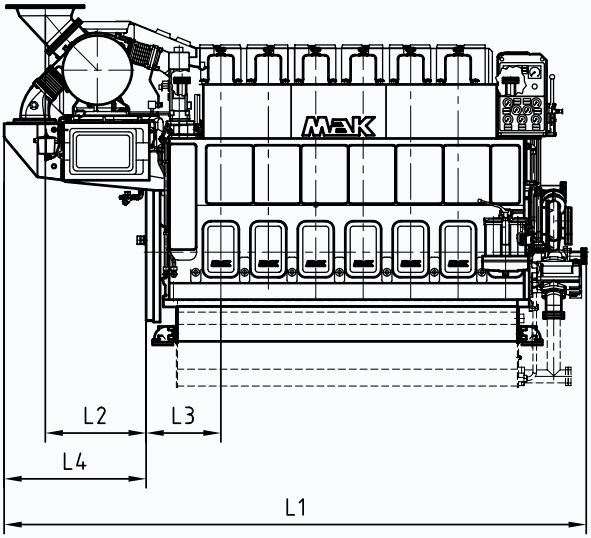
M 20 C



Propulsion Engine

DIMENSIONS (mm) AND WEIGHTS (t)

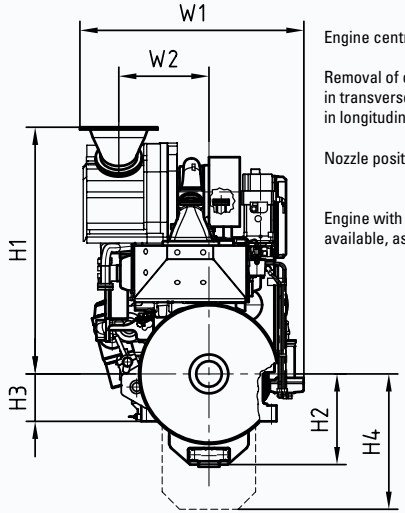
Type	L1	L2	L3	L4	H1	H2	H3	H4	W1	W2	Weight	
											Wet Sump	Dry Sump
6 M 20 C	4049	702	520	988	1714	630	330	941	1558	627	11.5	10.9
8 M 20 C	4846	802	520	1125	1856	630	330	941	1693	710	14.5	13.8
9 M 20 C	5176	802	520	1125	1856	630	330	941	1693	710	16.0	15.0



TECHNICAL DATA

Type	Output range		Speed	Mean eff. pressure	Mean piston speed	Bore	Stroke	Spec. fuel consumption	
								100%	85%
	kW	mhp	rpm	bar	m/s	mm	mm	g/kWh	g/kWh
6 M 20 C	1020	1390	900	24.1	9.0	200	300	187	186
	1140	1550	1000	24.2	10.0	200	300	190	189
8 M 20 C	1340	1850	900	24.1	9.0	200	300	187	186
	1520	2070	1000	24.2	10.0	200	300	190	189
9 M 20 C	1530	2082	900	24.1	9.0	200	300	187	186
	1710	2326	1000	24.2	10.0	200	300	190	189

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%



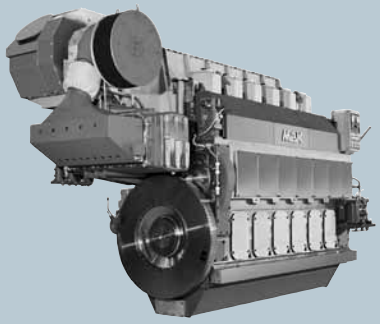
Engine centre distance: 2010 mm

Removal of cylinder liner:
in transverse direction 1910 mm
in longitudinal direction 2085 mm

Nozzle position: ask for availability

Engine with turbocharger at free end available, ask for dimensions

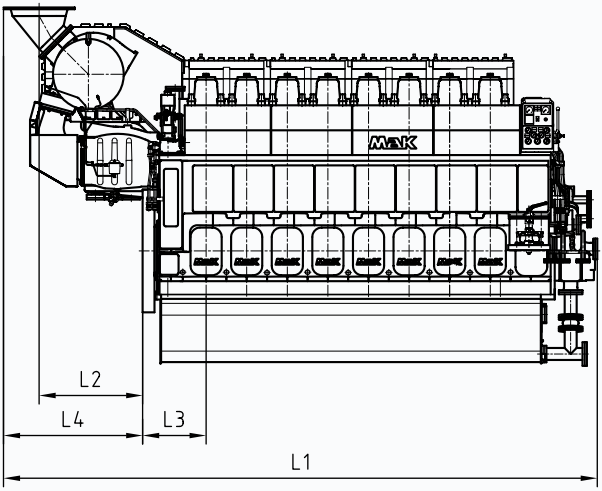
M 25 C



Propulsion Engine

DIMENSIONS (mm) AND WEIGHTS (t)

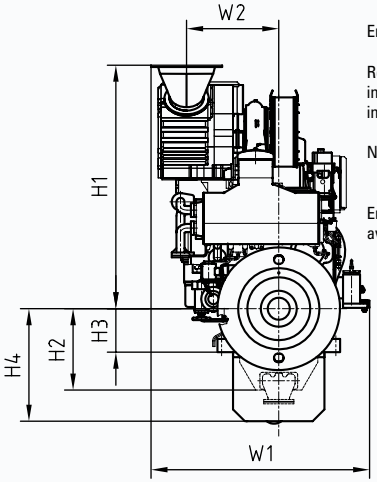
Type	L1	L2	L3	L4	H1	H2	H3	H4	W1	W2	Weight	
											Wet Sump	Dry Sump
6 M 25 C	5345	1068	672	1390	2526	861	460	1191	2261	977	23.5	21.2
8 M 25 C	6289	1097	672	1474	2578	861	460	1191	2316	977	30.0	28.5
9 M 25 C	6719	1097	672	1474	2578	861	460	1191	2316	977	32.0	30.0



TECHNICAL DATA

Type	Output range		Speed	Mean eff. pressure	Mean piston speed	Bore	Stroke	Spec. fuel consumption	
								100%	85%
	kW	mhp	rpm	bar	m/s	mm	mm	g/kWh	g/kWh
6 M 25 C	1900	2580	720	25.8	9.6	255	400	186	184
	2000	2720	750	26.1	10.0	255	400	186	184
8 M 25 C	2534	3450	720	25.8	9.6	255	400	187	184
	2666	3630	750	26.1	10.0	255	400	187	184
9 M 25 C	2850	3880	720	25.8	9.6	255	400	187	184
	3000	4080	750	26.1	10.0	255	400	187	184

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%



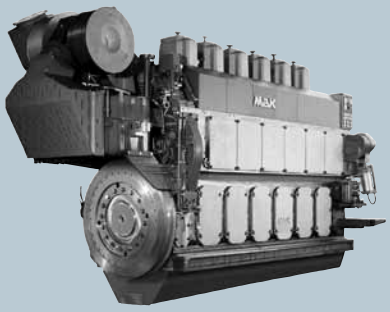
Engine centre distance: 2500 mm

Removal of cylinder liner:
in transverse direction 2510 mm
in longitudinal direction 2735 mm

Nozzle position: ask for availability

Engine with turbocharger at free end available, ask for dimensions

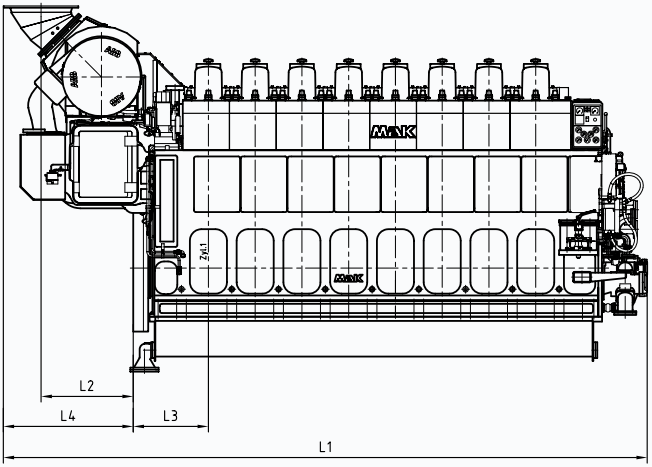
M 32 C



Propulsion Engine

DIMENSIONS (mm) AND WEIGHTS (t)

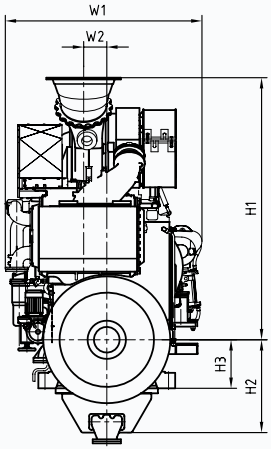
Type	L1	L2	L3	L4	H1	H2	H3	W1	W2	Weight
6 M 32 C	5934	788	852	1168	2784	1052	550	2418	962	39.5
8 M 32 C	7298	1044	852	1472	2969	1052	550	2229	262	49.0
9 M 32 C	7828	1044	852	1472	2969	1052	550	2229	262	52.0



TECHNICAL DATA

Type	Output range		Speed	Mean eff. pressure	Mean piston speed	Bore	Stroke	Spec. fuel consumption	
								100%	85%
	kW	mhp	rpm	bar	m/s	mm	mm	g/kWh	g/kWh
6 M 32 C	2880	3920	600	24.9	9.6	320	480	177	176
	3000	4080	600	25.9	9.6	320	480	177	176
8 M 32 C	3840	5220	600	24.9	9.6	320	480	177	176
	4000	5440	600	25.9	9.6	320	480	177	176
9 M 32 C	4320	5880	600	24.9	9.6	320	480	177	176
	4500	6120	600	25.9	9.6	320	480	177	176

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%



Engine centre distance: 2800 mm *

* If turbocharger is located on opposite coupling side, the water cover of the charge air cooler must be dismantled.

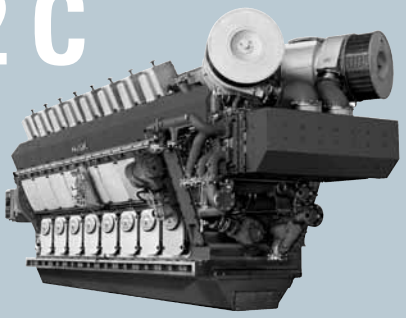
Removal of cylinder liner:
in transverse direction 3040 mm
in longitudinal direction 3405 mm

Nozzle position: ask for availability

Engine with turbocharger at free end available, ask for dimensions

Cat Common Rail: ask for availability

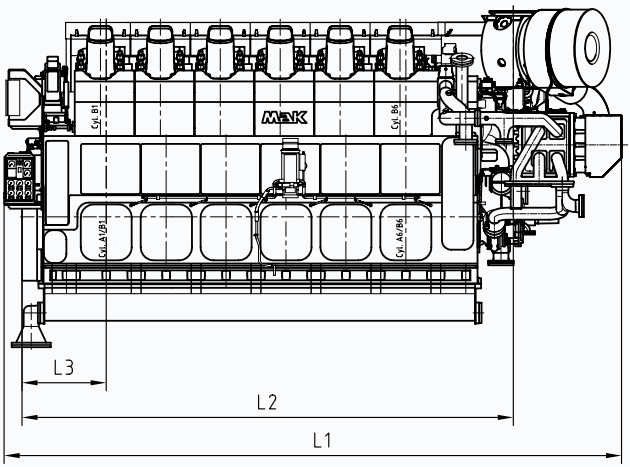
VM 32 C



Propulsion Engine

DIMENSIONS (mm) AND WEIGHTS (t)

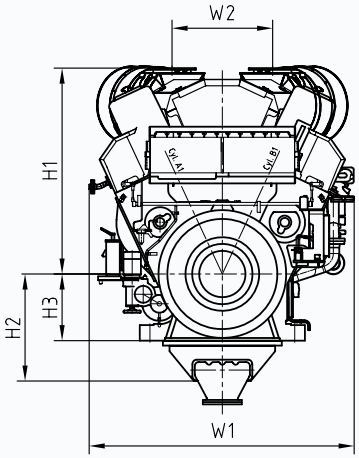
Type	L1	L2	L3	H1	H2	H3	W1	W2	Weight
12 M 32 C	6956	5535	949	2319	1205	750	2985	1133	65.0
16 M 32 C	8328	6885	949	2319	1205	750	2985	1133	82.0



TECHNICAL DATA

Type	Output range		Speed	Mean eff. pressure	Mean piston speed	Bore	Stroke	Spec. fuel consumption	
								100%	85%
	kW	mhp	rpm	bar	m/s	mm	mm	g/kWh	g/kWh
12 M 32 C	6000	8160	720	22.5	11.0	320	460	178	177
	6000	8160	750	21.6	11.5	320	460	179	179
16 M 32 C	8000	10880	720	22.5	11.0	320	460	178	177
	8000	10880	750	21.6	11.5	320	460	179	179

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%



Engine centre distance: 3500 mm

Removal of cylinder liner:
in transverse direction 2836 mm

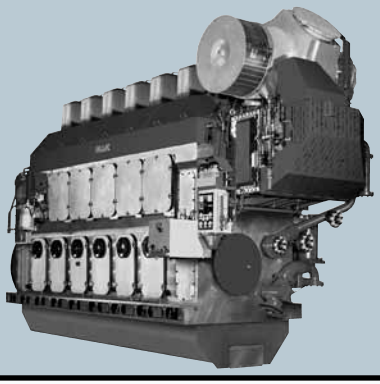
Nozzle position: ask for availability

This engine is only available with dry oil sump.

Engine with turbocharger at driving end available, ask for dimensions

Cat Common Rail: ask for availability

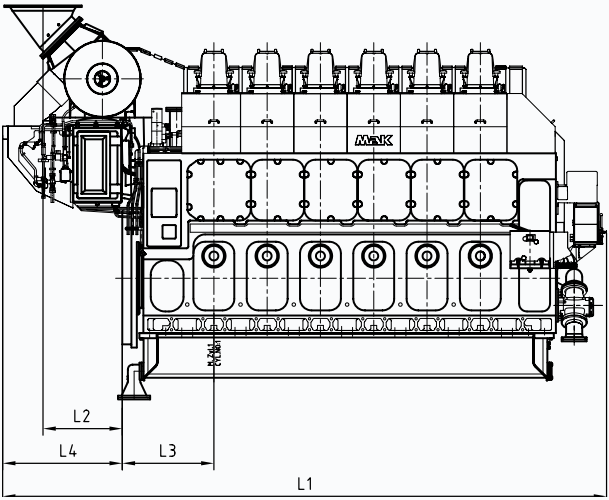
M 43 C



Propulsion Engine

DIMENSIONS (mm) AND WEIGHTS (t)

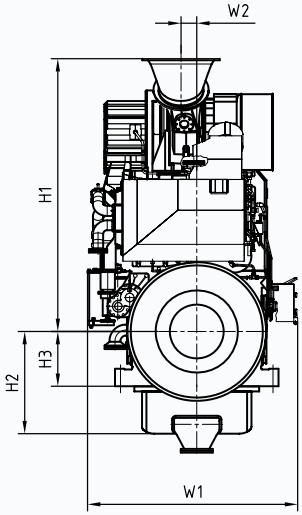
Type	L1	L2	L3	L4	H1	H2	H3	W1	W2	Weight
6 M 43 C	8271	1086	1255	1638	3734	1399	750	2878	215	94.0
7 M 43 C	9068	1119	1255	1704	4105	1399	750	2878	232	107.0
8 M 43 C	9798	1119	1255	1704	4105	1399	750	2878	232	114.0
9 M 43 C	10528	1119	1255	1704	4105	1399	750	2878	232	127.0



TECHNICAL DATA

Type	Output range		Speed	Mean eff. pressure	Mean piston speed	Bore	Stroke	Spec. fuel consumption 100%	Spec. fuel consumption 85%
	kW	mhp	rpm	bar	m/s	mm	mm	g/kWh	g/kWh
6 M 43 C	6000	8160	500	27.1	10.2	430	610	176	175
	6000	8160	514	26.4	10.5	430	610	176	175
7 M 43 C	7000	9520	500	27.1	10.2	430	610	176	175
	7000	9520	514	26.4	10.5	430	610	176	175
8 M 43 C	8000	10880	500	27.1	10.2	430	610	176	175
	8000	10880	514	26.4	10.5	430	610	176	175
9 M 43 C	9000	12240	500	27.1	10.2	430	610	176	175
	9000	12240	514	26.4	10.5	430	610	176	175

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%



Engine centre distance: 3400 mm

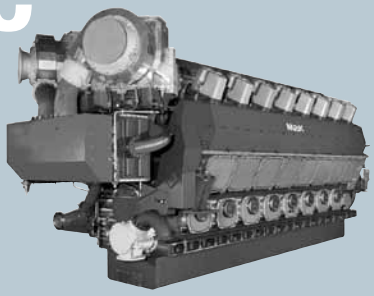
Removal of cylinder liner:
in transverse direction 4165 mm
in longitudinal direction 4610 mm

Nozzle position: ask for availability

This engine is only available with dry oil sump

Engine with turbocharger at free end available, ask for dimensions

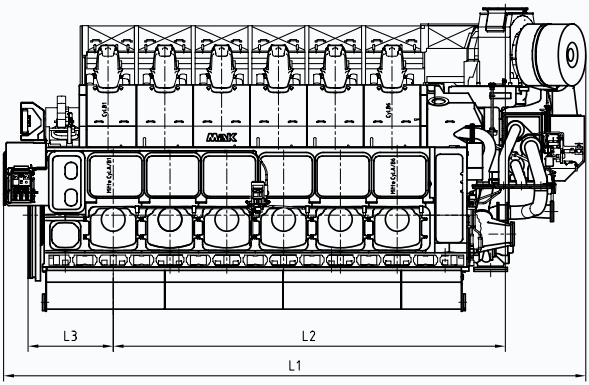
VM 43 C



Propulsion Engine

DIMENSIONS (mm) AND WEIGHTS (t)

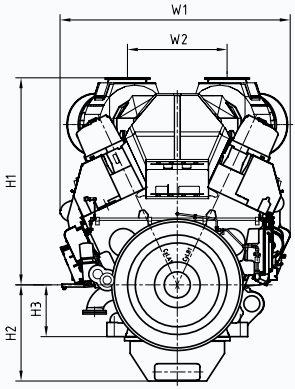
Type	L1	L2	L3	H1	H2	H3	W1	W2	Weight
12 M 43 C	9842	6628	1440	3497	1625	875	3890	1685	160.0
16 M 43 C	11943	8533	1440	3473	1625	875	4027	1670	220.0



TECHNICAL DATA

Type	Output range		Speed	Mean eff. pressure	Mean piston speed	Bore	Stroke	Spec. fuel consumption	
								100%	85%
	kW	mhp	rpm	bar	m/s	mm	mm	g/kWh	g/kWh
12 M 43 C	12000	16320	500	27.1	10.2	430	610	176	175
	12000	16320	514	26.4	10.5	430	610	176	175
16 M 43 C	16000	21760	500	27.1	10.2	430	610	176	175
	16000	21760	514	26.4	10.5	430	610	176	175

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%



Engine centre distance: 4500 mm

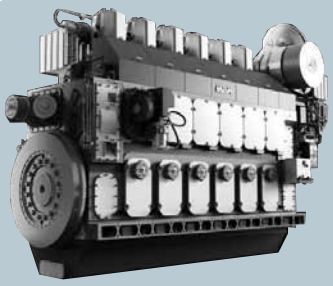
Removal of cylinder liner:
in transverse direction 3700 mm

Nozzle position: ask for availability

This engine is only available with dry oil sump

Engine with turbocharger at flywheel end available, ask for dimensions

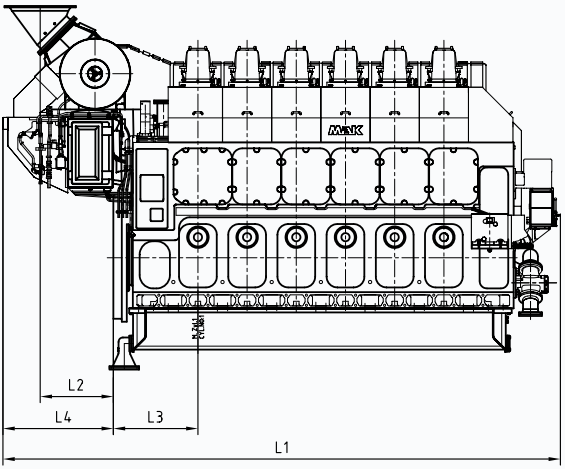
M 46 DF



Propulsion Engine

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1	L2	L3	L4	H1	H2	H3	W1	W2	Weight
6 M 46 DF	8271	1086	1255	1638	3734	1399	750	2878	215	94.0
7 M 46 DF	9068	1119	1255	1704	4105	1399	750	2878	232	107.0
8 M 46 DF	9798	1119	1255	1704	4105	1399	750	2878	232	114.0
9 M 46 DF	10528	1119	1255	1704	4105	1399	750	2878	232	127.0

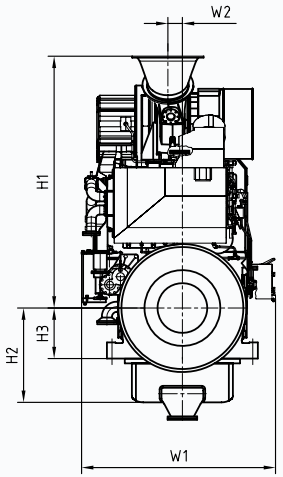


TECHNICAL DATA

Type	Output range		Speed	Mean eff. pressure	Mean piston speed	Bore	Stroke	Spec fuel oil consumption 100%/85%	Spec gas consumption 100%/85%
	kW	mhp	rpm	bar	m/s	mm	mm	g/kWh	kJ/kWh
6 M 46 DF	5400	7345	500	21.3	10.2	460	610	184/183	7200/7344
	5400	7345	514	20.7	10.5	460	610	184/183	7200/7344
7 M 46 DF	6300	8570	500	21.3	10.2	460	610	184/183	7200/7344
	6300	8570	514	20.7	10.5	460	610	184/183	7200/7344
8 M 46 DF	7200	9790	500	21.3	10.2	460	610	184/183	7200/7344
	7200	9790	514	20.7	10.5	460	610	184/183	7200/7344
9 M 46 DF	8100	11015	500	21.3	10.2	460	610	184/183	7200/7344
	8100	11015	514	20.7	10.5	460	610	184/183	7200/7344

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%

Note: 5% tolerance +1% per pump
In gas mode plus 1% ignition fuel oil consumption



Engine centre distance: 3400 mm

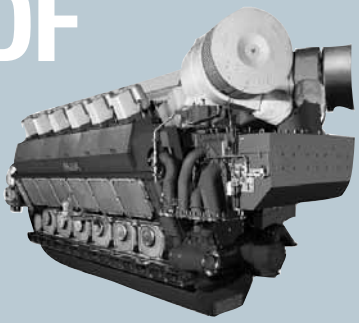
Removal of cylinder liner:
in transverse direction 4165 mm
in longitudinal direction 4610 mm

Nozzle position: ask for availability

This engine is only available with dry oil sump

Engine with turbocharger at flywheel end available, ask for dimensions.

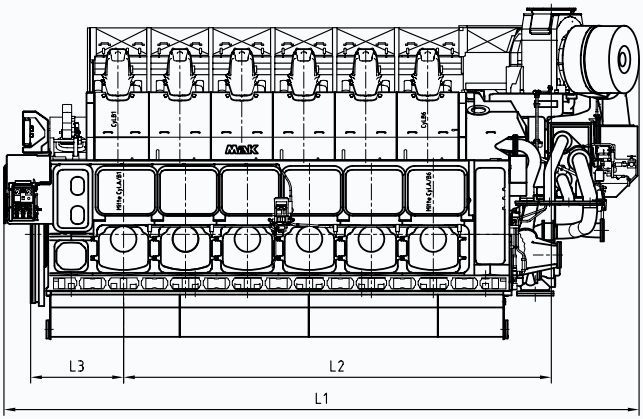
VM 46 DF



Propulsion Engine

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1	L2	L3	H1	H2	H3	W1	W2	Weight
12 M 46 DF	9842	6628	1440	3497	1625	875	3890	1685	160.0
16 M 46 DF	11943	8533	1440	3473	1625	875	4027	1670	220.0
20 M 46 DF	13930	—	—	4619	1625	—	4027	—	260.0

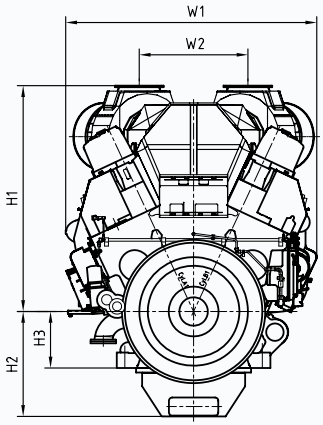


TECHNICAL DATA

Type	Output range		Speed	Mean eff. pressure	Mean piston speed	Bore	Stroke	Spec fuel oil consumption 100%/85%	Spec gas consumption 100%/85%
	kW	mhp	rpm	bar	m/s	mm	mm	g/kWh	kJ/kWh
12 M 46 DF	10800	14688	500	21.3	10.2	460	610	184/183	7200/7344
	10800	14688	514	20.7	10.5	460	610	184/183	7200/7344
16 M 46 DF	14400	19584	500	21.3	10.2	460	610	184/183	7200/7344
	14400	19584	514	20.7	10.5	460	610	184/183	7200/7344
20 M 46 DF	18000	24480	500	21.3	10.2	460	610	184/183	7200/7344
	18000	24480	514	20.7	10.5	460	610	184/183	7200/7344

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%

Note: 5% tolerance +1% per pump
In gas mode plus 1% ignition fuel oil consumption



Engine centre distance: 4500 mm

Removal of cylinder liner:
in transverse direction 3700 mm

Nozzle position: ask for availability

This engine is only available with dry oil sump

Engine with turbocharger at flywheel end available, ask for dimensions.

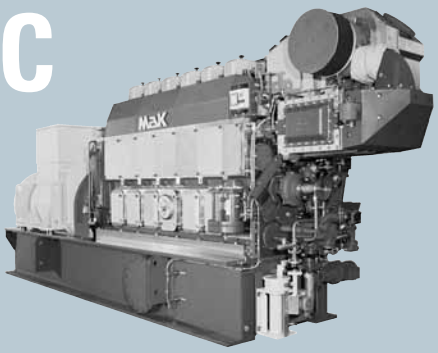
MaK Marine Generator Sets

MaK Marine Generator Sets

The shipping industry today relies on dependable on-board electrical power generation. MaK auxiliary diesel engines ensure the availability of electrical power, wherever and whenever needed. Whether for navigational equipment, monitoring installations, refrigerated containers, lighting, pumps, heating, or ventilation, MaK auxiliary engines are the right choice.

As with the MaK propulsion engines, these auxiliary engines can be operated with the economical Heavy Fuel Oil (HFO) option, and are compliant with the NOx limits according to IMO Code Revised MARPOL, Annex VI, NOx Technical Code 2008, (IMO Tier II).

M 20 C

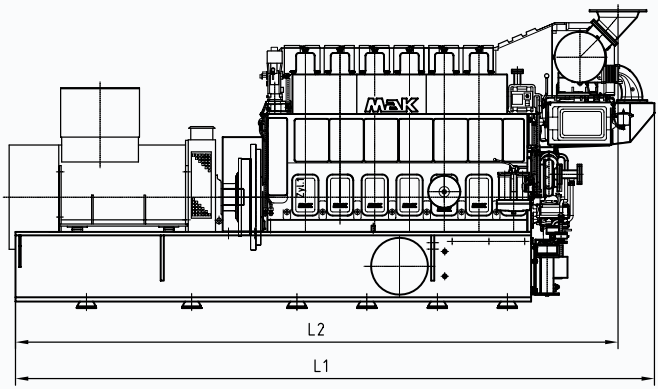


Generator Set

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1*	L2	H1	H2	W1	W2	Weight
6 M 20 C	6073	5727	1779	1054	1680	627	18.8
8 M 20 C	6798	6475	1956	1054	1816	710	23.1
9 M 20 C	7125	6802	1956	1054	1816	710	26.0

*Dependent on generator make/type.

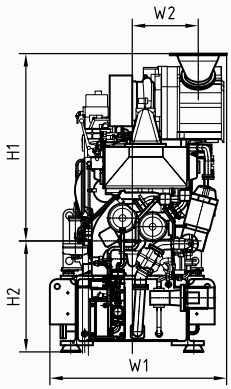


TECHNICAL DATA

Type	Engine rating	Generator rating 50 Hz Speed: 1000 rpm		Generator rating 60 Hz Speed: 900 rpm		Mean eff. pressure	Mean piston speed	Spec. fuel consumption 100%	Spec. fuel consumption 85%
	kW	kWe	kVA	kWe	kVA	bar	m/s	g/kWh	g/kWh
6 M 20 C	1020			979	1224	24.1	9.0	187	186
	1140	1094	1224			24.2	10.0	190	189
8 M 20 C	1360			1306	1632	24.1	9.0	187	186
	1520	1459	1824			24.2	10.0	190	189
9 M 20 C	1530			1468	1836	24.1	9.0	187	186
	1710	1641	2052			24.2	10.0	190	189

Bore: 200 mm
Stroke: 300 mm

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%
Generator efficiency: 0.96, cos φ: 0.8
Engine output 180/200 kW/cyl at 900/1000 rpm, ask for availability.



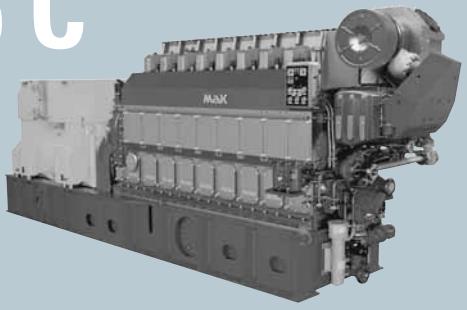
Genset centre distance: min. 2010 mm

Removal of cylinder liner:
in transverse direction 2964 mm
in longitudinal direction 3139 mm

Nozzle position: ask for availability

Engine with turbocharger at driving end available, ask for dimensions

M 25 C

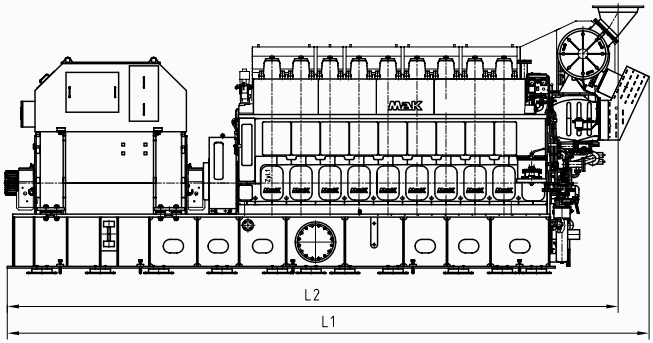


Generator Set

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1*	L2	H1	H2	W1	W2	Weight
6 M 25 C	8070	7638	2571	1340	2479	977	43.0
8 M 25 C	9130	8727	2623	1340	2534	977	53.0
9 M 25 C	9516	9057	2623	1340	2534	977	56.0

*Dependent on generator make/type.

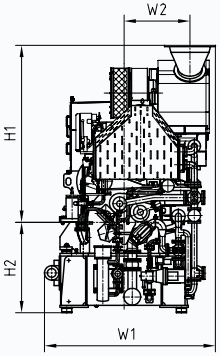


TECHNICAL DATA

Type	Engine rating	Generator rating 50 Hz Speed: 750 rpm		Generator rating 60 Hz Speed: 720 rpm		Mean eff. pressure	Mean piston speed	Spec. fuel consumption 100%	Spec. fuel consumption 85%
	kW	kWe	kVA	kWe	kVA	bar	m/s	g/kWh	g/kWh
6 M 25 C	2000	1920	2400			26.1	10.0	186	184
	2000			1920	2400	27.2	9.6	188	185
8 M 25 C	2666	2559	3199			26.1	10.0	187	184
	2666			2559	3199	27.2	9.6	189	185
9 M 25 C	3000	2880	3600			26.1	10.0	187	184
	3000			2880	3600	27.2	9.6	189	185

Bore: 255 mm Stroke: 400 mm

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%
Generator efficiency: 0.96, cos φ: 0.8



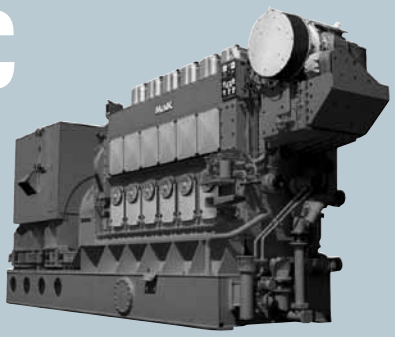
Genset centre distance: min. 2700 mm

Removal of cylinder liner:
in transverse direction 3850 mm
in longitudinal direction 4075 mm

Nozzle position: ask for availability

Engine with turbocharger at driving end available, ask for dimensions

M 32 C

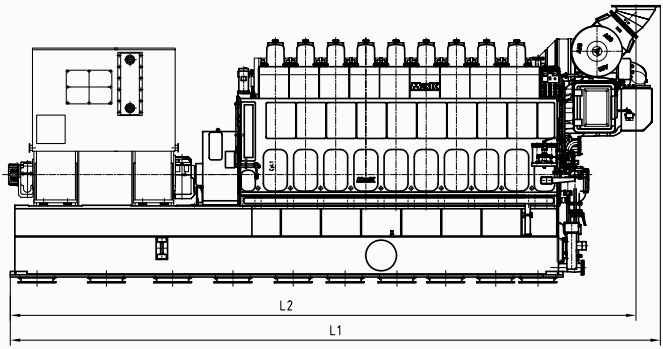


Generator Set

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1*	L2	H1	H2	W1	W2	Weight
6 M 32 C	9302	8869	2901	1900	962	2639	73
8 M 32 C	10866	10461	2969	1900	262	2600	92
9 M 32 C	11419	10991	2969	1900	262	2600	98

*Dependent on generator make/type.

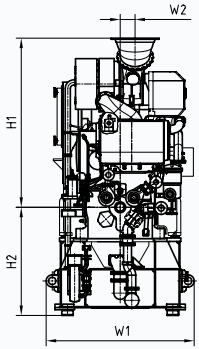


TECHNICAL DATA

Type	Engine rating	Generator rating 50/60 Hz Speed: 600 rpm		Mean eff. pressure	Mean piston speed	Spec. fuel consumption 100%	Spec. fuel consumption 85%
	kW	kWe	kVA	bar	m/s	g/kWh	g/kWh
6 M 32 C	2880	2765	3456	24.9	9.6	177	176
	3000	2880	3600	25.9	9.6	177	176
8 M 32 C	3840	3686	4608	24.9	9.6	177	176
	4000	3840	4800	25.9	9.6	177	176
9 M 32 C	4320	4147	5184	24.9	9.6	177	176
	4500	4320	5400	25.9	9.6	177	176

Bore: 320 mm
Stroke: 480 mm

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%
Generator efficiency: 0.96, cos φ: 0.8



Genset centre distance: min. 3000 mm

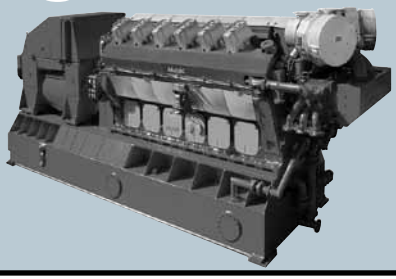
Removal of cylinder liner:
in transverse direction 4940 mm
in longitudinal direction 5305 mm

Nozzle position: ask for availability

Engine with turbocharger at driving end available, ask for dimensions

Cat Common Rail : ask for availability

VM 32 C

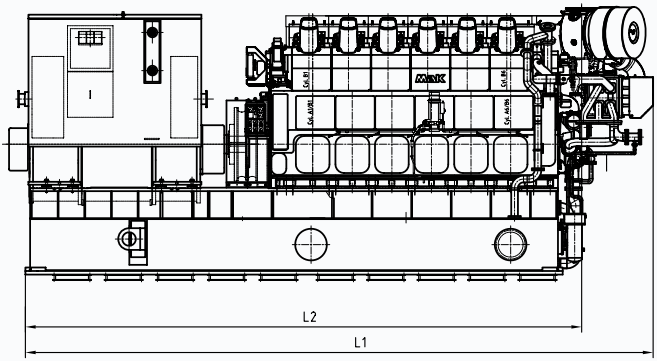


Generator Set

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1*	L2	H1	H2	W1	W2	Weight
12 M 32 C	10703	9484	2319	2320	1133	3526	120
16 M 32 C	10930	12149	2319	2320	1133	3526	140

*Dependent on generator make/type.

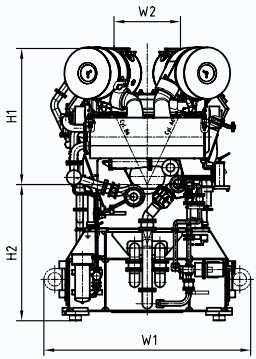


TECHNICAL DATA

Type	Engine rating	Generator rating 50 Hz Speed: 750 rpm		Generator rating 60 Hz Speed: 720 rpm		Mean eff. pressure	Mean piston speed	Spec. fuel consumption 100 %	85%
	kW	kWe	kVA	kWe	kVA	bar	m/s	g/kWh	g/kWh
12 M 32 C	6000			5760	7200	22.5	11.0	178	177
	6000	5760	5760			21.6	11.8	179	179
	6600			6336	7920	24.8	11.0	183	180
	6600	6336	7920			23.8	11.8	184	181
16 M 32 C	8000			7680	9600	22.5	11.0	178	177
	8000	7680	9600			21.6	11.8	179	179
	8800			8448	10560	24.8	11.0	183	180
	8800	8448	10560			23.8	11.8	184	181

Bore : 320 mm
Stroke: 460 mm

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%
Generator efficiency: 0.96, cos φ: 0.8



Genset centre distance: min. 3500 mm

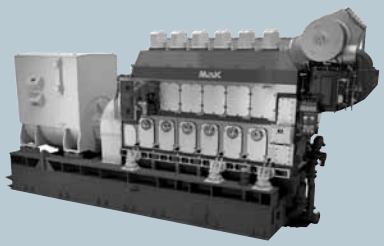
Removal of cylinder liner:
in transverse direction 5156 mm

Nozzle position: ask for availability

Engine with turbocharger at driving end available, ask for dimensions

Cat Common Rail: ask for availability

M 43 C

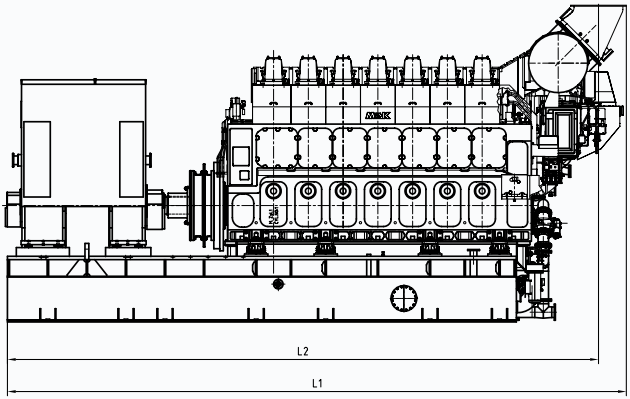


Generator Set

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1*	L2	H1	H2	W1	W2	Weight
6 M 43 C	12202	11651	3834	2444	3400	215	178
7 M 43 C	12999	12414	4205	2444	3400	232	195
8 M 43 C	13729	13144	4205	2444	3400	232	210
9 M 43 C	14459	13874	4205	2444	3400	232	240

*Dependent on generator make/type.

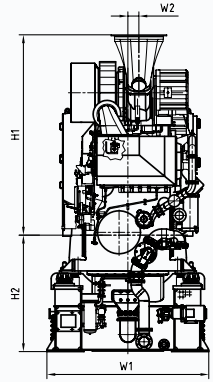


TECHNICAL DATA

Type	Engine rating	Generator rating 50 Hz Speed: 514 rpm		Generator rating 60 Hz Speed: 500 rpm		Mean eff. pressure	Mean piston speed	Spec. fuel consumption 100%	Spec. fuel consumption 85%
	kW	kWe	kVA	kWe	kVA	bar	m/s	g/kWh	g/kWh
6 M 43 C	6000			5760	7200	27.1	10.2	176	175
	6000	5760	7200			26.4	10.5	176	175
7 M 43 C	7000			6720	8400	**27.1**	10.2	176	175
	7000	6720	8400			26.4	10.5	176	175
8 M 43 C	8000			7680	9600	27.1	10.2	176	175
	8000	7680	9600			26.4	10.5	176	175
9 M 43 C	9000			8640	10800	27.1	10.2	176	175
	9000	8640	10800			26.4	10.5	176	175

Bore: 430 mm Stroke: 610 mm

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%
Generator efficiency: 0.96, cos φ: 0.8

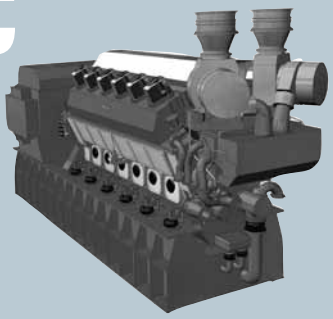


Genset centre distance: min. 3700 mm

Removal of cylinder liner:
in transverse direction 6609 mm

Nozzle position: ask for availability

VM 43 C

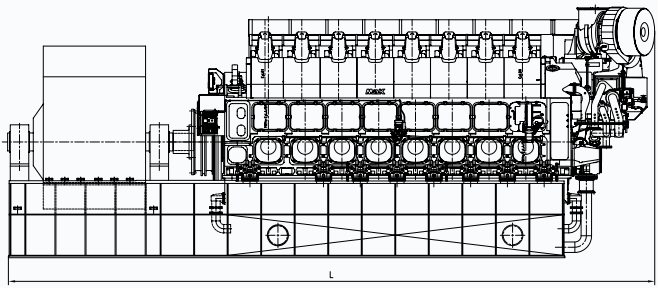


Generator Set

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1*	H1	H2	W1	W2	Weight
12 M 43 C	14740	3497	3020	3890	1685	275.0
16 M 43 C	16870	3473	3020	4027	1670	345.0

*Dependent on generator make/type.

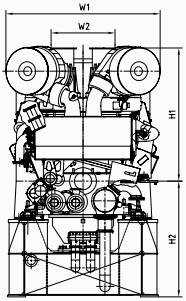


TECHNICAL DATA

Type	Engine rating	Generator rating 50 Hz Speed: 500 rpm		Generator rating 60 Hz Speed: 514 rpm		Mean eff. pressure	Mean piston speed	Spec. fuel consumption 100%	Spec. fuel consumption 85%
	kW	kWe	kVA	kWe	kVA	bar	m/s	g/kWh	g/kWh
12 M 43 C	12000	11520	14400			27.1	10.2	176	175
	12000			11520	14400	26.4	10.5	176	175
16 M 43 C	16000	15360	19200			27.1	10.2	176	175
	16000			15360	19200	26.4	10.5	176	175

Bore: 430 mm Stroke: 610 mm

Specific lubricating oil consumption 0.6 g/kWh, ± 0.3 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%
Generator efficiency: 0.96, cos φ: 0.8

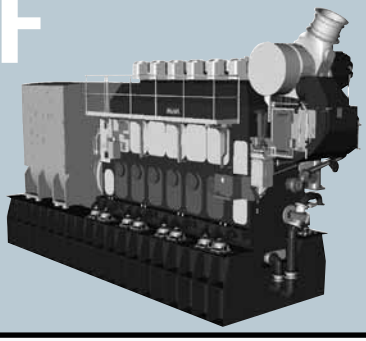


Genset centre distance: min. 4500 mm

Removal of cylinder liner: 6720 mm

Nozzle position: ask for availability

M 46 DF

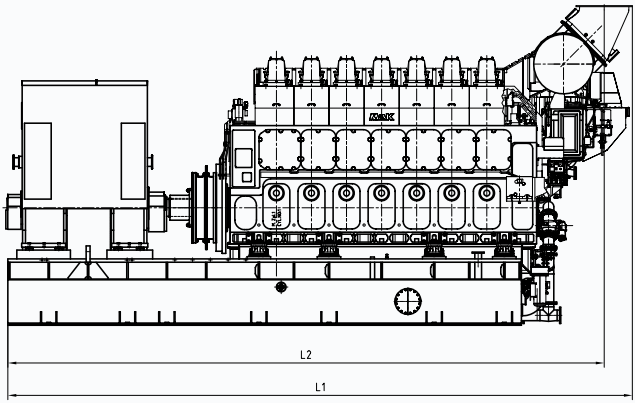


Generator Set

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1*	L2	H1	H2	W1	W2	Weight
6 M 46 DF	12202	11651	3834	2444	3400	215	178
7 M 46 DF	12999	12414	4205	2444	3400	232	195
8 M 46 DF	13729	13144	4205	2444	3400	232	210
9 M 46 DF	14459	13874	4205	2444	3400	232	240

*Dependent on generator make/type.



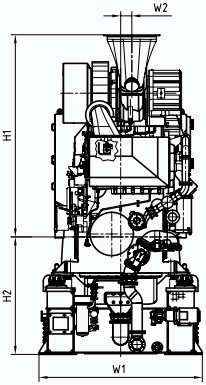
TECHNICAL DATA

Type	Engine rating	Generator rating 50 Hz Speed: 514 rpm		Generator rating 60 Hz Speed: 500 rpm		Mean eff. pressure	Mean piston speed	Spec fuel oil consumption 100%/85%	Spec gas consumption 100%/85%
	kW	kWe	kVA	kWe	kVA	bar	m/s	g/kWh	kJ/kWh
6 M 46 DF	5400			5148	6480	**21.3**	10.2	184/183	7200/7344
	5400	5148	6480			20.7	10.5	184/183	7200/7344
7 M 46 DF	6300			6048	7560	21.3	10.2	184/183	7200/7344
	6300	6048	7560			20.7	10.5	184/183	7200/7344
8 M 46 DF	7200			6912	8640	21.3	10.2	184/183	7200/7344
	7200	6912	8640			20.7	10.5	184/183	7200/7344
9 M 46 DF	8100			7776	9720	21.3	10.2	184/183	7200/7344
	8100	7776	9720			20.7	10.5	184/183	7200/7344

Bore: 430 mm Stroke: 610 mm

Specific lubrication oil consumption 0.6 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%
Generator efficiency: 0.96, cos φ: 0.8

Note: 5% tolerance +1% per pump
In gas mode plus 1% ignition fuel oil consumption

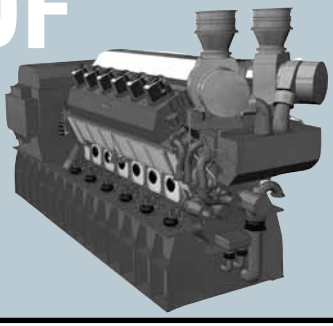


Genset centre distance: min. 3700 mm

Removal of cylinder liner:
in transverse direction 6609 mm

Nozzle position: ask for availability

VM 46 DF

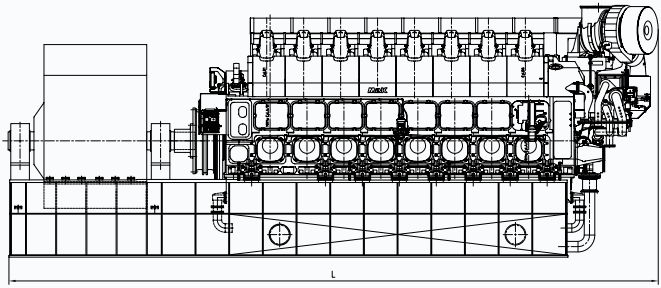


Generator Set

DIMENSIONS (mm) AND WEIGHTS (t)

Type	L1*	H1	H2	W1	W2	Weight
12 M 46 DF	14740	3497	3020	3890	1685	275.0
16 M 46 DF	16870	3473	3020	4027	1670	345.0
20 M 46 DF	18790	3473	3020	4027	1670	435.0

*Dependent on generator make/type.



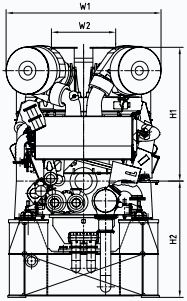
TECHNICAL DATA

Type	Engine rating	Generator rating 50 Hz Speed: 514 rpm		Generator rating 60 Hz Speed: 500 rpm		Mean eff. pressure	Mean piston speed	Spec fuel oil consumption 100%/85%	Spec gas consumption 100%/85%
	kW	kWe	kVA	kWe	kVA	bar	m/s	g/kWh	kJ/kWh
12 M 46 DF	10800			10368	12960	21.3	10.2	184/183	7200/7344
	10800	10368	12960			20.7	10.5	184/183	7200/7344
16 M 46 DF	14400			13824	17280	21.3	10.2	184/183	7200/7344
	14400	13824	17280			20.7	10.5	184/183	7200/7344
20 M 46 DF	18000			17280	21600	21.3	10.2	184/183	7200/7344
	18000	17280	21600			20.7	10.5	184/183	7200/7344

Bore: 460 mm
Stroke: 610 mm

Specific lubrication oil consumption 0.6 g/kWh
LCV = 42700 kJ/kg, without engine-driven pumps, tolerance 5%
Generator efficiency: 0.96, cos φ: 0.8

Note: 5% tolerance +1% per pump
In gas mode plus 1% ignition fuel oil consumption



Genset centre distance: min. 4500 mm

Removal of cylinder liner:
in transverse direction 6720 mm

Nozzle position: ask for availability

Notes

MARINE ENGINE SELECTION GUIDE

For more information please visit:
MARINE.CAT.COM
E-mail: cat_power@cat.com

Caterpillar follows a policy of continual product improvement. For this reason, some material and specifications could change without notice. Please reference TMI Web for most current information.

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