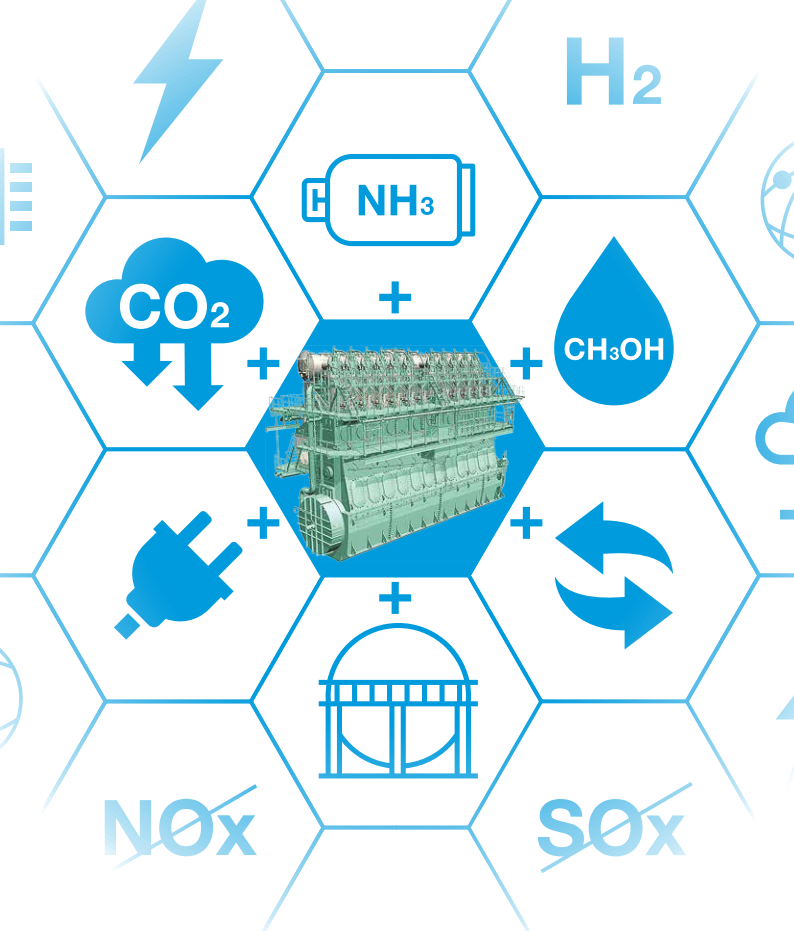


MARINE PROPULSION SYSTEM

Program 2025

MITSUI E&S

船舶推進システムの
トータルサプライヤーへ

船の心臓部を担い、世界の海上物流を前進させ続けることが私たちの使命です。
信頼のエンジンを中核として、温室効果ガス排出を削減する環境技術や、
代替燃料の供給装置、DX、安定した運航を支えるアフターサービスまでを担い、
船舶推進システムのトータルサプライヤーとして、お客様に貢献いたします。

After-sales service

Turbocharger

DX

Main engine

NOx reduction

Training program

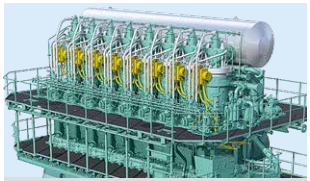
Fuel supply system

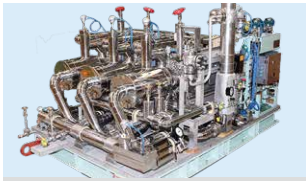
Alternative fuel

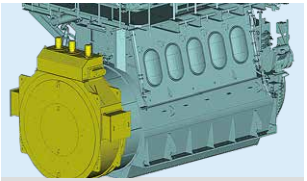
Comprehensive Supplier of Marine Propulsion Systems

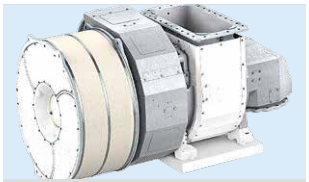
Our mission is to continue to advance the world's maritime logistics and transportation by playing a central role in the heart of the ship. With our reliable engines at the core, we offer environmental technology to reduce greenhouse gas emissions, alternative fuel supply systems, DX, and after-sales service to support efficient ship operations. We contribute to our customers as a total supplier of ship propulsion systems.

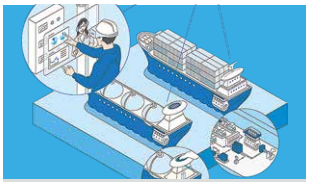
INDEX









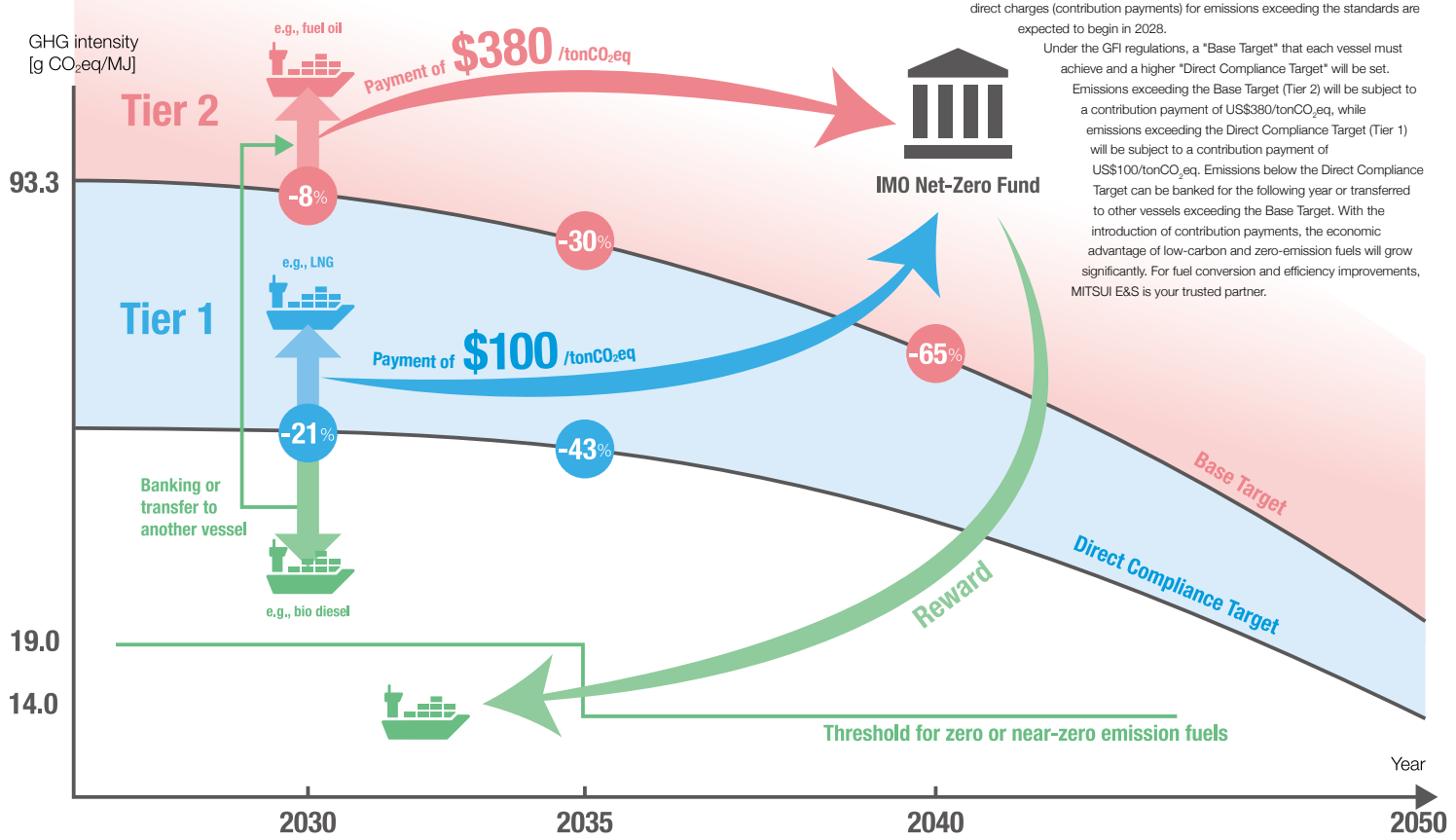


GHG直接課金 開始へ

国際海事機関（IMO）は、温室効果ガス（GHG）削減の中期対策としてGFI規制（使用燃料のGHG強度規制）を承認しました。この制度により、基準を超過した排出量への直接課金（拠出金支払い）が2028年にも開始する見込みです。
GFI規制では、各船舶の達成が必要な「規制値（Base Target）」と、より高い目標である「基準値（Direct Compliance Target）」が設定されます。規制値を超過した排出量（Tier 2）へは380米ドル/tonCO$_2$eq、基準値の超過分（Tier 1）へは100米ドル/tonCO$_2$eqの拠出金支払いが必要になります。基準値を下回った排出量は、翌年へのバンキングや規制値を超過した他船への融通が可能です。
拠出金支払いの開始により、低炭素・ゼロエミッション燃料利用の経済的優位性が高まります。燃料転換や燃費向上は、ぜひ三井E&Sにご相談ください。

Direct GHG Charging to Begin

The International Maritime Organization (IMO) has approved the GFI regulation (greenhouse gas intensity regulation on fuel used) as a mid-term measure to reduce greenhouse gas emissions. Under this framework, direct charges (contribution payments) for emissions exceeding the standards are expected to begin in 2028.
Under the GFI regulations, a "Base Target" that each vessel must achieve and a higher "Direct Compliance Target" will be set. Emissions exceeding the Base Target (Tier 2) will be subject to a contribution payment of US$380/tonCO$_2$eq, while emissions exceeding the Direct Compliance Target (Tier 1) will be subject to a contribution payment of US$100/tonCO$_2$eq. Emissions below the Direct Compliance Target can be banked for the following year or transferred to other vessels exceeding the Base Target. With the introduction of contribution payments, the economic advantage of low-carbon and zero-emission fuels will grow significantly. For fuel conversion and efficiency improvements, MITSUI E&S is your trusted partner.

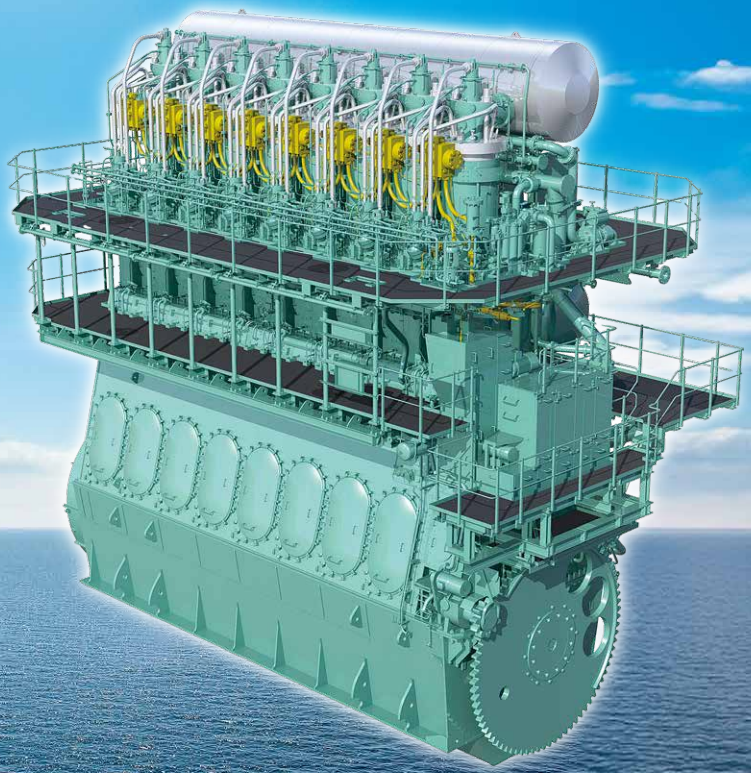


二元燃料エンジン

Dual Fuel Engines

高い信頼を獲得してきた重油焚きエンジンをベースに
多彩な燃料を活用して、
時代の変化に対応する二元燃料エンジン。
船の脱炭素化の切り札です。

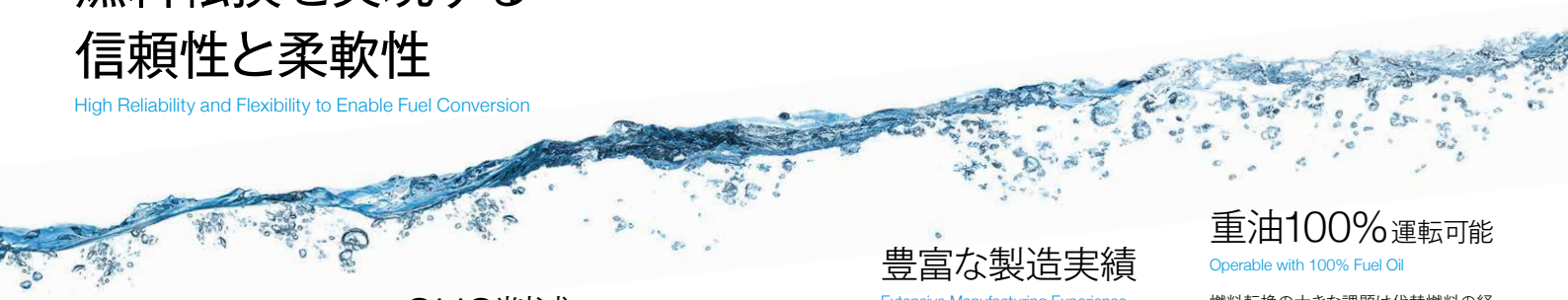
Based on the tried and true fuel oil engine, this dual fuel engine responds to the changing times by utilizing a variety of fuels. This is the key to decarbonizing ships.



Yellow parts : added parts for ME-GI

燃料転換を実現する信頼性と柔軟性

High Reliability and Flexibility to Enable Fuel Conversion



多様な燃料に対応

Utilizes a Variety of Fuels

当社の二元燃料エンジンには、燃料ガスを使用するGI（Gas Injection）形エンジンと、低引火点（LFL: Low Flashpoint Liquid）燃料を使うLGI（Liquid Gas Injection）形エンジンがあります。そのため、メタン（天然ガス、LNG）、エタン、メタノール、液化石油ガス（LPG）といった様々な燃料に対応できます。

We offer two types of dual fuel engines: Gas Injection (GI) engines that use fuel gas and Liquid Gas Injection (LGI) engines that use Low Flashpoint Liquid (LFL) fuel. They can be used with a variety of fuels, including methane (natural gas, LNG), ethane, methanol, and liquefied petroleum gas (LPG).

	Fuel Type	Fuel Designation
ME-GI Gas Injection	Methane	-GI
	Ethane	-GIE

	Fuel Type	Fuel Designation
ME-LGI Liquid Gas Injection	Methanol	-LGIM
	LPG	-LGIP

GHG削減に寄与

Significant GHG Reduction

代替燃料は重油よりCO_2排出量が少ないことが最大の特長です。当社のメタン焚きエンジンはメタンスリップが少なく、実質的なGHG削減に大きく貢献できます。さらに、CO_2を出さないゼロエミッション燃料として期待されているアンモニア焚きエンジンの開発も進めています。代替燃料のメタンやメタノールは硫黄分をほとんど含まないため、燃料転換によってSOx規制がクリア可能です。同時にPMも大幅に削減できます。

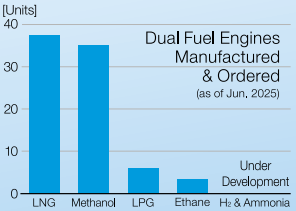
The main advantage of alternative fuels is that they emit less CO_2 than heavy fuel oil. Furthermore, our methane dual fuel engines have low methane slip and can contribute significantly to real GHG reduction. We are also developing ammonia dual fuel engines, which are expected to be a zero-emission fuel that does not emit CO_2. In addition, alternative fuels such as methane and methanol contain little to no sulfur, enabling compliance with SOx regulations through fuel conversion. At the same time, PM can be significantly reduced.

豊富な製造実績

Extensive Manufacturing Experience

三井E&Sは1994年に世界に先駆けてメタン焚きエンジンを開発しており、様々な二元燃料エンジンの豊富な受注・製造実績があります。当社の二元燃料エンジンは、業界をリードしてきた重油焚きのME形をベースにし、そこにGI/LGI関連部品を追加する形式であるため、高い信頼性があります。

MITSUI E&S was the first in the world to develop a methane dual fuel engine in 1994, and has extensive experience in the order and manufacture of a wide variety of dual fuel engines. Our dual fuel engines are highly reliable because they are based on the industry-leading fuel oil ME engines, to which we add GI/LGI components.



重油100%運転可能

Operable with 100% Fuel Oil

燃料転換の大きな課題は代替燃料の経済的な確保にあり、燃料の価格や調達状況に合わせた運用の柔軟性が重要です。当社の二元燃料エンジンは、重油のみを使用する「燃料油運転モード」と、燃料ガス／LFL燃料と少量の燃料油（パイロット油）を使用する「二元燃料運転モード」の2つの運転モードがあり、お客様の状況に合わせた運用が可能です。運航中のモード切替にも対応し、GI形エンジンでは代替燃料の使用割合の柔軟な設定も可能です。

One of the major challenges in fuel conversion is securing alternative fuels economically, and operational flexibility to match fuel prices and availability is critical. Our dual fuel engines have two operating modes: “fuel oil mode” which uses only fuel oil, and “dual fuel mode,” which uses both fuel gas or LFL fuel and a small amount of fuel oil (as pilot oil). This dual-mode capability allows operators to adapt to changing conditions, including mode switching during operation. In addition, our GI-type engines offer flexible settings for the proportion of alternative fuel used.

LNG

メタン／LNG焚きエンジン（GI）

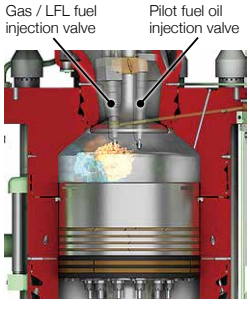
Methane Dual Fuel Engines (GI)

メタンスリップを極小化

Minimize Methane Slip

メタンは入手性に優れた代替燃料であり、船の低炭素化の重要な選択肢です。ただしCO_2の25倍の温室効果があるため、未燃メタンの大気中への流出（メタンスリップ）が問題となります。三井E&SのGI形エンジンは、ディーゼルサイクルを採用し、メタンを上死点で噴射して燃やしきることで、メタンスリップを極小化します。GI形エンジンは、着火不良やノッキングが起きにくく、燃料ガスの性状に運転が左右されにくいのも特長です。

Combustion chamber for GI/LGI



Methane is a readily available alternative fuel and an important low-carbon option for ships. However, because it has 25 times the greenhouse effect of CO_2, the release of unburned methane into the atmosphere—known as methane slip—poses a significant challenge. MITSUI E&S' GI engine uses a diesel cycle to minimize methane slip by injecting methane at the top dead center to ensure complete combustion. GI engines are also characterized by their resistance to ignition failure and knocking, and their operation is not easily affected by the properties of the fuel gas.

パイロット油を半減

Pilot Oil Reduced by Half

二元燃料エンジンには代替燃料の他に一定量のパイロット油（燃料油）が必要なため、できる限り少ないパイロット油での運航を実現することが、一層のGHG排出削減につながります。そこで最新のGI形エンジンでは、ガス運転時の燃料噴射孔の一部をふさいで、L1点でのパイロット油消費量を3%から1.5%へと半減させています。

Dual fuel engines require a certain amount of pilot oil (fuel oil) in addition to alternative fuels, so operating with as little pilot oil as possible leads to further GHG emission reductions. Therefore, the latest GI engines have halved the pilot oil consumption at the L1 point from 3% to 1.5% by partially blocking the fuel injection holes during gas operation.

Methanol

メタノール焚きエンジン（LGIM）

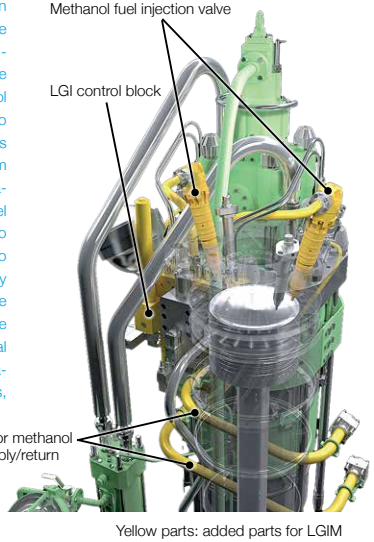
Methanol Dual Fuel Engines (LGIM)

燃料の取り扱いが容易

Easy Fuel Handling

代替燃料として急速に注目を浴びているメタノールは、再エネ水素やバイオマス由来のグリーンメタノールの場合、WtW（Well to Wake）で最大90%のGHG削減を期待できます。メタノールはNOxの排出も少なく、硫黄が含まれていないためSOxやすすの排出もほとんどありません。さらに、常温常圧で液体であり、安定性が高いために貯蔵が容易で、13barという低い圧力で燃料供給が可能です。他の代替燃料と比較して取り扱いが容易なのが特長です。この舶用メタノールエンジンを、世界で初めて製造したのは三井E&Sであり、従来の重油焚きエンジンと同等もしくは若干上回る効率を実現しています。既にメタノール運搬船向けの豊富な運転実績があり、新しい選択肢でありながら信頼性も非常に高いのが特長です。

Methanol is rapidly gaining attention as an alternative fuel, and in the case of renewable hydrogen and biomass-derived green methanol, GHG reductions of up to 90% can be expected at WtW (Well to Wake). Methanol also has low NOx emissions and almost no SOx or soot emissions because it contains no sulfur. On top of that, it is a liquid at room temperature and pressure, and its high stability makes it easy to store and supply fuel at pressures as low as 13 bar. Compared to other alternative fuels, it is extremely easy to handle. MITSUI E&S was the first company in the world to manufacture this marine methanol engine, which achieves the same or slightly higher efficiency than conventional fuel oil engines. It has an extensive operational track record for methanol carriers, making it a new option that is also extremely reliable.



Yellow parts: added parts for LGIM

Ammonia

アンモニア焚きエンジン(LGIA)

Ammonia Dual Fuel Engines (LGIA) Under Development

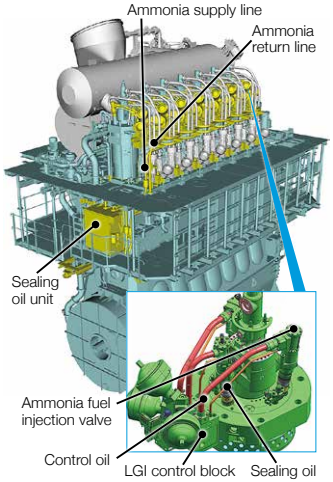
世界初 商用機の陸上試験開始

World's First Commercial Engine Shop Test Begins

2025年2月から、世界初のアンモニア焚き大型低速エンジンの試験運転を、当社の玉野工場で開始しました。この試験はライセンサーであるEverllenceの単気筒でのアンモニア燃焼試験運転の成果を基に着手しました。

分子構造に炭素を含まないアンモニアは、燃焼させてもCO_2を排出しません。硫黄も含まないためSOxやすすもほぼ排出しません。常温でも8.6barで液化するので、LNGのような極低温が不要なのも特長であり、脱炭素で重要な役割を果たしうる燃料として期待されています。アンモニアは難燃性であることが大きな課題ですが、その解決にはパイロット燃料を使用した着火方式が有効です。開発中のエンジンは、液化石油ガス運搬船で実績を積み上げてきたLGIP形をベースにしています。

In February 2025, MITSUI E&S launched the world's first test operation of an ammonia-fuelled large low-speed engine began at its Tamano Works. This groundbreaking test builds on the successful single-cylinder results of the ammonia-firing test operations carried out by the licensor Everllence.
Ammonia, which contains no carbon in its molecular structure, does not emit CO_2 when burned. It also contains no sulfur, resulting in virtually zero SOx emissions and soot. It liquefies at 8.6 bar at room temperature, so it does not require cryogenic temperatures like LNG. Ammonia's flame retardancy is a major issue, and the ignition method using pilot fuel, which is one of our specialties, is effective in solving this issue. The engine under development is based on the LGIP type, which has a proven track record in liquefied petroleum gas carriers.



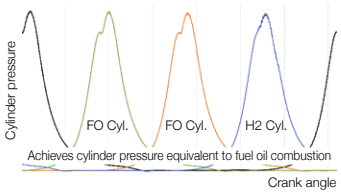
Hydrogen

水素焚き 100%負荷試験に成功

Hydrogen Combustion at 100% Load Test Succeeded

ME-GIエンジンである当社テストエンジン4S50ME-T9.7の1シリンダを水素燃焼用に改造し、100%負荷での運転に成功しました。水素漏洩などの不具合もなく、ガス燃料焚きエンジンをベースにした水素利用に一歩近づきました。

One cylinder of our test engine, 4S50ME-T9.7, an ME-GI engine, was converted for hydrogen combustion and successfully operated at 100% load. There were no hydrogen leaks or other problems. We are one step closer to hydrogen utilization based on gas-fueled engines.



本事業は2021年度にダイハツディーゼル株式会社と共に採択された国土交通省補助事業「海事産業集約連携促進技術開発費補助金」を基に実施しました。
The development of the technologies have been supported by the Ministry of Land, Infrastructure, Transport and Tourism subsidy project "Maritime Industry Aggregation and Coordination Promotion Technology Development Support Project", which was adopted jointly with Daihatsu Diesel Co., Ltd. in fiscal 2021.

燃料供給装置

Fuel Supply System

燃料転換の実現には、新たな燃料供給装置が不可欠です。
代替燃料を安心してお使いいただくために
新たな装置を積極的に開発・提供していきます。

The realization of fuel conversion requires the development of new fuel supply systems. To ensure the safe and reliable use of alternative fuels, MITSUI E&S is actively developing and delivering next-generation equipment to meet the new energy needs.

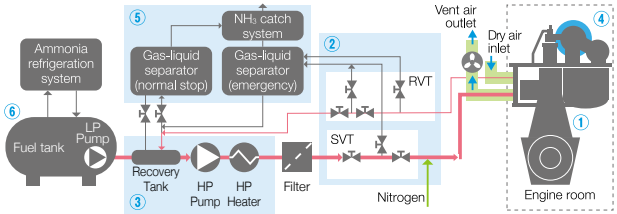
舶用アンモニア燃料供給装置

Marine Ammonia Fuel Supply System

Under Development

ゼロエミッション燃料として期待されるアンモニアについて、三井E&Sはマリン領域における脱炭素社会の実現に貢献するべく、アンモニアを貯蔵するタンクから、燃料供給／循環システム、除害装置など、システム全体の開発を進めています。2025年2月からは商用機の試験運転を玉野工場で開始しました。

In order to contribute to the realization of a decarbonized society in the marine sector, MITSUI E&S is developing the entire system, from ammonia storage tanks to fuel supply/circulation systems and detoxification equipment. In February 2025, test operation of the commercial machine started at the Tamano factory.



① Ammonia dual fuel engine (ME-LGIA)
② Fuel Valve Train (FVT)
③ Supply and recirculation system
④ SCR (for NOx Tier III & II technology)
⑤ Ammonia catch system
⑥ Ammonia fuel tank


Gas-liquid separator (normal stop)


Gas-liquid separator (emergency)

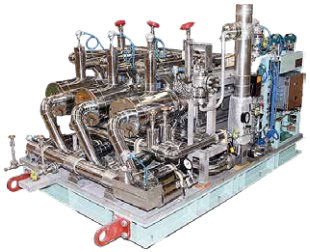

Ammonia fuel tank (Onshore facility)

本事業は国立研究開発法人新エネルギー・産業技術総合開発機構（NEDO）「グリーンイノベーション基金事業／次世代船舶の開発／アンモニア燃料船の開発／アンモニア燃料船開発と社会実装の一体型プロジェクト」の助成を受けています。
Subsidized by the New Energy and Industrial Technology Development Organization (NEDO) as a part of the Green Innovation Fund projects, Next-generation Ship Development / Development of ammonia fueled ships / Integrated project for development and social implementation of ammonia fueled ships.

MHP—LNG燃料高圧ポンプ

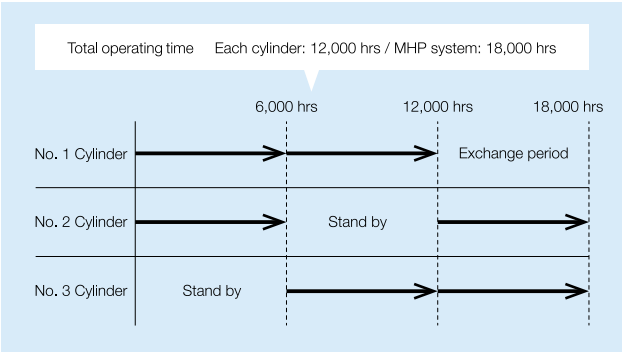
MITSUI High Pressure LNG Pump

ガス燃料焚きエンジン（ME-GI）の燃料供給機器として、独自開発したLNG燃料高圧ポンプがMHPシステムです。油圧駆動を採用し、高圧ポンプの各シリンダを個別に動作制御可能です。その結果、1本のシリンダをStand-by状態にでき、単一ユニットで冗長性を持たせられます。運転時のシリンダ動作速度を低速設計にし、シリンダを長寿命化しました。低速サイクルからの起動や緊急時の急速停止動作を制御することで、LNG吐出圧力の急上昇を防止できます。



High pressure LNG pump

We have originally developed and released the High Pressure LNG Pump (MHP system) as a fuel supply device for the dual fuel engines (ME-GI). The MHP system uses Hydraulic Drive Unit to control the operation of each cylinder of the High Pressure LNG Pump individually. This allows one cylinder to remain in stand-by mode, providing redundancy in a single unit. The cylinder operating speed during operation is designed to be slow, extending the cylinder's life-span. A sudden rise in LNG discharge pressure can be prevented by controlling start-up from a slow-speed cycle and quick stop operation in an emergency.



Life-span image of cylinder operation

MHPシリーズ仕様 MHP Series Specifications

主機の要求流量に合わせ、下記のようにシリンダ本数を選定します。同設計のシリンダをすべての型式に採用していますので、迅速なシリンダ交換が可能です。

According to the required flow rate of the main engine, the number of cylinders can be selected as shown in the table below. Cylinder used for all models have a same design, so cylinder can be replaced quickly.

	Cylinder No. →		
TYPE	MHP-3	MHP-4	MHP-5
Engine output [MW]	~ 18.6	~ 27.9	~ 37.2
Cylinder No.	3	4	5
Operation Cylinder No.	2	3	4
Flow rate [L/min]	~ 70	~ 105	~ 140
Flow rate [kg/h] (@460kg/m^3)	~ 1,932	~ 2,898	~ 3,864

＊エンジン出力は参考値とし、うちシリンダ 1 本をスタンバイ機として用いる。シリンダーは 12,000 運転時間メンテナンスフリー。オプション仕様：シリンダ全数運転（Stand-by 無し）も可能。例／適用主機：～46.5MW/ ポンプユニット（5 シリンダー運転）。 46.5MW を越える場合には、MHP を複数台搭載します

＊The engine output is a reference value, and one cylinder is standby. Cylinder is maintenance free for 12,000 run-hours. Optional specifications: Full cylinder operation (without stand-by) is also possible. (E.G.) Applicable main engine: up to 46.5 MW/pump unit (5-cylinder run). If the output exceeds 46.5 MW, multiple MHPs are installed.

高圧BOG圧縮機

High Pressure BOG Compressor

LNG燃料船向けのBOG (Boil Off Gas)圧縮機をリリースしました。本製品はBOGを高圧に圧縮することで主機の燃料として供給することができます。本技術は余剰BOGを有効活用できる燃料節約技術として注目されています。圧縮機容量はLNG燃料船の余剰BOG処理に適したものとしており、幅広い船種に適用可能です。

High Pressure BOG Compressor

We have released a BOG (Boil Off Gas) Compressor for LNG fueled vessels. The product can compress BOG to high pressure and supply it as fuel for the main engine. This technology is attracting attention as energy saving with effective utilization of excess BOG. The capacity is suitable for excess BOG treatment of LNG fueled vessels and applicable for various ship types.

システム概要 System Outline

圧縮機本体には陸上の自動車用CNGステーション向けで多数の実績のある型式を使用し、スナッバーやクーラー等の付帯品を備えた一体型ユニットとして提供します。

The compressor itself is proven type of many delivery records for land automotive CNG stations. We provide the compressor as a integrated unit including associated equipment, e.g. snubbers and coolers.

Compressor model	WT3-110GH
Compressor type	W-type 3-stage
Flow rate [kg/h]	250
Discharge pressure [MPaG]	31.5
Suction pressure [MPaG]	0.6
Drive	Electric motor and belt driven crankshaft

TGE MARINE

TGEマリンガスエンジニアリングは、液化ガス運搬船、バンカー船、FSRU向けの、液化ガスシステム・タンクの設計・エンジニアリングを専門にしています。LNG燃料ガスシステム、LNGバンカリング船、LNG浮体式貯蔵設備という先進的な分野における先駆者です。技術革新も積極的に進めており、代替燃料やCCSのためのCO_2輸送など、持続可能な未来のための技術的ソリューションを提供していきます。

TGE Marine is the leading liquefied gas systems' provider, specializing in the design and engineering of cargo handling systems and tanks for any type of liquefied gas carriers, bunker vessels and FSRUs. We are a pioneer in the dynamic field of LNG fuel gas systems, LNG bunker vessels and LNG floating storage.With our passion for innovation, we are supporting the industry with technical solutions for a sustainable future, such as alternative fuels or CO_2 transport for CCS projects.

+45 years of experience

250+ Ships Gas tanker

400+ Units Cargo & fuel gas tanks

100+ Units Fuel gas system

省エネ技術

Energy Saving Technologies

お客様の運航コストを削減する省エネ技術に、
EcoEGRや軸発電機といった新たな手法が登場しています。
従来の燃料消費率の最適化方法については
p.91をご覧ください。

Energy-saving technologies that reduce your operating costs; new technologies such as EcoEGR and shaft generators are emerging. See p. 91 for information on how to optimize conventional fuel consumption rates.

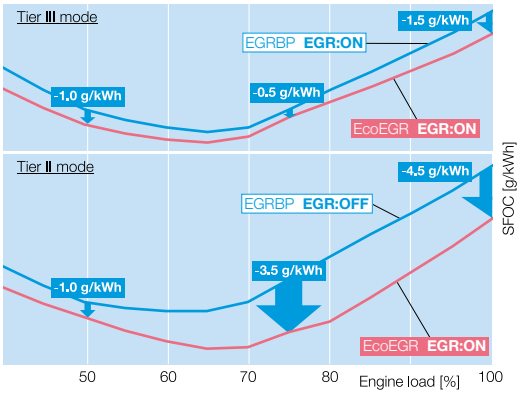
EcoEGR

EGRで燃費もNOxも改善する

Improvement of Fuel Consumption and NOx Emission with EGR

従来のエンジンチューニングでは、燃料消費率とNOx排出はトレードオフの関係にありました。この限界を打破する画期的なシステムがEcoEGRです。EcoEGRは「EGR（排気再循環）のNOx低減機能を全海域で有効活用する」という設計思想を導入。エンジンチューニングを燃料消費率優先で最適化した上で、Tier II、Tier III全海域でEGRを稼働しNOxを削減することで、燃料消費率改善とNOx削減を両立させています。このシステムはEEDI改善に大きく貢献します。二元燃料エンジンでもEcoEGRは採用可能です（ME-GIE及びME-LGIPエンジンを除く）。

Specific fuel consumption and NOx emission have been in a trade-off relation with conventional engine tuning. An EcoEGR system is breakthrough technology which overcomes this relationship. The EcoEGR has introduced a design concept of "effectively utilizing the EGR NOx reduction function in all sea areas". Both specific fuel consumption improvement and NOx reduction can be achieved by optimizing the specific fuel consumption preferentially by operating EGR in all Tier II and Tier III emission control areas to reduce NOx. EEDI can be greatly improved by applying this system. The option of EcoEGR is also available for the dual fuel engines except for the ME-GIE type and ME-LGIP type.



Comparison of SFOC curve with EcoEGR
(ex. EGRBP vs EcoEGR for S60ME-C10.5 at MCO : L1)

軸発電機

Shaft Generator

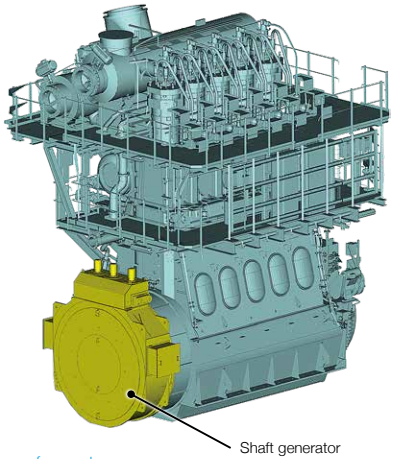
高効率なメインエンジンを発電にも利用

Highly Efficient Main Engine Also Used for Power Generation

船舶の推進力を担うメインエンジンは、高効率で多様な燃料が使用可能です。軸発電機はそのメインエンジンのクランク軸動力を発電に使用することで、船舶全体の省エネ化に貢献します。軸発電機はクランク軸のFore端に追加します。IMOなどの規制強化で省エネ促進の必要性は増しており、軸発電機には以下のような多様な利点があります。

- EEDIの改善、規制強化への対応
- 発電機エンジン運転回避によるOPEX削減（メンテナンス、SCR尿素）
- 乗組員の負担軽減
- 代替燃料利用で先行するメインエンジンの有効活用

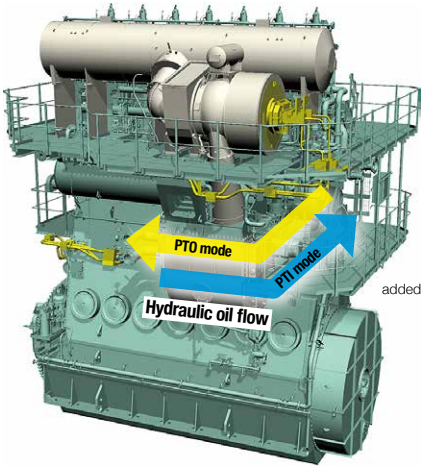
The main engine, which is responsible for propulsion of a ship, is highly efficient and can use a wide variety of fuels. Shaft generators use the crankshaft power of the main engine to generate electricity, thereby contributing to energy conservation throughout the ship. The shaft generator is added to the Fore end of the crankshaft. The need to promote energy conservation is increasing due to stricter IMO and other regulations, and shaft generators offer a variety of advantages, including the following



- EEDI improvements, compliance with stricter regulations
- OPEX reduction through avoidance of generator engine operation (maintenance, SCR urea)
- Reduce crew workload
- Effective use of main engine ahead of alternative fuel use

THS2—廃熱回収装置

Turbo Hydraulic System type2



Yellow parts : added parts for THS2

燃料消費率を最大2%削減

Max. 2% Fuel Saving

舶用エンジンに搭載される過給機は、高効率化により排ガスの余剰エネルギーを有効利用可能です。弊社が独自開発したTHS（Turbo Hydraulic System）は、その余剰エネルギーを油圧動力として回収・利用します。THSは一般的な廃熱回収装置と比較して非常にコンパクトで、機関室設計に大きな変更を必要としません。THS2は従来のTHSを踏襲しME-Cエンジンに特化したシステムで、Tier IIIエンジンにも適用可能です。また、EcoEGRと併用できます。THS2は次頁の2種類の運転モードを持ちます。

Turbocharger with THS2

Ordered Experience

Conventional type	23	All deliverd
THS2	1	

The surplus exhaust gas energy can be utilized thanks to the recent improvement of the efficiency of turbochargers for marine engines. THS (Turbo Hydraulic System), developed independently by MITSUI E&S, recovers surplus energy and uses it as hydraulic power. THS is very compact compared to other waste heat recovery systems and does not require large modifications to the engine room. The THS2 system is the successor to original THS and is specifically designed for

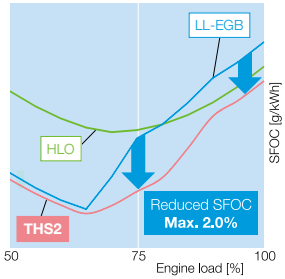
ME-C engines, but can also be applied to Tier III engines. THS2 can also be used in conjunction with EcoEGR and has two modes of operation.

PTOモード ― 油圧動力供給&主機アシスト

PTO mode - Hydraulic oil power supply and assists the engine rotation

50%負荷以上ではPTO（Power Take Out）modeを使用可能です。回収した油圧動力はエンジン内で使用され、燃料消費率を最大2%削減しEEDIを改善します。加えて余剰動力をクランク軸側に送り、主機の回転をアシストすることも可能です。

The PTO (Power Take Out) mode can be applied at 50% load or more. THS is a system which uses power hydraulically recovered from the surplus gas energy. The specific fuel consumption can be reduced by max. 2% and EEDI can be improved by the THS. In addition, it is also possible to assist the engine rotation by sending surplus power to crankshaft side.



Comparison of SFOC curve with THS2

PTIモード ― 油圧流れ逆転で過給機アシスト Option

PTI mode - Assist the T/C rotation by reversing the flow of hydraulic oil

低負荷域ではPTI（Power Take In）モードを適用可能です。過給機の回転を加勢し掃気圧を上昇させることで、補助ブロワを停止した状態で運航できる負荷範囲を拡げることができ、更なる減速運航に貢献します。さらに、主機負荷／回転速度を向上させ、加速時間を短縮することもできます。

The PTI (Power Take In) mode can be applied in the low load range. Turbocharger speed is increased and the scavenging pressure is also increased. As a result, the engine load range which is operated with the auxiliary blower stopped can be extended, contributing to further slow steaming. In addition, the engine load/speed can be increased and so that the acceleration time can be shortened.

Concept of PTI mode

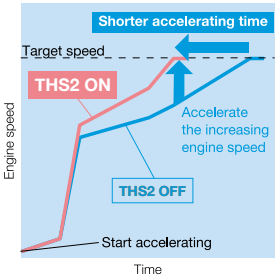


Image of improved acceleration performance by THS2

「三井品質」
を
支える人々

PEOPLE BEHIND MITSUI QUALITY

大海原への卒業試験

GRADUATION TEST TO THE OCEAN

造船所で船舶に搭載されたエンジンの、最終試験となるのが「海上試運転」です。まずは岸壁で3～5日間かけて新品のエンジンに潤滑油や冷却水などを流し、安全な起動のために各部の動作を確認します。洋上では、起動試験、耐久負荷試験、スピードテスト、機関室無人化試験、保護装置試験などを実施します。試験中は機関室や機関制御室で、計器データ、異音、異臭、振動、流体漏れを五感を研ぎ澄ませて確認します。責任の重い「卒業試験」は、知識と技術そして鋭敏な感覚がないと務まりません。試験は通常数日ですが、試験項目の多いエンジンでは、約3カ月に及んだこともあります。

The final test of an engine installed on a ship at the shipyard is a sea trial run. First, lubricating oil and cooling water are poured into the new engine for 3 to 5 days at the wharf to check the operation of each part for safe startup. At sea, startup tests, endurance load tests, speed tests, engine room unmanned tests, and protection device tests are conducted. During the tests, we check instrument data, unusual noises, odors, vibrations, and fluid leaks in the engine room and engine control room with all of our senses. The "graduation test," which is a heavy responsibility, requires knowledge, skill, and a keen sense of perception.

三井-Everllence B&W

エンジンラインナップ

MITSUI-Everllence B&W Engine Lineup

10の新しいエンジンがラインナップに加わりました。
二元燃料エンジンが充実し、特にメタン焚きエンジンの
ラインナップを拡充しました。

Ten new engines have been added to the lineup.
The dual fuel engine lineup has been expanded,
especially methane dual fuel engines.

ライセンサーのMAN Energy Solutionsの社名が
Everllenceになりました

Licensor MAN Energy Solutions has changed its name to Everllence

エンジン形式命名規則

Engine Type Designation

6 S 70 ME-C 10.5 - GI - EGRBP

Tier III technology

(blank)	Tier **II** only
EcoEGR	EGR in Tier **III** and Tier **II** mode
EGRBP	EGR with bypass matching
EGRTC	EGR with T/C cut out
HPSCR	High-pressure SCR
LPSCR	Low-pressure SCR

Fuel injection concept

(blank)	Fuel oil only
GI	Gas injection methane
GIE	Gas injection ethane
LGIM	Liquid gas injection methanol
LGIP	Liquid gas injection LPG

Dot (.) number

Mark number

Concept

ME-C	Electronically controlled

Diameter of piston in cm

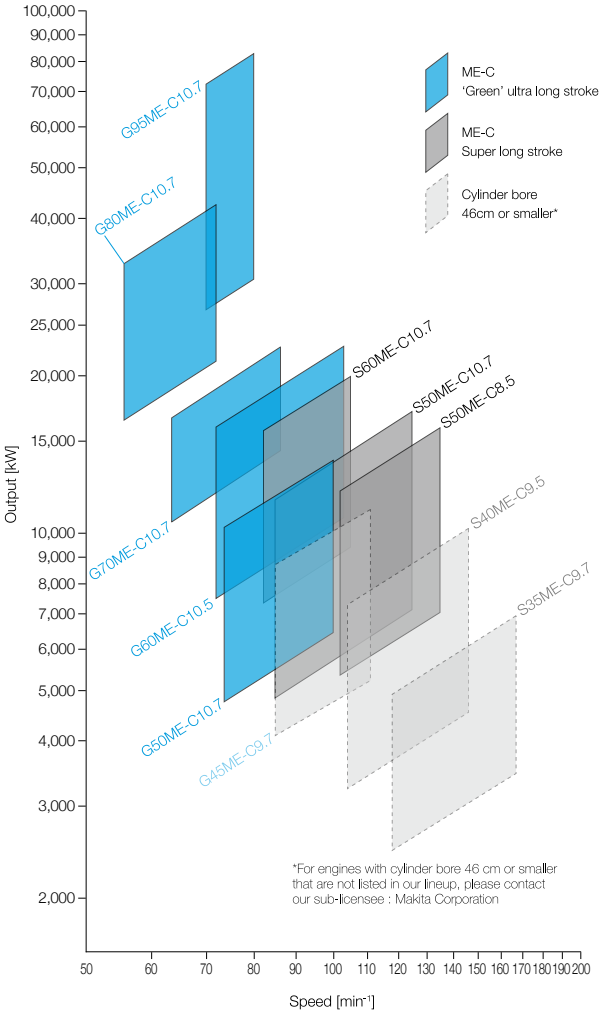
Stroke/bore ratio

G	'Green' ultra long stroke
S	Super long stroke

Number of cylinders

出力·回転速度の範囲

Output and Speed Range



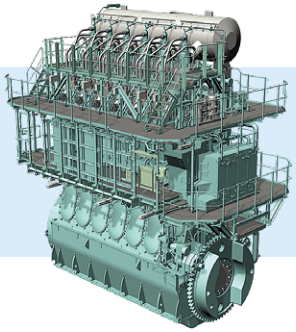
ME形エンジンの特長

Features of the ME Program

「燃費の向上」「NOx等の排出抑制」「部分負荷時の最適化」「シリンダ油消費量の削減」などを、電子制御による精密なコントロールにより、高いレベルへと引き上げるのがME形エンジンです。弊社が提供するエンジンはすべてME形です。

ME engines can achieve greater performance: “reduction of fuel consumption”, “reduction of NOx emissions”, “optimization at part load” and “reduction of cylinder oil consumption” through precise electronic control. We only supply ME type engines.

電子制御項目 Electronically Controlled Item



エンジン出力 Engine Output

本カタログに記載しているエンジン出力は kWです。kWとPS（メートル馬力）との換算は、1 PS = 75 kgfm/s = 0.7355 kW です。各エンジンの諸元表に記載しているエンジン出力は、下記の熱帯条件においても有効です。

The engine output figures in the catalog are stated in kW. For conversion between kW and PS (metric horsepower), please note that 1 PS = 75 kgfm/s = 0.7355 kW. The engine outputs stated in the specification tables for each engine are also valid for the following tropical conditions.

過給機ブロワ入口温度／Turbocharger blower inlet temperature	45 °C
空気冷却器冷却水入口温度／Air cooler cooling water inlet temperature	32 °C
大気圧／Atmospheric pressure	1,000 hPa

燃料消費率 SFOC

本カタログに記載している燃料消費率の条件および、使用燃料の低発熱量（LCV）、SFOC保証のトレランスは次のとおりです。SFOC保証点は50%～100%の範囲の負荷点で選択可能です。

The fuel consumption rate conditions, Low Calorific Value (LCV) of the fuel used, and SFOC guarantee tolerances listed in this catalog are as below. The SFOC guarantee point can be selected at a load point in the range of 50% to 100%.

ISO 15550:2002 and ISO 3046-1:2002	
過給機ブロワ入口温度／Turbocharger blower inlet temperature	25 °C
空気冷却器冷却水入口温度／Air cooler cooling water inlet temperature	25 °C
大気圧／Atmospheric pressure	1,000 hPa
過給機出口後の排気背圧（連続最大出力時） Exhaust gas back pressure (at the Maximum continuous rating)	3.0 kPa

Fuel LCV

Fuel type	Fuel designation	LCV [kJ/kg]
Fuel Oil	(blank)	42,700
Methane	-GI	50,000
Ethane	-GIE	47,500
Methanol	-LGIM	19,900
LPG	-LGIP	46,000

SFOC guarantee tolerance

100% - 85%	+5% Tolerance
< 85% - 65%	+6% Tolerance
< 65 % - 50 %	+7% Tolerance

SFOC保証は、1つの負荷点かつ1つの運転モードに対してのみ与えられます。対応可能な運転モードは以下の表のとおりです。

The SFOC guarantee point can only be given in one (1) load point and in one (1) operating mode. The supported operation modes are as shown in the table below.

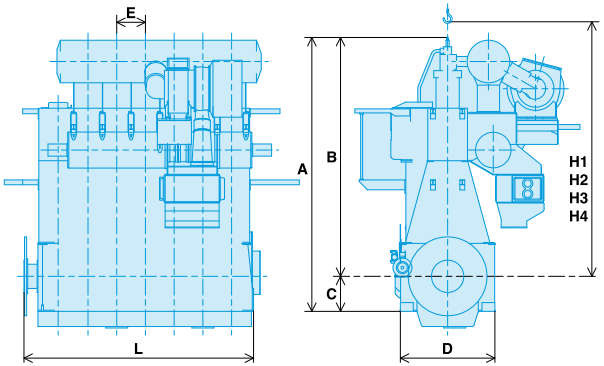
Available operating mode for SFOC guarantee

IMO NOx	Dual fuel engine	Tier III technologies	Available operating mode for SFOC guarantee			
			Fuel oil mode		Dual fuel mode*	
			Tier III	Tier II	Tier III	Tier II
Tier II engine	Without	Without		Available		
	With	Without		Available		Available
Tier III engine	Without	With	Available	Available		
	With	With	Available	Available	Available	Available

* 二元燃料運転モードの場合は、パイロット油消費率とパイロット油の低発熱量で換算されたガス/LFL燃料消費率の合計値で保証されます。
* In dual fuel operation mode, the guaranteed value is the sum of the specific pilot oil consumption and specific gas/LFL fuel consumption. Specific gas/LFL fuel consumption is converted by the LCV of the pilot oil.

主要寸法･乾燥質量

Main Dimensions and Dry Masses



本カタログに記載しているエンジンの主要寸法[mm]は、ガイダンス寸法です。解放高さ寸法は下記になります。

H1 垂直吊り高さ（シリンダカバー締付用スタッド付）
H2 斜め吊り高さ（シリンダカバー締付用スタッド付）
H3 斜め吊り高さ
（Everllence B&Wダブルジブクレーン使用の場合）
H4 垂直吊り高さ
（Everllence B&Wダブルジブクレーン使用の場合）

Tier IIIエンジンの質量は、エンジン上に直接搭載されるTier III技術関連部品の質量を含みます。エンジン質量は、標準過給機、標準回転勢車を装備した場合におけるものであり、モーメントコンペンセータ、チューニングホイール等といったオプション項目や設計点により、10%程度増量することがあります。

Main dimensions in this catalog are given in mm, for guidance only. Dismantling height;
H1: vertical lift, with cylinder cover studs.
H2: tilted lift, with cylinder cover studs.
H3: tilted lift, using Everllence B&W double-jib crane
H4: vertical lift, using Everllence B&W SE double-jib crane
The masses for Tier III engines include the masses of components of Tier III technology directly integrated on the engine. The masses are stated for engines with standard turbocharger(s), a standard turning wheel and can vary up to 10% depending on the design and options chosen such as moment compensators, tuning wheel, etc.

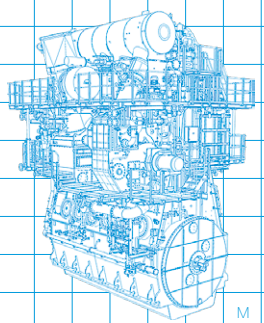
燃料別のエンジン一覧

Engine Lineup by Fuel

エンジン形式 Engine type	燃料種別 Fuel type				
	重油 Fuel Oil	メタン Methane	メタノール Methanol	LPG	エタン Ethane
	-	GI	LGIM	LGIP	GIE
G95ME-C10.7	p.37	p.47	p.65		
G95ME-C10.5		p.48			
G80ME-C10.7	p.38	p.50	p.66		
G80ME-C10.5		p.51			
G70ME-C10.7	p.39	p.53	p.67		
G70ME-C10.5	p.79	p.54			
G60ME-C10.5	p.40	p.55	p.68	p.73	
G60ME-C9.5					p.77
S60ME-C10.7	p.41	p.56	p.69		
S60ME-C10.5	p.79	p.57			
G50ME-C10.7	p.42	p.59	p.70		
G50ME-C9.6	p.79	p.80	p.80	p.74	
G50ME-C9.5					p.78
S50ME-C10.7	p.43	p.60	p.71		
S50ME-C9.7	p.80	p.61			
S50ME-C8.5	p.44				
G45ME-C9.5		p.62			
S35ME-C9.7		p.63			

■ 従来形エンジン Conventional Engine

* 当社ラインアップに記載の無い46ボア以下のエンジンについてはサブライセンシのマキタへお問い合わせ下さい
* For engines with cylinder bore 46 cm or smaller that are not listed in our lineup, please contact our sub-licensee : Makita Corporation



重油焚きエンジン
Fuel Oil Engines

各重油焚きエンジンの主要目について次頁より示します。

Main data for each fuel oil engines are shown on the following pages.

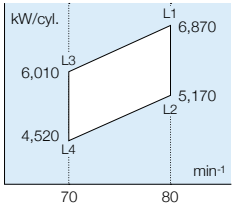
G95ME-C10.7 New Engine

Bore: 950mm
Stroke: 3,460mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
6	41,220	31,020	36,060	27,120
7	48,090	36,190	42,070	31,640
8	54,960	41,360	48,080	36,160
9	61,830	46,530	54,090	40,680
10	68,700	51,700	60,100	45,200
11	75,570	56,870	66,110	49,720
12	82,440	62,040	72,120	54,240



SFOC [g/kWh]

Tier II Engine

Optimized load range	Tuning	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
Low load	SEQ	152.9	156.9	163.5	150.0	152.6	158.5

Tier III Engine

Tier III technology **Engine type**	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
EGRTC **G95ME-C10.7-EGRTC**	Tier III	158.9	160.9	167.5	156.0	156.6	162.5
	Tier II	152.9	156.9	163.5	150.0	152.6	158.5
EcoEGR **G95ME-C10.7-EcoEGR**	Tier III	158.9	160.4	166.0	156.0	156.1	161.0
	Tier II	153.9	153.9	161.5	151.0	149.6	156.5
LPSCR **G95ME-C10.7-LPSCR**	Tier III	159.9	159.9	165.5	157.0	155.6	160.5
	Tier II	152.9	156.9	163.5	150.0	152.6	158.5

Main Dimensions and Mass

Dimensions:		A	B	C	D	E	H1
	[mm]	14,813	12,753	2,060	5,380	*	16,310

* 6-9 cyl. :1,574, 10-12cyl.: 1,574 / 1,670 (fore / aft of HPS chain drive)

Cylinders:		6	7	8	9	10	11	12
L	[mm]	11,907	13,481	16,058	17,632	19,819	21,489	23,159
Dry Mass	[t]	1,220	1,360	1,615	1,780	1,950	2,130	2,320
Added Dry Mass	EGR [t]	16	17	18	19	20	21	31
	LPSCR [t]	-	-	-	-	-	-	-

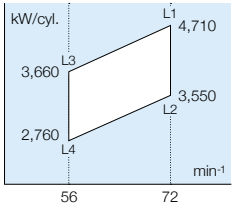
G80ME-C10.7 New Engine

Bore: 800mm
Stroke: 3,720mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
6	28,260	21,300	21,960	16,560
7	32,970	24,850	25,620	19,320
8	37,680	28,400	29,280	22,080
9	42,390	31,950	32,940	24,840



SFOC [g/kWh]

Tier II Engine

Optimized load range	Tuning	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
Low load	SEQ	153.9	157.9	164.5	151.0	153.6	159.5

Tier III Engine

Tier III technology **Engine type**	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
EGRTC **G80ME-C10.7-EGRTC**	Tier III	159.9	161.9	168.5	157.0	157.6	163.5
	Tier II	153.9	157.9	164.5	151.0	153.6	159.5
EcoEGR **G80ME-C10.7-EcoEGR**	Tier III	159.9	161.4	167.0	157.0	157.1	162.0
	Tier II	154.9	154.9	162.5	152.0	150.6	157.5
HPSCR **G80ME-C10.7-HPSCR**	Tier III	156.9	158.4	165.0	154.0	154.1	160.0
	Tier II	153.9	157.9	164.5	151.0	153.6	159.5
LPSCR **G80ME-C10.7-LPSCR**	Tier III	160.9	160.9	166.5	158.0	156.6	161.5
	Tier II	153.9	157.9	164.5	151.0	153.6	159.5

Main Dimensions and Mass

Dimensions:		A	B	C	D	E	H1
	[mm]	14,415	12,455	1,960	5,018	1,400	16,300

Cylinders:		6	7	8	9
L	[mm]	10,875	12,275	13,675	16,020
Dry Mass	[t]	900	1,000	1,110	1,240
Added Dry Mass	EGR [t]	14	14	14	15
	HPSCR [t]	4	5	5	*
	LPSCR [t]	-	-	-	-

* Available on request for HPSCR

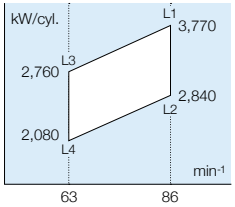
G70ME-C10.7

Bore: 700mm
Stroke: 3,256mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	18,850	14,200	13,800	10,400
6	22,620	17,040	16,560	12,480



SFOC [g/kWh]

Tier II Engine

Optimized load range	Tuning	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
Low load	EGB	157.9	158.9	165.5	155.0	154.6	160.5

Tier III Engine

*SFOC values for EGRBP are available on request

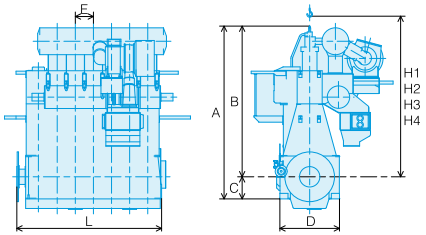
Tier III technology **Engine type**	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
EGRBP **G70ME-C10.7-EGRBP**	Tier III	*	*	*	*	*	*
	Tier II	*	*	*	*	*	*
EcoEGR **G70ME-C10.7-EcoEGR**	Tier III	161.9	162.4	168.0	159.0	158.1	163.0
	Tier II	156.9	154.9	162.5	154.0	150.6	157.5
HPSCR **G70ME-C10.7-HPSCR**	Tier III	158.9	159.4	166.0	156.0	155.1	161.0
	Tier II	157.9	158.9	165.5	155.0	154.6	160.5

Main Dimensions and Mass

** Available on request

Dimensions:	A	B	C	D	E	H1
[mm]	12,700	10,950	1,750	4,470	1,166	

Cylinders:		5	6
L [mm]		8,645	9,811
Dry Mass [t]		593	672
Added Dry Mass	EGR [t]	13	13
	HPSCR [t]	**	**



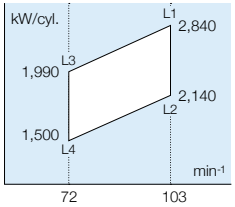
G60ME-C10.5

Bore: 600mm
Stroke: 2,790mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	14,200	10,700	9,950	7,500
6	17,040	12,840	11,940	9,000
7	19,880	14,980	13,930	10,500
8	22,720	17,120	15,920	12,000



SFOC [g/kWh]

Tier II Engine

Optimized load range	Tuning	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
Low load	EGB	158.9	159.9	166.5	156.0	155.6	161.5

Tier III Engine*

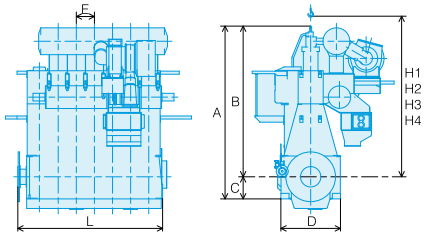
*EGRBP is available on request

Tier III technology **Engine type**	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
EcoEGR **G60ME-C10.5-EcoEGR**	Tier III	162.9	163.4	169.0	160.0	159.1	164.0
	Tier II	157.9	156.9	164.5	155.0	152.6	159.5
HPSCR **G60ME-C10.5-HPSCR**	Tier III	159.9	160.4	167.0	157.0	156.1	162.0
	Tier II	158.9	159.9	166.5	156.0	155.6	161.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H4
[mm]	11,274	9,774	1,500	4,090	1,080	12,650	11,975

Cylinders:		5	6	7	8
L [mm]		7,385	8,465	9,545	10,625
Dry Mass [t]		395	440	490	555
Added Dry Mass	EGR [t]	10	10	11	11
	HPSCR [t]	3	4	5	5



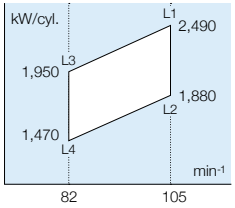
S60ME-C10.7

Bore: 600mm
Stroke: 2,400mm

Engine Output [kW]

Cyl.	L1	L2	L3	L4
5	12,450	9,400	9,750	7,350
6	14,940	11,280	11,700	8,820
7	17,430	13,160	13,650	10,290
8	19,920	15,040	15,600	11,760

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa



SFOC [g/kWh]

Tier II Engine

Optimized load range	Tuning	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
Low load	EGB	158.9	159.9	166.5	156.0	155.6	161.5

Tier III Engine

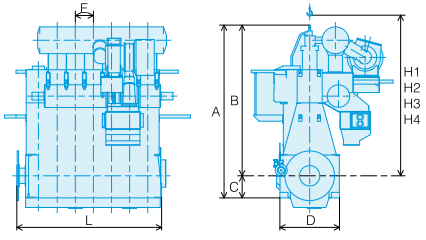
*SFOC values for EGRBP are available on request

Tier III technology **Engine type**	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
EGRBP **S60ME-C10.7-EGRBP**	Tier III	*	*	*	*	*	*
	Tier II	*	*	*	*	*	*
EcoEGR **S60ME-C10.7-EcoEGR**	Tier III	162.9	163.4	169.0	160.0	159.1	164.0
	Tier II	157.9	155.9	163.5	155.0	151.6	158.5
HPSCR **S60ME-C10.7-HPSCR**	Tier III	159.9	160.4	167.0	157.0	156.1	162.0
	Tier II	158.9	159.9	166.5	156.0	155.6	161.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	9,825	8,525	1,300	3,420	940	10,900		

Cylinders:		5	6	7	8
L [mm]		6,547	7,487	8,427	9,367
Dry Mass [t]		320	345	370	410
Added Dry Mass	EGR [t]	10	10	11	11
	HPSCR [t]	6	6	6	6



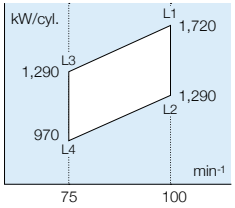
G50ME-C10.7

Bore: 500mm
Stroke: 2,500mm

Engine Output [kW]

Cyl.	L1	L2	L3	L4
5	8,600	6,450	6,450	4,850
6	10,320	7,740	7,740	5,820
7	12,040	9,030	9,030	6,790
8	13,760	10,320	10,320	7,760

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa



SFOC [g/kWh]

Tier II Engine

Optimized load range	Tuning	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
Low load	EGB	159.9	159.9	166.5	157.0	155.6	161.5

Tier III Engine

*SFOC values for EGRBP are available on request

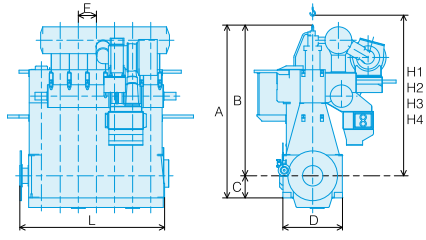
Tier III technology **Engine type**	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
EGRBP **G50ME-C10.7-EGRBP**	Tier III	*	*	*	*	*	*
	Tier II	*	*	*	*	*	*
EcoEGR **G50ME-C10.7-EcoEGR**	Tier III	163.9	163.4	169.0	161.0	159.1	164.0
	Tier II	158.9	155.9	163.5	156.0	151.6	158.5
HPSCR **G50ME-C10.7-HPSCR**	Tier III	160.9	160.4	167.0	158.0	156.1	162.0
	Tier II	159.9	159.9	166.5	157.0	155.6	161.5

Main Dimensions and Mass

** Available on request

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	9,962	8,757	1,205	**	872	11,350	10,649	9,825

Cylinders:		5	6	7	8
L [mm]		5,779	6,651	7,523	8,395
Dry Mass [t]		214	249	280	315
Added Dry Mass	EGR [t]	12	12	13	13
	HPSCR [t]	6	6	7	7



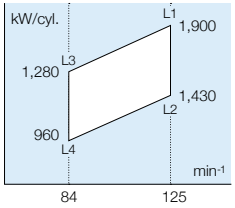
S50ME-C10.7

Bore: 500mm
Stroke: 2,214mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	9,500	7,150	6,400	4,800
6	11,400	8,580	7,680	5,760
7	13,300	10,010	8,960	6,720
8	15,200	11,440	10,240	7,680
9	17,100	12,870	11,520	8,640



SFOC [g/kWh]

Tier II Engine

Optimized load range	Tuning	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
Low load	EGB	160.9	160.9	167.5	158.0	156.6	162.5

Tier III Engine

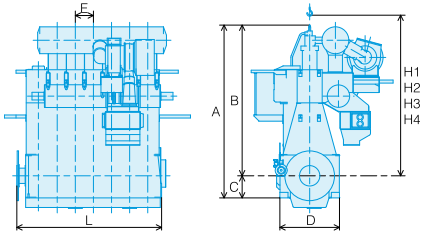
*SFOC values for EGRBP are available on request

Tier III technology **Engine type**	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
EGRBP **S50ME-C10.7-EGRBP**	Tier III	*	*	*	*	*	*
	Tier II	*	*	*	*	*	*
EcoEGR **S50ME-C10.7-EcoEGR**	Tier III	164.9	164.4	170.0	162.0	160.1	165.0
	Tier II	159.9	156.9	164.5	157.0	152.6	159.5
HPSCR **S50ME-C10.7-HPSCR**	Tier III	161.9	161.4	168.0	159.0	157.1	163.0
	Tier II	160.9	160.9	167.5	158.0	156.6	162.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	9,320	8,130	1,190	3,350	875	10,232		

Cylinders:		5	6	7	8	9
L	[mm]	5,757	6,632	7,507	8,382	9,257
Dry Mass	[t]	195	226	262	293	324
Added Dry Mass	EGR [t]	12	12	13	13	13
	HPSCR [t]	6	6	6	6	6



S50ME-C8.5

Bore: 500mm
Stroke: 2,000mm

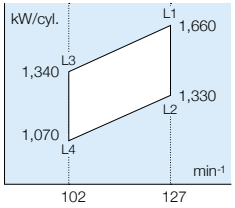
Engine Output* [kW]

MEP L1-L3: 2.00 MPa
L2-L4: 1.60 MPa

Cyl.	L1	L2	L3	L4
5	8,300	6,650	6,700	5,350
6	9,960	7,980	8,040	6,420
7	11,620	9,310	9,380	7,490
8	13,280	10,640	10,720	8,560
9	14,940	11,970	12,060	9,630

* For 10, 11 and 12 Cyl. engines, please contact us.

This engine type has the extended layout area, please see page 103



SFOC [g/kWh]

Tier II Engine

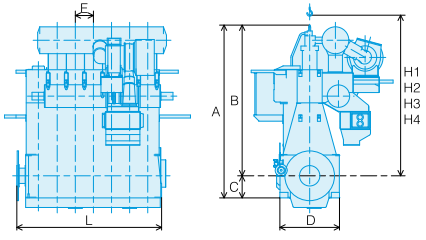
Optimized load range	Tuning	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
Low load	EGB	**	**	**	**	**	**

** SFOC values are available on request *** S50ME-C8.5-GI is available on request

Main Dimensions and Mass*

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	8,707	7,619	1,088	3,150	850	9,500	8,828	8,250

Cylinders:	5	6	7	8	9
L [mm]	5,589	6,439	7,289	8,139	8,989
Dry Mass [t]	180	210	240	270	295



「三井品質」
を
支える人々

PEOPLE BEHIND MITSUI QUALITY

燃料転換を支える超精密加工

ULTRA-PRECISION MACHINING TO SUPPORT FUEL CONVERSION

二元燃料エンジンで使用する低引火燃料は、発熱量、圧縮性、粘度、引火点の低下などの特性が重油と大きく異なります。燃料それぞれに合わせた噴射量などの精密な制御や、燃料漏洩量の低減が必要であり、それを実現したのが新型燃料弁「FBIV(Fuel Booster Injection Valve)」です。FBIVの燃料圧縮を担う部分に求められる加工精度はミクロン単位。それを実現するためにサブミクロンレベルの研削を少しずつ繰り返し、求める精度を実現しています。加工作業は、削るというより磨くレベル。担当者はミクロンレベルに感覚を研ぎ澄まし、燃料転換を実現する心臓部の製作に臨んでいます。

The characteristics of low-flash fuels used in dual fuel engines differ greatly from those of heavy fuel oils in terms of calorific value, compressibility, viscosity, and flash point reduction. The new type of fuel valve, FBIV (Fuel Booster Injection Valve), has been developed to achieve the precise control of the injection amount and reduction of fuel leakage required for each fuel. In order to achieve this, grinding at the submicron level is repeated little by little to achieve the required precision. The machining process is at the level of polishing rather than grinding. The person in charge sharpens his/her senses to the micron level to manufacture the heart of the fuel conversion.

メタン／LNG焚き二元燃料エンジン

Methane Dual Fuel Engines (ME-GI)

GI形エンジンを適用可能な機種については、燃料ガス消費率等を併せて示します。以下の燃料消費率の値を、二元燃料エンジンの表に示しています。

For models to which GI engines can be applied, GI figures such as fuel gas consumption rates are also provided. The following specific fuel consumption rates are shown in the tables for dual fuel engines.

重油運転モード Fuel oil mode	SFOC: 燃料油消費率 Specific fuel oil consumption
二元燃料運転モード Dual fuel mode	SGC: 燃料ガス消費率 Specific gas consumption
	SPOC: パイロット油消費率 Specific pilot oil consumption

G95ME-C10.7-GI

New Engine

Bore: 950mm
Stroke: 3,460mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G95ME-C10.7-GI	Dual Fuel	127.3 + 3.8	128.9 + 2.9	135.9 + 2.4	123.7 + 5.1	124.4 + 3.9	130.9 + 3.2
	Fuel Oil	153.9	157.9	164.5	151.0	153.6	159.5

Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRTC G95ME-C10.7-GI-EGRTC	Tier III	Dual Fuel	132.4 + 3.8	134.0 + 2.9	139.3 + 2.4	128.9 + 5.1	129.6 + 3.9	134.3 + 3.2
		Fuel Oil	159.9	161.9	168.5	157.0	157.6	163.5
	Tier II	Dual Fuel	127.3 + 3.8	128.9 + 2.9	135.9 + 2.4	123.7 + 5.1	124.4 + 3.9	130.9 + 3.2
		Fuel Oil	153.9	157.9	164.5	151.0	153.6	159.5
EcoEGR G95ME-C10.7-GI-EcoEGR	Tier III	Dual Fuel	132.4 + 3.8	133.6 + 2.9	138.0 + 2.4	128.9 + 5.1	129.1 + 3.9	133.0 + 3.2
		Fuel Oil	159.9	161.4	167.0	157.0	157.1	162.0
	Tier II	Dual Fuel	128.2 + 3.8	128.0 + 2.9	134.2 + 2.4	124.6 + 5.1	123.6 + 3.9	129.2 + 3.2
		Fuel Oil	154.9	154.9	162.5	152.0	150.6	157.5
LPSCR G95ME-C10.7-GI-LPSCR	Tier III	Dual Fuel	133.3 + 3.8	133.2 + 2.9	137.6 + 2.4	129.7 + 5.1	128.7 + 3.9	132.6 + 3.2
		Fuel Oil	160.9	160.9	166.5	158.0	156.6	161.5
	Tier II	Dual Fuel	127.3 + 3.8	128.9 + 2.9	135.9 + 2.4	123.7 + 5.1	124.4 + 3.9	130.9 + 3.2
		Fuel Oil	153.9	157.9	164.5	151.0	153.6	159.5

Added Dry Mass

Cylinders:	6	7	8	9	10	11	12
GI [t]	8	9	10	11	12	13	14

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for GI

→ Please see page 37

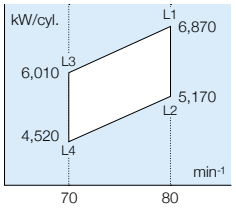
G95ME-C10.5-GI

Bore: 950mm
Stroke: 3,460mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
6	41,220	31,020	36,060	27,120
7	48,090	36,190	42,070	31,640
8	54,960	41,360	48,080	36,160
9	61,830	46,530	54,090	40,680
10	68,700	51,700	60,100	45,200
11	75,570	56,870	66,110	49,720
12	82,440	62,040	72,120	54,240



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G95ME-C10.5-GI	Dual Fuel	129.9 + 3.8	132.7 + 2.9	141.0 + 2.4	126.3 + 5.1	127.0 + 3.9	134.8 + 3.2
	Fuel Oil	155.9	157.9	164.5	153.0	153.6	159.5

Tier III Engine

* The SFOC lower than 75% load in Tier II mode is the value with T/C cut-out

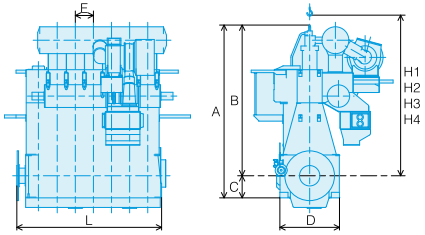
Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRTC* G95ME-C10.5-GI-EGRTC	Tier III	Dual Fuel	133.3 + 3.8	137.9 + 2.9	144.4 + 2.4	129.7 + 5.1	132.1 + 3.9	138.2 + 3.2
		Fuel Oil	159.9	161.9	168.5	157.0	157.6	163.5
	Tier II	Dual Fuel	127.3 + 3.8	132.7 + 2.9	141.0 + 2.4	123.7 + 5.1	127.0 + 3.9	134.8 + 3.2
		Fuel Oil	153.9	157.9	164.5	151.0	153.6	159.5
EcoEGR G95ME-C10.5-GI-EcoEGR	Tier III	Dual Fuel	133.3 + 3.8	137.4 + 2.9	143.1 + 2.4	129.7 + 5.1	131.7 + 3.9	136.9 + 3.2
		Fuel Oil	159.9	161.4	167.0	157.0	157.1	162.0
	Tier II	Dual Fuel	129.0 + 3.8	131.9 + 2.9	139.3 + 2.4	125.5 + 5.1	126.2 + 3.9	133.0 + 3.2
		Fuel Oil	154.9	154.9	162.5	152.0	150.6	157.5
LPSCR G95ME-C10.5-GI-LPSCR	Tier III	Dual Fuel	134.1 + 3.8	137.0 + 2.9	142.7 + 2.4	130.6 + 5.1	131.3 + 3.9	136.5 + 3.2
		Fuel Oil	160.9	160.9	166.5	158.0	156.6	161.5
	Tier II	Dual Fuel	129.9 + 3.8	132.7 + 2.9	141.0 + 2.4	126.3 + 5.1	127.0 + 3.9	134.8 + 3.2
		Fuel Oil	155.9	157.9	164.5	153.0	153.6	159.5

Main Dimensions and Mass

Dimensions:		A	B	C	D	E	H1
[mm]		14,813	12,753	2,060	5,380	*	16,310

* 6-9 cyl.:1,574, 10-12cyl.: 1,574 / 1,670 (fore / aft of HPS chain drive)

Cylinders:			6	7	8	9	10	11	12
L		[mm]	11,907	13,481	16,058	17,632	19,819	21,489	23,159
Dry Mass		[t]	1,220	1,360	1,615	1,780	1,950	2,130	2,320
Added Dry Mass	EGR	[t]	16	17	18	19	20	21	31
	LPSCR	[t]	-	-	-	-	-	-	-
	GI	[t]	8	9	10	11	12	13	14



G80ME-C10.7-GI

New Engine

Bore: 800mm
Stroke: 3,720mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G80ME-C10.7-GI	Dual Fuel	128.1 + 3.9	129.7 + 2.9	136.7 + 2.4	124.6 + 5.1	125.3 + 3.9	131.8 + 3.2
	Fuel Oil	154.9	158.9	165.5	152.0	154.6	160.5

Tier III Engine

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRTC G80ME-C10.7-GI-EGRTC	Tier III	Dual Fuel	133.3 + 3.9	134.9 + 2.9	140.1 + 2.4	129.7 + 5.1	130.4 + 3.9	135.2 + 3.2
		Fuel Oil	160.9	162.9	169.5	158.0	158.6	164.5
	Tier II	Dual Fuel	128.1 + 3.9	129.7 + 2.9	136.7 + 2.4	124.6 + 5.1	125.3 + 3.9	131.8 + 3.2
		Fuel Oil	154.9	158.9	165.5	152.0	154.6	160.5
EcoEGR G80ME-C10.7-GI-EcoEGR	Tier III	Dual Fuel	133.3 + 3.9	134.4 + 2.9	138.8 + 2.4	129.7 + 5.1	130.0 + 3.9	133.9 + 3.2
		Fuel Oil	160.9	162.4	168.0	158.0	158.1	163.0
	Tier II	Dual Fuel	129.0 + 3.9	128.9 + 2.9	135.0 + 2.4	125.4 + 5.1	124.4 + 3.9	130.0 + 3.2
		Fuel Oil	155.9	155.9	163.5	153.0	151.6	158.5
HPSCR G80ME-C10.7-GI-HPSCR	Tier III	Dual Fuel	130.7 + 3.9	131.9 + 2.9	137.1 + 2.4	127.1 + 5.1	127.4 + 3.9	132.2 + 3.2
		Fuel Oil	157.9	159.4	166.0	155.0	155.1	161.0
	Tier II	Dual Fuel	128.1 + 3.9	129.7 + 2.9	136.7 + 2.4	124.6 + 5.1	125.3 + 3.9	131.8 + 3.2
		Fuel Oil	154.9	158.9	165.5	152.0	154.6	160.5
LPSCR G80ME-C10.7-GI-LPSCR	Tier III	Dual Fuel	134.1 + 3.9	134.0 + 2.9	138.4 + 2.4	130.6 + 5.1	129.6 + 3.9	133.5 + 3.2
		Fuel Oil	161.9	161.9	167.5	159.0	157.6	162.5
	Tier II	Dual Fuel	128.1 + 3.9	129.7 + 2.9	136.7 + 2.4	124.6 + 5.1	125.3 + 3.9	131.8 + 3.2
		Fuel Oil	154.9	158.9	165.5	152.0	154.6	160.5

Added Dry Mass

Cylinders:	6	7	8	9
GI [t]	6	7	8	9

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for GI

→ Please see page **38**

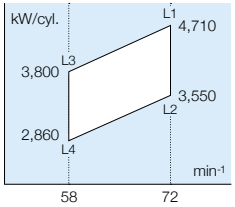
G80ME-C10.5-GI

Bore: 800mm
Stroke: 3,720mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
6	28,260	21,300	22,800	17,160
7	32,970	24,850	26,600	20,020
8	37,680	28,400	30,400	22,880
9	42,390	31,950	34,200	25,740



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G80ME-C10.5-GI	Dual Fuel	129.8 + 3.9	132.7 + 2.9	141.0 + 2.4	126.3 + 5.1	127.0 + 3.9	134.7 + 3.2
	Fuel Oil	156.9	158.9	165.5	154.0	154.6	160.5

Tier III Engine

* The SFOC lower than 75% load in Tier II mode is the value with T/C cut-out

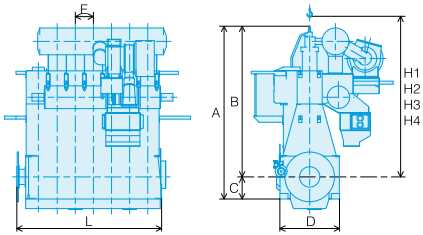
Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRTC G80ME-C10.5-GI-EGRTC	Tier III	Dual Fuel	133.3 + 3.9	137.9 + 2.9	144.4 + 2.4	129.7 + 5.1	132.1 + 3.9	138.2 + 3.2
		Fuel Oil	160.9	162.9	169.5	158.0	158.6	164.5
	Tier II	Dual Fuel	128.1 + 3.9	132.7 + 2.9	141.0 + 2.4	124.6 + 5.1	127.0 + 3.9	134.7 + 3.2
		Fuel Oil	154.9	158.9	165.5	152.0	154.6	160.5
EcoEGR G80ME-C10.5-GI-EcoEGR	Tier III	Dual Fuel	133.3 + 3.9	137.4 + 2.9	143.1 + 2.4	129.7 + 5.1	131.7 + 3.9	136.9 + 3.2
		Fuel Oil	160.9	162.4	168.0	158.0	158.1	163.0
	Tier II	Dual Fuel	129.0 + 3.9	131.9 + 2.9	139.3 + 2.4	125.4 + 5.1	126.1 + 3.9	133.0 + 3.2
		Fuel Oil	155.9	155.9	163.5	153.0	151.6	158.5
HPSCR G80ME-C10.5-GI-HPSCR	Tier III	Dual Fuel	130.7 + 3.9	134.9 + 2.9	141.4 + 2.4	127.1 + 5.1	129.1 + 3.9	135.2 + 3.2
		Fuel Oil	157.9	159.4	166.0	155.0	155.1	161.0
	Tier II	Dual Fuel	129.8 + 3.9	132.7 + 2.9	141.0 + 2.4	126.3 + 5.1	127.0 + 3.9	134.7 + 3.2
		Fuel Oil	156.9	158.9	165.5	154.0	154.6	160.5
LPSCR G80ME-C10.5-GI-LPSCR	Tier III	Dual Fuel	134.1 + 3.9	137.0 + 2.9	142.7 + 2.4	130.6 + 5.1	131.3 + 3.9	136.4 + 3.2
		Fuel Oil	161.9	161.9	167.5	159.0	157.6	162.5
	Tier II	Dual Fuel	129.8 + 3.9	132.7 + 2.9	141.0 + 2.4	126.3 + 5.1	127.0 + 3.9	134.7 + 3.2
		Fuel Oil	156.9	158.9	165.5	154.0	154.6	160.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1
[mm]	14,415	12,455	1,960	5,018	1,400	16,300

Cylinders:		6	7	8	9
L [mm]		10,875	12,275	13,675	16,020
Dry Mass [t]		900	1,000	1,110	1,240
Added Dry Mass	EGR [t]	14	14	14	15
	HPSCR [t]	4	5	5	**
	LPSCR [t]	-	-	-	-
	GI [t]	6	7	8	9

** Available on request



G70ME-C10.7-GI

New Engine

Bore: 700mm
Stroke: 3,256mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G70ME-C10.7-GI	Dual Fuel	131.5 + 3.9	130.6 + 3.0	137.5 + 2.4	128.0 + 5.2	126.1 + 3.9	132.6 + 3.2
	Fuel Oil	158.9	159.9	166.5	156.0	155.6	161.5

Tier III Engine

*SFOC values for EGRBP are available on request

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP G70ME-C10.7-GI-EGRBP	Tier III	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
	Tier II	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
EcoEGR G70ME-C10.7-GI-EcoEGR	Tier III	Dual Fuel	134.9 + 3.9	135.3 + 3.0	139.7 + 2.4	131.4 + 5.2	130.8 + 3.9	134.7 + 3.2
		Fuel Oil	162.9	163.4	169.0	160.0	159.1	164.0
	Tier II	Dual Fuel	130.7 + 3.9	128.9 + 3.0	135.0 + 2.4	127.1 + 5.2	124.4 + 3.9	130.0 + 3.2
		Fuel Oil	157.9	155.9	163.5	155.0	151.6	158.5
HPSCR G70ME-C10.7-GI-HPSCR	Tier III	Dual Fuel	132.4 + 3.9	132.7 + 3.0	138.0 + 2.4	128.8 + 5.2	128.3 + 3.9	133.0 + 3.2
		Fuel Oil	159.9	160.4	167.0	157.0	156.1	162.0
	Tier II	Dual Fuel	131.5 + 3.9	130.6 + 3.0	137.5 + 2.4	128.0 + 5.2	126.1 + 3.9	132.6 + 3.2
		Fuel Oil	158.9	159.9	166.5	156.0	155.6	161.5

Added Dry Mass

Cylinders:	5	6
GI [t]	5	6

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for GI

→ Please see page 39

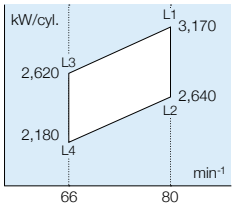
G70ME-C10.5-GI

Bore: 700mm
Stroke: 3,256mm

Engine Output [kW]

MEP L1-L3: 1.90 MPa, L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	15,850	13,200	13,100	10,900
6	19,020	15,840	15,720	13,080



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G70ME-C10.5-GI	Dual Fuel	133.0 + 3.9	134.1 + 3.0	142.1 + 2.5	130.8 + 4.7	130.6 + 3.6	138.3 + 3.0
	Fuel Oil	160.7	161.1	167.5	158.9	158.5	164.4

Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP G70ME-C10.5-GI-EGRBP	Tier III	Dual Fuel	137.3 + 3.9	139.2 + 3.0	145.5 + 2.5	135.1 + 4.7	135.7 + 3.6	141.7 + 3.0
		Fuel Oil	165.7	165.1	171.5	163.9	162.5	168.4
	Tier II	Dual Fuel	133.0 + 3.9	134.5 + 3.0	143.4 + 2.5	130.8 + 4.7	131.0 + 3.6	139.6 + 3.0
		Fuel Oil	160.7	161.6	169.0	158.9	159.0	165.9
EcoEGR G70ME-C10.5-GI-EcoEGR	Tier III	Dual Fuel	136.4 + 3.9	138.8 + 3.0	144.2 + 2.5	134.3 + 4.7	135.3 + 3.6	140.4 + 3.0
		Fuel Oil	164.7	164.6	170.0	162.9	162.0	166.9
	Tier II	Dual Fuel	132.2 + 3.9	133.3 + 3.0	140.4 + 2.5	130.0 + 4.7	129.7 + 3.6	136.6 + 3.0
		Fuel Oil	159.7	158.1	165.5	157.9	155.5	162.4
HPSCR G70ME-C10.5-GI-HPSCR	Tier III	Dual Fuel	133.9 + 3.9	136.2 + 3.0	142.5 + 2.5	131.7 + 4.7	132.7 + 3.6	138.7 + 3.0
		Fuel Oil	161.7	161.6	168.0	159.9	159.0	164.9
	Tier II	Dual Fuel	133.0 + 3.9	134.1 + 3.0	142.1 + 2.5	130.8 + 4.7	130.6 + 3.6	138.3 + 3.0
		Fuel Oil	160.7	161.1	167.5	158.9	158.5	164.4

Main Dimensions and Mass

Dimensions:			
	A	[mm]	12,700
	B	[mm]	10,950
	C	[mm]	1,750
	D	[mm]	4,470
	E	[mm]	1,044
	H1	[mm]	14,150

Cylinders:			5	6
	L	[mm]	7,399	8,443
	Dry Mass	[t]	525	590
Added Dry Mass	EGR	[t]	11	11
	HPSCR	[t]	3	3
	GI	[t]	5	6

G60ME-C10.5-GI

Bore: 600mm
Stroke: 2,790mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G60ME-C10.5-GI	Dual Fuel	132.4 + 3.9	134.4 + 3.0	142.7 + 2.5	128.8 + 5.2	128.7 + 4.0	136.4 + 3.3
	Fuel Oil	159.9	160.9	167.5	157.0	156.6	162.5

Tier III Engine*

*EGRBP is available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EcoEGR G60ME-C10.5-GI-EcoEGR	Tier III	Dual Fuel	135.8 + 3.9	139.1 + 3.0	144.8 + 2.5	132.2 + 5.2	133.4 + 4.0	138.5 + 3.3
		Fuel Oil	163.9	164.4	170.0	161.0	160.1	165.0
	Tier II	Dual Fuel	131.5 + 3.9	133.5 + 3.0	140.9 + 2.5	127.9 + 5.2	127.8 + 4.0	134.7 + 3.3
		Fuel Oil	158.9	157.9	165.5	156.0	153.6	160.5
HPSCR G60ME-C10.5-GI-HPSCR	Tier III	Dual Fuel	133.2 + 3.9	136.5 + 3.0	143.1 + 2.5	129.7 + 5.2	130.8 + 4.0	136.8 + 3.3
		Fuel Oil	160.9	161.4	168.0	158.0	157.1	163.0
	Tier II	Dual Fuel	132.4 + 3.9	134.4 + 3.0	142.7 + 2.5	128.8 + 5.2	128.7 + 4.0	136.4 + 3.3
		Fuel Oil	159.9	160.9	167.5	157.0	156.6	162.5

Added Dry Mass

Cylinders:	5	6	7	8
GI [t]	5	5	6	7

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for GI
→ Please see page 40

S60ME-C10.7-GI

Bore: 600mm
Stroke: 2,400mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
S60ME-C10.7-GI	Dual Fuel	132.4 + 3.9	131.4 + 3.0	138.4 + 2.5	128.8 + 5.2	127.0 + 3.9	133.4 + 3.3
	Fuel Oil	159.9	160.9	167.5	157.0	156.6	162.5

Tier III Engine

*SFOC values for EGRBP are available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP S60ME-C10.7-GI-EGRBP	Tier III	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
	Tier II	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
EcoEGR S60ME-C10.7-GI-EcoEGR	Tier III	Dual Fuel	135.8 + 3.9	136.1 + 3.0	140.5 + 2.5	132.2 + 5.2	131.7 + 3.9	135.6 + 3.3
		Fuel Oil	163.9	164.4	170.0	161.0	160.1	165.0
	Tier II	Dual Fuel	131.5 + 3.9	129.7 + 3.0	135.8 + 2.5	128.0 + 5.2	125.3 + 3.9	130.9 + 3.3
		Fuel Oil	158.9	156.9	164.5	156.0	152.6	159.5
HPSCR S60ME-C10.7-GI-HPSCR	Tier III	Dual Fuel	133.2 + 3.9	133.5 + 3.0	138.8 + 2.5	129.7 + 5.2	129.1 + 3.9	133.9 + 3.3
		Fuel Oil	160.9	161.4	168.0	158.0	157.1	163.0
	Tier II	Dual Fuel	132.4 + 3.9	131.4 + 3.0	138.4 + 2.5	128.8 + 5.2	127.0 + 3.9	133.4 + 3.3
		Fuel Oil	159.9	160.9	167.5	157.0	156.6	162.5

Added Dry Mass

Cylinders:	5	6	7	8
GI [t]	5	5	6	7

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for GI
→ Please see page 41

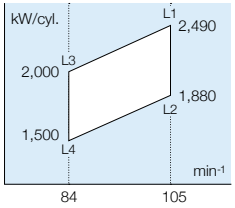
S60ME-C10.5-GI

Bore: 600mm
Stroke: 2,400mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	12,450	9,400	10,000	7,500
6	14,940	11,280	12,000	9,000
7	17,430	13,160	14,000	10,500
8	19,920	15,040	16,000	12,000



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
S60ME-C10.5-GI	Dual Fuel	134.9 + 4.0	136.9 + 3.0	145.2 + 2.5	131.3 + 5.3	131.2 + 4.0	138.9 + 3.3
	Fuel Oil	162.9	163.9	170.5	160.0	159.6	165.5

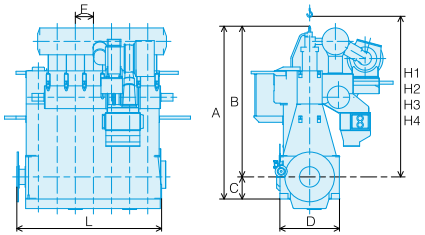
Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP S60ME-C10.5-GI-EGRBP	Tier III	Dual Fuel	139.1 + 4.0	142.0 + 3.0	148.6 + 2.5	135.6 + 5.3	136.3 + 4.0	142.3 + 3.3
		Fuel Oil	167.9	167.9	174.5	165.0	163.6	169.5
	Tier II	Dual Fuel	134.9 + 4.0	137.3 + 3.0	146.5 + 2.5	131.3 + 5.3	131.6 + 4.0	140.2 + 3.3
		Fuel Oil	162.9	164.4	172.0	160.0	160.1	167.0
EcoEGR S60ME-C10.5-GI-EcoEGR	Tier III	Dual Fuel	138.3 + 4.0	141.6 + 3.0	147.3 + 2.5	134.7 + 5.3	135.9 + 4.0	141.1 + 3.3
		Fuel Oil	166.9	167.4	173.0	164.0	163.1	168.0
	Tier II	Dual Fuel	134.0 + 4.0	136.1 + 3.0	143.5 + 2.5	130.4 + 5.3	130.3 + 4.0	137.2 + 3.3
		Fuel Oil	161.9	160.9	168.5	159.0	156.6	163.5
HPSCR S60ME-C10.5-GI-HPSCR	Tier III	Dual Fuel	135.7 + 4.0	139.1 + 3.0	145.6 + 2.5	132.1 + 5.3	133.3 + 4.0	139.4 + 3.3
		Fuel Oil	163.9	164.4	171.0	161.0	160.1	166.0
	Tier II	Dual Fuel	134.9 + 4.0	136.9 + 3.0	145.2 + 2.5	131.3 + 5.3	131.2 + 4.0	138.9 + 3.3
		Fuel Oil	162.9	163.9	170.5	160.0	159.6	165.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	9,825	8,525	1,300	3,420	940	10,950		10,125

Cylinders:		5	6	7	8
L [mm]		6,502	7,442	8,382	9,322
Dry Mass [t]		305	330	355	395
Added Dry Mass	EGR [t]	10	10	11	11
	HPSCR [t]	6	6	6	6
	GI [t]	5	5	6	7



G50ME-C10.7-GI

New Engine

Bore: 500mm
Stroke: 2,500mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G50ME-C10.7-GI	Dual Fuel	133.2 + 3.9	131.4 + 3.0	138.4 + 2.5	129.6 + 5.2	126.9 + 4.0	133.4 + 3.3
	Fuel Oil	160.9	160.9	167.5	158.0	156.6	162.5

Tier III Engine

*SFOC values for EGRBP are available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP G50ME-C10.7-GI-EGRBP	Tier III	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
	Tier II	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
EcoEGR G50ME-C10.7-GI-EcoEGR	Tier III	Dual Fuel	136.6 + 3.9	136.1 + 3.0	140.5 + 2.5	133.0 + 5.2	131.6 + 4.0	135.5 + 3.3
		Fuel Oil	164.9	164.4	170.0	162.0	160.1	165.0
	Tier II	Dual Fuel	132.4 + 3.9	129.7 + 3.0	135.8 + 2.5	128.8 + 5.2	125.2 + 4.0	130.8 + 3.3
		Fuel Oil	159.9	156.9	164.5	157.0	152.6	159.5
HPSCR G50ME-C10.7-GI-HPSCR	Tier III	Dual Fuel	134.1 + 3.9	133.5 + 3.0	138.8 + 2.5	130.5 + 5.2	129.0 + 4.0	133.8 + 3.3
		Fuel Oil	161.9	161.4	168.0	159.0	157.1	163.0
	Tier II	Dual Fuel	133.2 + 3.9	131.4 + 3.0	138.4 + 2.5	129.6 + 5.2	126.9 + 4.0	133.4 + 3.3
		Fuel Oil	160.9	160.9	167.5	158.0	156.6	162.5

Added Dry Mass

Cylinders:	5	6	7	8
GI [t]	4	4	5	5

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for GI

→ Please see page 42

S50ME-C10.7-GI

New Engine

Bore: 500mm
Stroke: 2,214mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
S50ME-C10.7-GI	Dual Fuel	134.1 + 3.9	132.3 + 3.0	139.2 + 2.5	130.5 + 5.2	127.8 + 4.0	134.3 + 3.3
	Fuel Oil	161.9	161.9	168.5	159.0	157.6	163.5

Tier III Engine

*SFOC values for EGRBP are available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP S50ME-C10.7-GI-EGRBP	Tier III	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
	Tier II	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
EcoEGR S50ME-C10.7-GI-EcoEGR	Tier III	Dual Fuel	137.5 + 3.9	136.9 + 3.0	141.4 + 2.5	133.9 + 5.2	132.4 + 4.0	136.4 + 3.3
		Fuel Oil	165.9	165.4	171.0	163.0	161.1	166.0
	Tier II	Dual Fuel	133.2 + 3.9	130.5 + 3.0	136.7 + 2.5	129.6 + 5.2	126.0 + 4.0	131.7 + 3.3
		Fuel Oil	160.9	157.9	165.5	158.0	153.6	160.5
HPSCR S50ME-C10.7-GI-HPSCR	Tier III	Dual Fuel	134.9 + 3.9	134.4 + 3.0	139.7 + 2.5	131.3 + 5.2	129.9 + 4.0	134.7 + 3.3
		Fuel Oil	162.9	162.4	169.0	160.0	158.1	164.0
	Tier II	Dual Fuel	134.1 + 3.9	132.3 + 3.0	139.2 + 2.5	130.5 + 5.2	127.8 + 4.0	134.3 + 3.3
		Fuel Oil	161.9	161.9	168.5	159.0	157.6	163.5

Added Dry Mass

Cylinders:	5	6	7	8	9
GI [t]	4	4	5	5	6

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for GI

→ Please see page 43

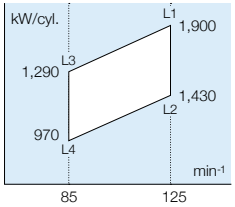
S50ME-C9.7-GI

Bore: 500mm
Stroke: 2,214mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	9,500	7,150	6,450	4,850
6	11,400	8,580	7,740	5,820
7	13,300	10,010	9,030	6,790
8	15,200	11,440	10,320	7,760
9	17,100	12,870	11,610	8,730



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
S50ME-C9.7-GI	Dual Fuel	135.7 + 4.0	136.9 + 3.0	145.2 + 2.5	132.1 + 5.3	131.1 + 4.0	138.9 + 3.3
	Fuel Oil	163.9	163.9	170.5	161.0	159.6	165.5

Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP S50ME-C9.7-GI-EGRBP	Tier III	Dual Fuel	140.0 + 4.0	142.0 + 3.0	148.6 + 2.5	136.4 + 5.3	136.2 + 4.0	142.3 + 3.3
		Fuel Oil	168.9	167.9	174.5	166.0	163.6	169.5
	Tier II	Dual Fuel	135.7 + 4.0	137.3 + 3.0	146.5 + 2.5	132.1 + 5.3	131.6 + 4.0	140.2 + 3.3
		Fuel Oil	163.9	164.4	172.0	161.0	160.1	167.0
HPSCR S50ME-C9.7-GI-HPSCR	Tier III	Dual Fuel	136.6 + 4.0	139.1 + 3.0	145.6 + 2.5	133.0 + 5.3	133.3 + 4.0	139.3 + 3.3
		Fuel Oil	164.9	164.4	171.0	162.0	160.1	166.0
	Tier II	Dual Fuel	135.7 + 4.0	136.9 + 3.0	145.2 + 2.5	132.1 + 5.3	131.1 + 4.0	138.9 + 3.3
		Fuel Oil	163.9	163.9	170.5	161.0	159.6	165.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	9,320	8,130	1,190	3,350	875	10,232		8,850

Cylinders:		5	6	7	8	9
L [mm]		5,757	6,632	7,507	8,382	9,257
Dry Mass [t]		193	223	259	289	320
Added Dry Mass	EGRBP [t]	12	12	13	13	13
	HPSCR [t]	4	4	5	6	7
	GI [t]	4	4	5	5	6

G45ME-C9.5-GI

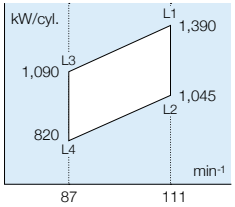
Bore: 450mm
Stroke: 2,250mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Tier II Engine

Cyl.	L1	L2	L3	L4
5	6,950	5,225	5,450	4,100
6	8,340	6,270	6,540	4,920
7	9,730	7,315	7,630	5,740
8	11,120	8,360	8,720	6,560



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G45ME-C9.5-GI	Dual Fuel	130.9 + 13.6	134.1 + 10.4	143.4 + 8.6	124.6 + 18.1	126.2 + 13.8	135.5 + 11.4
	Fuel Oil	167.9	167.9	174.5	165.0	163.6	169.5

Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP G45ME-C9.5-GI-EGRBP	Tier III	Dual Fuel	135.2 + 13.6	139.2 + 10.4	146.8 + 8.6	128.9 + 18.1	131.3 + 13.8	138.9 + 11.4
		Fuel Oil	172.9	171.9	178.5	170.0	167.6	173.5
	Tier II	Dual Fuel	130.9 + 13.6	134.5 + 10.4	144.7 + 8.6	124.6 + 18.1	126.6 + 13.8	136.7 + 11.4
		Fuel Oil	167.9	168.4	176.0	165.0	164.1	171.0
HPSCR G45ME-C9.5-GI-HPSCR	Tier III	Dual Fuel	131.8 + 13.6	136.2 + 10.4	143.9 + 8.6	125.5 + 18.1	128.4 + 13.8	135.9 + 11.4
		Fuel Oil	168.9	168.4	175.0	166.0	164.1	170.0
	Tier II	Dual Fuel	130.9 + 13.6	134.1 + 10.4	143.4 + 8.6	124.6 + 18.1	126.2 + 13.8	135.5 + 11.4
		Fuel Oil	167.9	167.9	174.5	165.0	163.6	169.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	9,063	7,894	1,169	3,260	784	10,220		9,275

Cylinders:		5	6	7	8
L [mm]		5,209	5,993	6,777	7,561
Dry Mass [t]		163	183	206	234
Added Dry Mass	EGRBP [t]	12	12	12	12
	HPSCR [t]	3	3	4	4
	GI [t]	4	4	5	5

S35ME-C9.7-GI

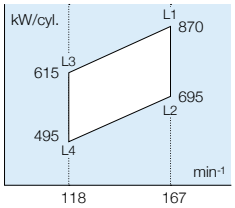
Bore: 350mm
Stroke: 1,550mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.68 MPa

Tier II Engine

Cyl.	L1	L2	L3	L4
5	4,350	3,475	3,075	2,475
6	5,220	4,170	3,690	2,970
7	6,090	4,865	4,305	3,465
8	6,960	5,560	4,920	3,960



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
S35ME-C9.7-GI	Dual Fuel	131.8 + 13.6	134.1 + 10.4	143.4 + 8.6	126.9 + 17.0	127.6 + 13.0	136.9 + 10.7
	Fuel Oil	168.9	167.9	174.5	166.6	164.4	170.5

Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
HPSCR S35ME-C9.7-GI-HPSCR	Tier III	Dual Fuel	132.6 + 13.6	136.2 + 10.4	143.9 + 8.6	127.8 + 17.0	129.8 + 13.0	137.3 + 10.7
		Fuel Oil	169.9	168.4	175.0	167.6	164.9	171.0
	Tier II	Dual Fuel	131.8 + 13.6	134.1 + 10.4	143.4 + 8.6	126.9 + 17.0	127.6 + 13.0	136.9 + 10.7
		Fuel Oil	168.9	167.9	174.5	166.6	164.4	170.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	6,501	5,670	831	2,300	612	7,200		6,275

Cylinders:		5	6	7	8
L [mm]		4,107	4,719	5,331	5,943
Dry Mass [t]		77	87	98	108
Added Dry Mass	HPSCR [t]	3	3	4	4
	GI [t]	3	3	4	4

メタノール焚き二元燃料エンジン

Methanol Dual Fuel Engines (ME-LGIM)

LGIM形エンジンを適用可能な機種については、メタノール消費率等を併せて示します。以下の燃料消費率の値を、二元燃料エンジンの表に示しています。

For models to which LGIM engines can be applied, LGIM figures such as fuel methanol consumption rates are also provided. The following specific fuel consumption rates are shown in the tables for dual fuel engines.

重油運転モード Fuel oil mode	SFOC: 燃料油消費率 Specific fuel oil consumption
二元燃料運転モード Dual fuel mode	SGC: 燃料ガス消費率 Specific gas consumption
	SPOC: パイロット油消費率 Specific pilot oil consumption

G95ME-C10.7-LGIM

New Engine

Bore: 950mm
Stroke: 3,460mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G95ME-C10.7-LGIM	Dual Fuel	298.5 + 12.8	307.1 + 9.8	327.1 + 8.1	283.3 + 17.0	291.1 + 13.0	310.7 + 10.7
	Fuel Oil	153.9	157.9	164.5	151.0	153.6	159.5

Tier III Engine

* LPSCR for LGIM is available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRTC G95ME-C10.7-LGIM-EGRTC	Tier III	Dual Fuel	311.4 + 12.8	322.1 + 9.8	335.7 + 8.1	296.2 + 17.0	306.1 + 13.0	319.3 + 10.7
		Fuel Oil	159.9	161.9	168.5	157.0	157.6	163.5
	Tier II	Dual Fuel	298.5 + 12.8	307.1 + 9.8	327.1 + 8.1	283.3 + 17.0	291.1 + 13.0	310.7 + 10.7
		Fuel Oil	153.9	157.9	164.5	151.0	153.6	159.5
EcoEGR G95ME-C10.7-LGIM-EcoEGR	Tier III	Dual Fuel	311.4 + 12.8	321.0 + 9.8	332.5 + 8.1	296.2 + 17.0	305.0 + 13.0	316.1 + 10.7
		Fuel Oil	159.9	161.4	167.0	157.0	157.1	162.0
	Tier II	Dual Fuel	300.7 + 12.8	304.9 + 9.8	322.8 + 8.1	285.4 + 17.0	288.9 + 13.0	306.4 + 10.7
		Fuel Oil	154.9	153.9	162.5	152.0	149.6	157.5

Added Dry Mass

Cylinders:	6	7	8	9	10	11	12
LGIM [t]	9	10	11	12	13	14	15

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for LGIM

→ Please see page **37**

G80ME-C10.7-LGIM

New Engine

Bore: 800mm
Stroke: 3,720mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G80ME-C10.7-LGIM	Dual Fuel	300.5 + 12.9	309.1 + 9.8	329.2 + 8.1	285.3 + 17.1	293.1 + 13.0	312.7 + 10.7
	Fuel Oil	154.9	158.9	165.5	152.0	154.6	160.5

Tier III Engine*

* LPSCR for LGIM is available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRTC G80ME-C10.7-LGIM-EGRTC	Tier III	Dual Fuel	313.4 + 12.9	324.1 + 9.8	337.7 + 8.1	298.1 + 17.1	308.1 + 13.0	321.3 + 10.7
		Fuel Oil	160.9	162.9	169.5	158.0	158.6	164.5
	Tier II	Dual Fuel	300.5 + 12.9	309.1 + 9.8	329.2 + 8.1	285.3 + 17.1	293.1 + 13.0	312.7 + 10.7
		Fuel Oil	154.9	158.9	165.5	152.0	154.6	160.5
EcoEGR G80ME-C10.7-LGIM-EcoEGR	Tier III	Dual Fuel	313.4 + 12.9	323.0 + 9.8	334.5 + 8.1	298.1 + 17.1	307.0 + 13.0	318.1 + 10.7
		Fuel Oil	160.9	162.4	168.0	158.0	158.1	163.0
	Tier II	Dual Fuel	302.6 + 12.9	306.9 + 9.8	324.9 + 8.1	287.4 + 17.1	290.9 + 13.0	308.5 + 10.7
		Fuel Oil	155.9	154.9	163.5	153.0	150.6	158.5
HPSCR G80ME-C10.7-LGIM-HPSCR	Tier III	Dual Fuel	306.9 + 12.9	316.6 + 9.8	330.2 + 8.1	291.7 + 17.1	300.6 + 13.0	313.8 + 10.7
		Fuel Oil	157.9	159.4	166.0	155.0	155.1	161.0
	Tier II	Dual Fuel	300.5 + 12.9	309.1 + 9.8	329.2 + 8.1	285.3 + 17.1	293.1 + 13.0	312.7 + 10.7
		Fuel Oil	154.9	158.9	165.5	152.0	154.6	160.5

Added Dry Mass

Cylinders:	6	7	8	9
LGIM [t]	7	8	9	10

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for LGIM

→ Please see page **38**

G70ME-C10.7-LGIM

Bore: 700mm
Stroke: 3,256mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G70ME-C10.7-LGIM	Dual Fuel	308.9 + 12.9	311.1 + 9.9	331.2 + 8.2	293.6 + 17.2	295.1 + 13.1	314.7 + 10.8
	Fuel Oil	158.9	159.9	166.5	156.0	155.6	161.5

Tier III Engine

*SFOC values for EGRBP are available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP G70ME-C10.7-LGIM-EGRBP	Tier III	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
	Tier II	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
EcoEGR G70ME-C10.7-LGIM-EcoEGR	Tier III	Dual Fuel	317.5 + 12.9	325.1 + 9.9	336.6 + 8.2	302.2 + 17.2	309.0 + 13.1	320.1 + 10.8
		Fuel Oil	162.9	163.4	169.0	160.0	159.1	164.0
	Tier II	Dual Fuel	306.8 + 12.9	309.0 + 9.9	326.9 + 8.2	291.4 + 17.2	292.9 + 13.1	310.4 + 10.8
		Fuel Oil	157.9	155.9	164.5	155.0	151.6	159.5
HPSCR G70ME-C10.7-LGIM-HPSCR	Tier III	Dual Fuel	311.1 + 12.9	318.6 + 9.9	332.3 + 8.2	295.7 + 17.2	302.6 + 13.1	315.8 + 10.8
		Fuel Oil	159.9	160.4	167.0	157.0	156.1	162.0
	Tier II	Dual Fuel	308.9 + 12.9	311.1 + 9.9	331.2 + 8.2	293.6 + 17.2	295.1 + 13.1	314.7 + 10.8
		Fuel Oil	158.9	159.9	166.5	156.0	155.6	161.5

Added Dry Mass

Cylinders:	5	6
LGIM [t]	6	7

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for LGIM
→ Please see page 39

G60ME-C10.5-LGIM

Bore: 600mm
Stroke: 2,790mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G60ME-C10.5-LGIM	Dual Fuel	316.8 + 13.3	319.2 + 10.1	339.3 + 8.4	301.3 + 17.6	303.0 + 13.4	322.8 + 11.1
	Fuel Oil	162.9	163.9	170.5	160.0	159.6	165.5

Tier III Engine*

*EGRBP is available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EcoEGR G60ME-C10.5-LGIM-EcoEGR	Tier III	Dual Fuel	325.4 + 13.3	333.1 + 10.1	344.7 + 8.4	309.9 + 17.6	316.9 + 13.4	328.1 + 11.1
		Fuel Oil	166.9	167.4	173.0	164.0	163.1	168.0
	Tier II	Dual Fuel	314.7 + 13.3	317.0 + 10.1	335.1 + 8.4	299.1 + 17.6	300.8 + 13.4	318.5 + 11.1
		Fuel Oil	161.9	159.9	168.5	159.0	155.6	163.5
HPSCR G60ME-C10.5-LGIM-HPSCR	Tier III	Dual Fuel	319.0 + 13.3	326.7 + 10.1	340.4 + 8.4	303.4 + 17.6	310.5 + 13.4	323.8 + 11.1
		Fuel Oil	163.9	164.4	171.0	161.0	160.1	166.0
	Tier II	Dual Fuel	316.8 + 13.3	319.2 + 10.1	339.3 + 8.4	301.3 + 17.6	303.0 + 13.4	322.8 + 11.1
		Fuel Oil	162.9	163.9	170.5	160.0	159.6	165.5

Added Dry Mass

Cylinders:	5	6	7	8
LGIM [t]	5	5	6	7

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for LGIM
→ Please see page 40

S60ME-C10.7-LGIM

Bore: 600mm
Stroke: 2,400mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
S60ME-C10.7-LGIM	Dual Fuel	310.9 + 13.0	313.1 + 9.9	333.2 + 8.2	295.6 + 17.2	297.1 + 13.2	316.8 + 10.9
	Fuel Oil	159.9	160.9	167.5	157.0	156.6	162.5

Tier III Engine

*SFOC values for EGRBP are available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP S60ME-C10.7-LGIM-EGRBP	Tier III	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
	Tier II	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
EcoEGR S60ME-C10.7-LGIM-EcoEGR	Tier III	Dual Fuel	319.5 + 13.0	327.1 + 9.9	338.6 + 8.2	304.2 + 17.2	311.0 + 13.2	322.2 + 10.9
		Fuel Oil	163.9	164.4	170.0	161.0	160.1	165.0
	Tier II	Dual Fuel	308.7 + 13.0	311.0 + 9.9	328.9 + 8.2	293.4 + 17.2	294.9 + 13.2	312.5 + 10.9
		Fuel Oil	158.9	156.9	165.5	156.0	152.6	160.5
HPSCR S60ME-C10.7-LGIM-HPSCR	Tier III	Dual Fuel	313.0 + 13.0	320.6 + 9.9	334.3 + 8.2	297.7 + 17.2	304.6 + 13.2	317.9 + 10.9
		Fuel Oil	160.9	161.4	168.0	158.0	157.1	163.0
	Tier II	Dual Fuel	310.9 + 13.0	313.1 + 9.9	333.2 + 8.2	295.6 + 17.2	297.1 + 13.2	316.8 + 10.9
		Fuel Oil	159.9	160.9	167.5	157.0	156.6	162.5

Added Dry Mass

Cylinders:	5	6	7	8
LGIM [t]	5	5	6	7

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for LGIM
→ Please see page 41

G50ME-C10.7-LGIM

New Engine

Bore: 500mm
Stroke: 2,500mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G50ME-C10.7-LGIM	Dual Fuel	313.0 + 13.0	313.1 + 9.9	333.2 + 8.2	297.5 + 17.4	296.8 + 13.2	316.6 + 10.9
	Fuel Oil	160.9	160.9	167.5	158.0	156.6	162.5

Tier III Engine

*SFOC values for EGRBP are available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP G50ME-C10.7-LGIM-EGRBP	Tier III	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
	Tier II	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
EcoEGR G50ME-C10.7-LGIM-EcoEGR	Tier III	Dual Fuel	321.6 + 13.0	327.1 + 9.9	338.6 + 8.2	306.1 + 17.4	310.8 + 13.2	322.0 + 10.9
		Fuel Oil	164.9	164.4	170.0	162.0	160.1	165.0
	Tier II	Dual Fuel	310.9 + 13.0	311.0 + 9.9	328.9 + 8.2	295.3 + 17.4	294.7 + 13.2	312.3 + 10.9
		Fuel Oil	159.9	156.9	165.5	157.0	152.6	160.5
HPSCR G50ME-C10.7-LGIM-HPSCR	Tier III	Dual Fuel	315.2 + 13.0	320.6 + 9.9	334.3 + 8.2	299.6 + 17.4	304.3 + 13.2	317.7 + 10.9
		Fuel Oil	161.9	161.4	168.0	159.0	157.1	163.0
	Tier II	Dual Fuel	313.0 + 13.0	313.1 + 9.9	333.2 + 8.2	297.5 + 17.4	296.8 + 13.2	316.6 + 10.9
		Fuel Oil	160.9	160.9	167.5	158.0	156.6	162.5

Added Dry Mass

Cylinders:	5	6	7	8
LGIM [t]	7	7	8	9

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for GI
→ Please see page 42

S50ME-C10.7-LGIM

Bore: 500mm
Stroke: 2,214mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
S50ME-C10.7-LGIM	Dual Fuel	315.0 + 13.1	315.1 + 10.0	335.3 + 8.3	299.5 + 17.4	298.9 + 13.3	318.7 + 11.0
	Fuel Oil	161.9	161.9	168.5	159.0	157.6	163.5

Tier III Engine

*SFOC values for EGRBP are available on request

Tier III technology / Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
EGRBP S50ME-C10.7-LGIM-EGRBP	Tier III	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
	Tier II	Dual Fuel	*	*	*	*	*	*
		Fuel Oil	*	*	*	*	*	*
EcoEGR S50ME-C10.7-LGIM-EcoEGR	Tier III	Dual Fuel	323.6 + 13.1	329.1 + 10.0	340.6 + 8.3	308.1 + 17.4	312.8 + 13.3	324.1 + 11.0
		Fuel Oil	165.9	165.4	171.0	163.0	161.1	166.0
	Tier II	Dual Fuel	312.9 + 13.1	313.0 + 10.0	331.0 + 8.3	297.4 + 17.4	296.7 + 13.3	314.4 + 11.0
		Fuel Oil	160.9	157.9	166.5	158.0	153.6	161.5
HPSCR S50ME-C10.7-LGIM-HPSCR	Tier III	Dual Fuel	317.1 + 13.1	322.6 + 10.0	336.3 + 8.3	301.7 + 17.4	306.4 + 13.3	319.8 + 11.0
		Fuel Oil	162.9	162.4	169.0	160.0	158.1	164.0
	Tier II	Dual Fuel	315.0 + 13.1	315.1 + 10.0	335.3 + 8.3	299.5 + 17.4	298.9 + 13.3	318.7 + 11.0
		Fuel Oil	161.9	161.9	168.5	159.0	157.6	163.5

Added Dry Mass

Cylinders:	5	6	7	8	9
LGIM [t]	7	7	8	9	10

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for LGIM

→ Please see page 43

LPG焚き二元燃料エンジン

LPG Dual Fuel Engines (ME-LGIP)

LGIP形エンジンを適用可能な機種については、LPG消費率等を併せて示します。以下の燃料消費率の値を、二元燃料エンジンの表に示しています。

For models to which LGIP engines can be applied, LGIP figures such as fuel gas consumption rates are also provided. The following specific fuel consumption rates are shown in the tables for dual fuel engines.

重油運転モード Fuel oil mode	SFOC: 燃料油消費率 Specific fuel oil consumption
二元燃料運転モード Dual fuel mode	SGC: 燃料ガス消費率 Specific gas consumption
	SPOC: パイロット油消費率 Specific pilot oil consumption

G60ME-C10.5-LGIP

Bore: 600mm
Stroke: 2,790mm

SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G60ME-C10.5-LGIP	Dual Fuel	139.1 + 13.0	142.4 + 9.9	149.7 + 8.2	132.5 + 17.3	135.5 + 13.2	142.6 + 10.9
	Fuel Oil	159.9	160.9	167.5	157.0	156.6	162.5

Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
HPSCR G60ME-C10.5-LGIP-HPSCR	Tier III	Dual Fuel	140.1 + 13.0	142.9 + 9.9	150.2 + 8.2	133.4 + 17.3	135.9 + 13.2	143.1 + 10.9
		Fuel Oil	160.9	161.4	168.0	158.0	157.1	163.0
	Tier II	Dual Fuel	139.1 + 13.0	142.4 + 9.9	149.7 + 8.2	132.5 + 17.3	135.5 + 13.2	142.6 + 10.9
		Fuel Oil	159.9	160.9	167.5	157.0	156.6	162.5

Added Dry Mass

Cylinders:	5	6	7	8
LGIP [t]	5	6	7	8

Engine Output
Speed Range
Main Dimensions
Dry Masses
Added Dry Masses Except for LGIP

→ Please see page 40

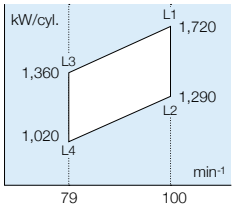
G50ME-C9.6-LGIP

Bore: 500mm
Stroke: 2,500mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	8,600	6,450	6,800	5,100
6	10,320	7,740	8,160	6,120
7	12,040	9,030	9,520	7,140
8	13,760	10,320	10,880	8,160
9	15,480	11,610	12,240	9,180



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G50ME-C9.6-LGIP	Dual Fuel	143.5 + 13.3	145.9 + 10.2	153.3 + 8.4	136.7 + 17.8	138.8 + 13.6	146.0 + 11.2
	Fuel Oil	164.9	164.9	171.5	162.0	160.6	166.5

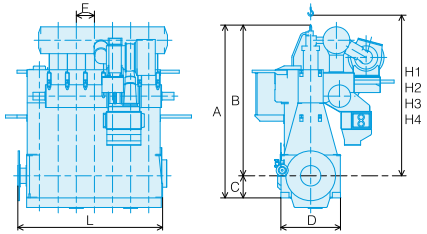
Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
HPSCR G50ME-C9.6-LGIP-HPSCR	Tier III	Dual Fuel	144.4 + 13.3	146.4 + 10.2	153.7 + 8.4	137.6 + 17.8	139.2 + 13.6	146.5 + 11.2
		Fuel Oil	165.9	165.4	172.0	163.0	161.1	167.0
	Tier II	Dual Fuel	143.5 + 13.3	145.9 + 10.2	153.3 + 8.4	136.7 + 17.8	138.8 + 13.6	146.0 + 11.2
		Fuel Oil	164.9	164.9	171.5	162.0	160.6	166.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	9,962	8,757	1,205	3,776	872	11,350	10,649	9,825

Cylinders:		5	6	7	8	9
L [mm]		5,779	6,651	7,523	8,395	9,267
Dry Mass [t]		211	246	276	311	346
Added Dry Mass	HPSCR [t]	6	6	7	7	7
	LGIP [t]	6	6	7	8	9



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GIE形エンジンを適用可能な機種については、燃料ガス消費率等を併せて示します。以下の燃料消費率の値を、二元燃料エンジンの表に示しています。

For models to which GIE engines can be applied, GIE figures such as fuel gas consumption rates are also provided. The following specific fuel consumption rates are shown in the tables for dual fuel engines.

重油運転モード Fuel oil mode	SFOC: 燃料油消費率 Specific fuel oil consumption
二元燃料運転モード Dual fuel mode	SGC: 燃料ガス消費率 Specific gas consumption
	SPOC: パイロット油消費率 Specific pilot oil consumption

エタン焚き二元燃料エンジン

Ethane Dual Fuel Engines (ME-GIE)

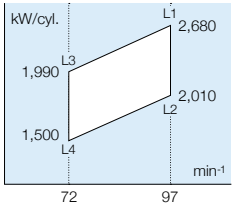
G60ME-C9.5-GIE

Bore: 600mm
Stroke: 2,790mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	13,400	10,050	9,950	7,500
6	16,080	12,060	11,940	9,000
7	18,760	14,070	13,930	10,500
8	21,440	16,080	15,920	12,000



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G60ME-C9.5-GIE	Dual Fuel	137.2 + 13.3	140.9 + 10.1	148.5 + 8.4	130.6 + 17.7	134.1 + 13.5	141.5 + 11.1
	Fuel Oil	165.9	166.9	173.5	163.0	162.6	168.5

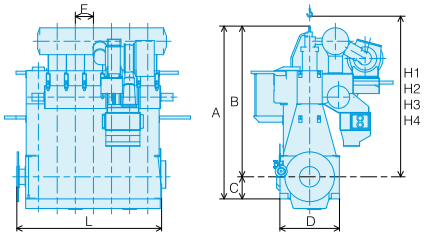
Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
HPSCR G60ME-C9.5-GIE-HPSCR	Tier III	Dual Fuel	138.1 + 13.3	141.4 + 10.1	148.9 + 8.4	131.5 + 17.7	134.5 + 13.5	141.9 + 11.1
		Fuel Oil	166.9	167.4	174.0	164.0	163.1	169.0
	Tier II	Dual Fuel	137.2 + 13.3	140.9 + 10.1	148.5 + 8.4	130.6 + 17.7	134.1 + 13.5	141.5 + 11.1
		Fuel Oil	165.9	166.9	173.5	163.0	162.6	168.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	11,274	9,774	1,500	4,090	1,080	12,750		11,550

Cylinders:		5	6	7	8
L [mm]		7,385	8,465	9,545	10,625
Dry Mass [t]		395	440	490	555
Added Dry Mass	HPSCR [t]	3	4	5	5
	GIE [t]	5	6	7	7



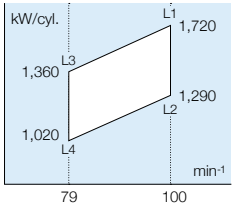
G50ME-C9.5-GIE

Bore: 500mm
Stroke: 2,500mm

Engine Output [kW]

MEP L1-L3: 2.10 MPa
L2-L4: 1.58 MPa

Cyl.	L1	L2	L3	L4
5	8,600	6,450	6,800	5,100
6	10,320	7,740	8,160	6,120
7	12,040	9,030	9,520	7,140
8	13,760	10,320	10,880	8,160
9	15,480	11,610	12,240	9,180



SGC + SPOC, SFOC [g/kWh]

Tier II Engine

Engine type	Mode	L1 - L3			L2 - L4		
		50%	75%	100%	50%	75%	100%
G50ME-C9.5-GIE	Dual Fuel	138.9 + 13.3	141.8 + 10.2	149.3 + 8.4	132.3 + 17.8	134.8 + 13.6	142.3 + 11.2
	Fuel Oil	167.9	167.9	174.5	165.0	163.6	169.5

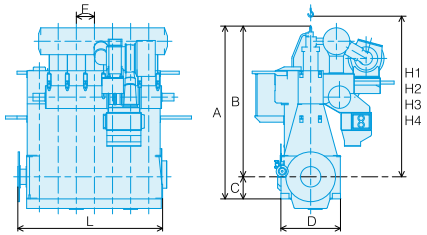
Tier III Engine

Tier III technology Engine type	Mode		L1 - L3			L2 - L4		
			50%	75%	100%	50%	75%	100%
HPSCR G50ME-C9.5-GIE-HPSCR	Tier III	Dual Fuel	139.8 + 13.3	142.2 + 10.2	149.8 + 8.4	133.2 + 17.8	135.3 + 13.6	142.8 + 11.2
		Fuel Oil	168.9	168.4	175.0	166.0	164.1	170.0
	Tier II	Dual Fuel	138.9 + 13.3	141.8 + 10.2	149.3 + 8.4	132.3 + 17.8	134.8 + 13.6	142.3 + 11.2
		Fuel Oil	167.9	167.9	174.5	165.0	163.6	169.5

Main Dimensions and Mass

Dimensions:	A	B	C	D	E	H1	H2	H3
[mm]	9,962	8,757	1,205	3,776	872	11,300		9,825

Cylinders:		5	6	7	8	9
L [mm]		5,779	6,651	7,523	8,395	9,267
Dry Mass [t]		211	246	276	311	346
Added Dry Mass	HPSCR [t]	6	6	7	7	7
	GIE [t]	4	4	5	5	6



従来形エンジン

Conventional Engines

以下に記載するエンジンは、より効率の高い新形エンジンに将来的に置き換えられるため、今後のカタログには掲載しない予定です。しかし、これら機種は個別対応として今後も製造可能です。新たなプロジェクトに対しては、より新しいエンジン形式の選定を推奨いたします。Tier IIエンジン、Tier IIIエンジンおよび二元燃料エンジンとしての対応可否については、弊社までお問い合わせください。

The engines listed below will not be included in future catalogs as they will be replaced by newer, more efficient engines. However, we will continue to produce these engines on a case-by-case basis. For new projects, we recommend choosing the newer engine types. Please contact us to inquire about Tier II, Tier III and dual fuel engine availability.

G70ME-C10.5

Bore: 700 mm, Stroke: 3,256 mm

5 - 6 cyl.		L1	L2	L3	L4
Output / cyl.	kW	3,170	2,640	2,500	2,080
Speed	min^{-1}	80	80	63	63
MEP	MPa	2.10	1.58	2.10	1.58
SFOC (Tier II, Low load)	g/kWh	166.5	163.4	166.5	163.4

S60ME-C10.5

Bore: 600 mm, Stroke: 2,400 mm

5 - 8 cyl.		L1	L2	L3	L4
Output / cyl.	kW	2,490	1,880	2,000	1,500
Speed	min^{-1}	105	105	84	84
MEP	MPa	2.10	1.58	2.10	1.58
SFOC (Tier II, Low load)	g/kWh	169.5	164.5	169.5	164.5

G50ME-C9.6

Bore: 500 mm, Stroke: 2,500 mm

5 - 9 cyl.		L1	L2	L3	L4
Output / cyl.	kW	1,720	1,290	1,360	1,020
Speed	min^{-1}	100	100	79	79
MEP	MPa	2.10	1.58	2.10	1.58
SFOC (Tier II, Low load)	g/kWh	170.5	165.5	170.5	165.5

G50ME-C9.6-GI

Bore: 500 mm, Stroke: 2,500 mm

5 - 9 cyl.		L1	L2	L3	L4
Output / cyl.	kW	1,720	1,290	1,360	1,020
Speed	min^{-1}	100	100	79	79
MEP	MPa	2.10	1.58	2.10	1.58
SFOC (Fuel oil, Tier II, Low load)	g/kWh	171.5	166.5	171.5	166.5

G50ME-C9.6-LGIM

Bore: 500 mm, Stroke: 2,500 mm

5 - 9 cyl.		L1	L2	L3	L4
Output / cyl.	kW	1,720	1,290	1,360	1,020
Speed	min^{-1}	100	100	79	79
MEP	MPa	2.10	1.58	2.10	1.58
SFOC (Fuel oil, Tier II, Low load)	g/kWh	171.5	166.5	171.5	166.5

S50ME-C9.7

Bore: 500 mm, Stroke: 2,214 mm

5 - 9 cyl.		L1	L2	L3	L4
Output / cyl.	kW	1,900	1,430	1,290	970
Speed	min^{-1}	125	125	85	85
MEP	MPa	2.10	1.58	2.10	1.58
SFOC (Tier II, Low load)	g/kWh	169.5	164.5	169.5	164.5

排ガス過給機ラインナップ

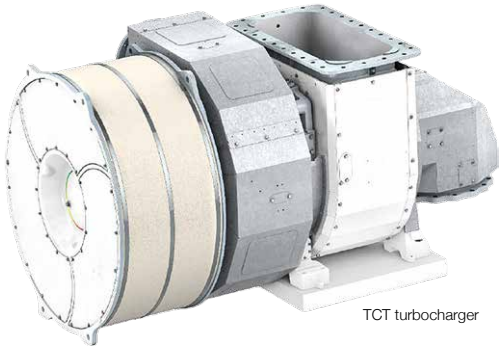
Exhaust Gas Turbochargers Lineup

TCT/TCA過給機とMET過給機から、三井-Everllence B&Wエンジンに最適な過給機を提供します。

We provide the optimal turbochargers for MITSUI-Everllence B&W engines from our TCT/TCA turbochargers and MET turbochargers.

TCT過給機

TCT Turbocharger



TCT turbocharger

TCT過給機は従来のTCAをベースに、堅牢性を維持したまま最大41%軽量化したコンパクトな軸流過給機です。TCA過給機よりもオーバーホール間隔を延長し、メンテナンス性が向上しています。TCT70/80も順次リリース予定です。

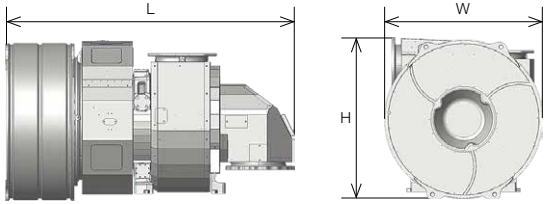
The TCT turbocharger is a compact axial flow turbocharger that is based on the conventional TCA type turbocharger, but it is up to 41% lighter while maintaining robustness of the TCA. It has a longer overhaul interval and improved maintainability than the TCA turbocharger. The TCT70/80 types will be released in due course.

TCTシリーズの仕様 TCT Series Program

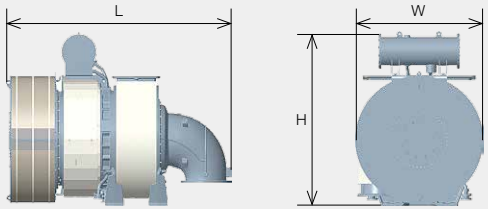
Turbine type	Axial flow turbine
Max. permissible temp.	520 °C
Pressure ratio	up to 4.7

* Under development

Type	Supercharged engine output [kW]	Length [mm]	Width [mm]	Height [mm]
TCT30	7,500	2,040	1,125	1,135
TCT40	9,460	2,290	1,260	1,275
TCT50	12,000	2,580	1,420	1,435
TCT60	15,120	2,900	1,595	1,610
TCT70*	19,040	3,250	1,790	1,805
TCT80*	24,030	3,650	2,010	2,028



TCAシリーズの仕様 TCA Series Program

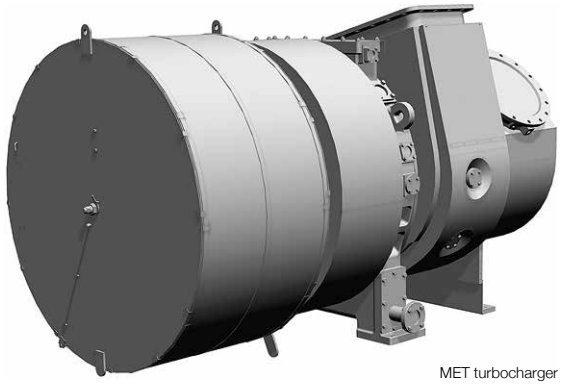


Turbine type	Axial flow turbine
Max. permissible temp.	500 °C
Pressure ratio	up to 4.4

Type	Supercharged engine output [kW]	Length [mm]	Width [mm]	Height [mm]
TCA44	7,000	2,190	1,100	1,614
TCA55	9,600	2,439	1,371	1,989
TCA66	14,000	2,888	1,625	2,191
TCA77	20,000	3,422	1,930	2,692
TCA88	30,000	4,033	2,270	2,950

MET-MB / MET-MBⅡ過給機

MET-MB/MET-MBII Turbocharger



MET turbocharger

MET-MB/MET-MBⅡは高い信頼性とメンテナンス性を有した軸流過給機です。MET-MBⅡはMET-MBに比べ最大16%の大風量化により、過給機を小型軽量化しています。MET過給機については、需要に応じてライセンス生産の形式を適宜拡大していく予定です。

The MET-MB/MET-MBII are axial turbochargers that are both highly reliable and easy-to-maintain. The compressor capacity of the MET-MBII is improved by up to 16% compared to the MET-MB, making it lighter and with a smaller footprint. The MET turbocharger lineup of licensed production will be expanded as needed according to demand.

MET-MB / MET-MBⅡシリーズの仕様

MET-MB/MET-MBII Series Program

Turbine type	Axial flow turbine
Max. permissible temp.	580 °C
Pressure ratio	up to 5.0

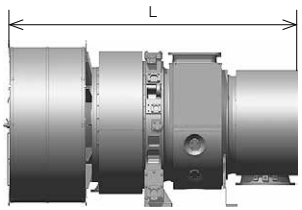
MET-MB Series

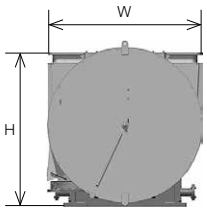
Type	Supercharged engine output [kW]	Length [mm]	Width [mm]	Height [mm]
MET33MB	4,600	1,661	899	945
MET37MB	6,300	1,851	998	1,095
MET42MB*	7,700	1,944	1,134	1,155
MET48MB	10,000	2,280	1,255	1,330
MET53MB	12,500	2,504	1,417	1,435
MET60MB	15,500	2,825	1,530	1,540
MET66MB	19,400	3,065	1,785	1,720
MET71MB	22,700	3,143	1,820	1,865
MET83MB	31,100	3,771	2,233	2,180
MET90MB	37,900	4,241	2,465	2,410

MET-MBⅡ Series

Type	Supercharged engine output [kW]	Length [mm]	Width [mm]	Height [mm]
MET33MBII	6,000	1,870	899	945
MET37MBII	7,600	2,080	998	1,095
MET42MBII*	9,300	2,190	1,094	1,171
MET48MBII*	11,900	2,400	1,255	1,330
MET53MBII	14,900	2,610	1,390	1,439
MET60MBII	18,400	2,960	1,530	1,570
MET66MBII*	23,100	3,200	1,718	1,780
MET71MBII	27,100	3,290	1,820	1,865
MET83MBII	37,100	3,940	2,233	2,225

*In-house production as of June 2025





NOx対策

NOx Reduction

三井E&Sは窒素酸化物（NOx）の
規制をクリアする、多彩な技術を提供可能です。
お客様の船のニーズに合わせて、最適な技術をご提案いたします。

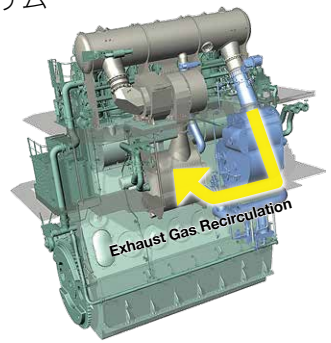
MITSUI E&S can provide a wide range of technologies
that meet regulations for nitrogen oxides (NOx) .
We will propose the most suitable technology to meet your ship's needs.

EGR—排気再循環

Exhaust Gas Recirculation

経済性の高いNOx削減システム

Highly Economical NOx Reduction System



EGRは排ガスの一部を冷却・清浄した後、掃気レシーバへ再循環するシステムです。これにより掃気中の酸素含有量が低下して、熱容量が増大し、燃焼温度最高点が低下してNOx生成が低減されます。エンジン形式や過給機台数により、Bypass matchingまたはT/C cut-out matchingのいずれかの方式が適用されます。

Bypass Matching（EGRBP）
過給機1台、シリンダボア70cm以下のエンジン用

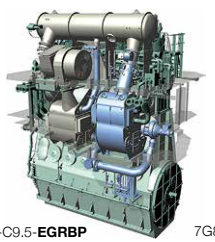
T/C Cut-out Matching（EGRTC）
過給機2台以上、シリンダボア80cm以上のエンジン用

In the EGR system, after a cooling and cleaning process, part of the exhaust gas is recirculated to the scavenging air receiver. This replacement decreases the oxygen content and increases the heat capacity of the scavenge air, thus reducing the temperature peak of the combustion and the formation of NOx. Two different methods; bypass matching or T/C cut-out matching are used for the EGR systems depending on the engine type or the number of turbocharger.

Bypass Matching (EGRBP)
1 turbocharger & engines with a cylinder bore size of 70cm or less

T/C Cut-out Matching (EGRTC)
2 or more turbochargers & engines with a cylinder bore size of 80cm or more

The blue part in the right figures shows the parts added by applying the EGR



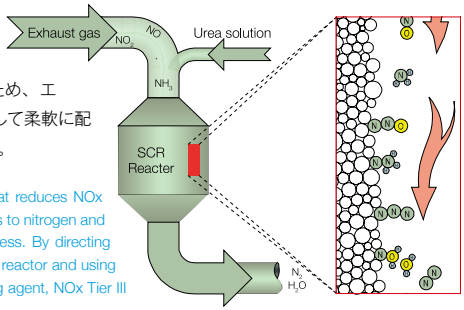
6G60ME-C9.5-**EGRBP**

7G80ME-C9.5-**EGRTC**

SCR—選択的触媒還元

Selective Catalytic Reduction

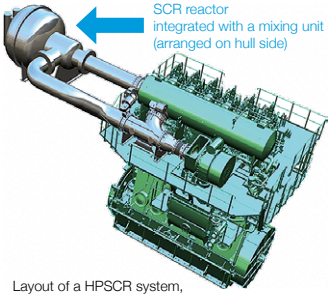
SCRは排ガスに含まれるNOxを窒素と水に還元し無害化する技術です。排ガスをSCR反応器へと導き、尿素水を還元剤とすることで、NOx Tier Ⅲ要件を満たします。SCRシステムには、高圧SCR（HPSCR）と低圧SCR（LPSCR）があります。HPSCRの反応器は過給機上流側に設置するため、エンジンの近くに配置されます。なお、SCR運転の間、使用する燃料の硫黄分を0.1%以下に制限する場合は、LPSCRを選択可能です。LPSCRは過給機出口後の排ガス管に接続されるため、エンジンからSCRを離して柔軟に配置することができます。



SCR is a technology that reduces NOx contained in exhaust gas to nitrogen and water rendering it harmless. By directing exhaust gas to the SCR reactor and using urea water as a reducing agent, NOx Tier III requirements are met. SCR systems are available in high pressure SCR (HPSCR) and low pressure SCR (LPSCR). The HPSCR reactor is installed upstream of the turbocharger, so it is located close to the engine. However, if the sulfur content of the fuel used during SCR operation is limited to 0.1% or less, the LPSCR can be selected. The LPSCR is connected to the exhaust pipe after the turbocharger outlet, allowing for flexible placement of the SCR away from the engine.

注記 Note

- SCRシステムはエンジンと連携しますが、SCR系統はエンジン支給品ではありません。システムは弊社からの仕様に基づく必要があります。
- シリンダボア90cm以上の大形エンジンへの高圧SCRの適用については、弊社までお問い合わせください。
- Although SCR system is closely related to the engine, the SCR line is not included in Engine Builder's scope of supply. The system, however, must be based on our specifications.
- Please contact us for the applicability of HPSCR to large engines with a cylinder bore of 90 cm or more.



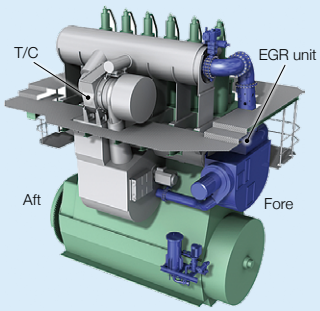
Layout of a HPSCR system,
as supplied by Everllence(SCR-HP)

EGRユニット配置

EGR Unit Arrangement

EGR bypass matching適用エンジンの場合、エンジン上に装備するEGRユニット（プレスプレ、EGRクーラ、EGR用ミストキャッチャ）の配置はエンジン形式に依存します。各エンジン形式におけるEGRユニット配置は 次頁の表をご参照ください。

For engines with EGR bypass matching, the location of the EGR unit (Pre-spray, EGR cooler, EGR mist catcher) installed on the engine depends on the engine model. Please refer to the table for the EGR unit location for each engine model.



EGR unit arrangement at Fore end

Engine type		EGR matching	T/C arrangement	EGR unit arrangement	
Cyl. bore	Concept			Fuel oil	Dual fuel
80 or larger	ME-C	EcoEGR / EGRTC	Exhaust side	Exhaust side	
70	ME-C	EcoEGR / EGRBP	Exhaust side	Exhaust side	
G60	ME-C	EcoEGR / EGRBP	Exhaust side	Exhaust side *	
S60	ME-C	EcoEGR / EGRBP	Exhaust side	Fore end *,**	Exhaust side
50 - 45	ME-C	EcoEGR / EGRBP	Exhaust side	Fore end **	
			Aft end	Exhaust side	

* EGRユニット配置の代替案については、弊社までお問い合わせください。
** EGR "舶端側" 配置の場合、2次バランサ（舶側モーメントコンペンセータ）は装備不可となりますのでご留意ください。
* Please contact us for alternative designs of EGR unit arrangement.
** For engines with EGR unit arrangement at the Fore end, it will not be possible to arrange moment compensators at the Fore end.

燃料消費率の最適化

Optimization of SFOC

最もよく利用する負荷領域での燃料消費率（SFOC）を低減する、船内での熱需要・電力需要に合わせる――など、お客様のニーズに合わせて燃料を効率よく活用するエンジン最適化方法をご提案します。

We offer engine optimization solutions tailored to the customer's specific needs—such as reducing Specific Fuel Oil Consumption (SFOC) in the most frequently used load range and matching onboard heat and power demands.

Tuning method

EGB	Exhaust Gas Bypass
EPT	Engine Process Tuning （only available on G95/G80ME-C10.5）
SEQ	Sequential Tuning （Only available in low-load optimized and on G95/80ME-C10.7）

EGB Option Exhaust Gas Bypass

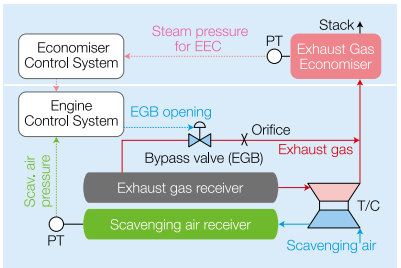
EGBでは、高効率・高圧力比の過給機を選定します。それにより、対象とする負荷領域での掃気圧・Pmax（シリンダ内最大燃焼圧力）を上昇させることが可能となり、SFOCが改善します。一方、高負荷域では過給機の過回転を防ぐために、排気レシーバ上に設置されたEGB弁を開いて排ガスを逃がします。EGB技術を導入時に、より柔軟に排ガス温度を調整する場合、Economiser Energy Control (EEC)を適用可能です。（オプション）

Bypass valve for EGB

For EGB, a turbocharger with high efficiency and high pressure ratio is selected. This makes it possible to increase the scavenging pressure and Pmax (maximum combustion pressure) in the target load range, thereby improving SFOC. On the other hand, in the high load range, the EGB valve installed on the exhaust receiver is opened to release exhaust gases in order to prevent overspeed of the turbocharger. When installing EGB technology, as an option the Economiser Energy Control (EEC) can be applied to adjust the exhaust gas temperature more flexibly.

EEC Option Economiser Energy Control

EECシステムはEGBシステム導入時に適用可能なEGB制御方法で、排ガスエコノマイザ（EGE）内のエネルギー（蒸気圧）を制御しています。EGE内の蒸気圧に応じて、最大一最小許容バイパスエリアの範囲内でEGB弁の開度を調整し、排ガス温度を最適化させます。例えば、開度を増大させる場合、エンジンのSFOCは悪化しますが、ボイラ側の追い焚き量を減らすことになり、船全体の運航コスト削減に貢献します。適用可否については、当社までお問い合わせください。



System layout of EGB and EEC

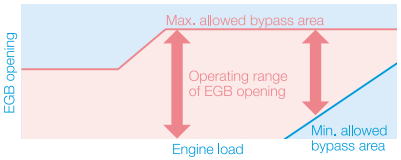


Image of operating range of EGB opening with EEC

The EEC system is an EGB control method which is applicable when EGB system is implemented, and controls the energy (steam pressure) in the exhaust gas economiser (EGE). The exhaust gas temperature will be optimized by adjusting the EGB valve position within the maximum and minimum allowable bypass area depending on the steam pressure in the EGE. For example, if the opening is increased, the engine's SFOC will worsen, but the amount of reheating on the boiler side will be reduced, contributing to a reduction in the ship's overall operating costs. Please contact us to find out whether it is applicable.

EPT Option Engine Process Tuning

EPT（Engine Process Tuning）では高効率・高圧力比の過給機を選定します。それにより、対象とする 負荷領域での掃気圧・Pmax(シリンダ内最大燃焼圧力)を上昇させることが可能となり、SFOC が改善します。一方、高負荷域では過大な最大爆発圧力を防ぐために、排気弁の閉じるタイミングを遅らせます。G95ME-C10.5およびG80ME-C10.5形エンジンにのみに適用可能です。なお、より高い排ガス温度が必要な場合には、御要求に応じてEECの適用も可能です。

For EPT (Engine Process Tuning) a turbocharger with high efficiency and high pressure ratio is selected. This makes it possible to increase the scavenging pressure and Pmax (maximum combustion pressure) in the target load range, thereby improving SFOC. On the other hand, in the high load range, the timing of closing the exhaust valve is delayed to prevent excessive maximum combustion pressure. EPT is only available for G95ME-C10.5,and G80ME-C10.5 engines. If a higher exhaust gas temperature is required, EEC can be applied upon request.

注記 Note

- 主管庁は運転モードを任意に移行することを認可していません。運航パターンが変わった際のモードの変更は、船籍国の代行機関（通常は船級）にそのことを報告し承認を受けた場合に許可されます。したがって長期的には、船主は1つのエンジンモードまたはそれ以外を選択できますが、主管庁に通知するという条件が付きます。
- これらのチューニング方法を適用すると、軸系捩り振動に影響を及ぼすことがありますので．弊社まで御相談ください。
- チューニング方法によっては過給機形式が変更となる可能性がありますので留意してください。
- The authorities do not allow random shifting between the modes. A mode shift in case of a change in operating pattern is permitted if reported and approved by the flag state representative, usually a classification society. Hence, on a longer term basis, the owner can select one or the other of the modes for the engine, provided the authorities are informed.
- Applying these tuning methods may affect the torsional vibration aspect. Please contact us.
- The turbocharger type can be changed depending on engine tuning methods.

SEQ Sequential Tuning

SEQは過給機カット技術を用いたチューニング方法です。大小2種類の過給機を装備し、部分負荷域において小過給機をカットしSFOC改善を図ります。SEQはG95ME-C10.7 形および G80ME-C10.7形エンジンのみ適用されます。

SEQ is a tuning method using turbocharger cutting technology. Equipped with two types of large and small turbochargers, the small turbocharger is cut in the part-load range to improve SFOC. SEQ is available only G95ME-C10.7 and G80ME-C10.7 type

各形式に適用可能なチューニング

Applicable Tuning Methods for Each Engine Type

Engine type	Applicable tuning method			
	EGB	EGB with EEC	EPT	SEQ
G95ME-C10.7, G80ME-C10.7				Applicable
G95ME-C10.5, G80ME-C10.5		Applicable	Applicable	
ME-C engines with cyl. bore 50 cm or larger except for above 4 engine types	Applicable	Applicable		

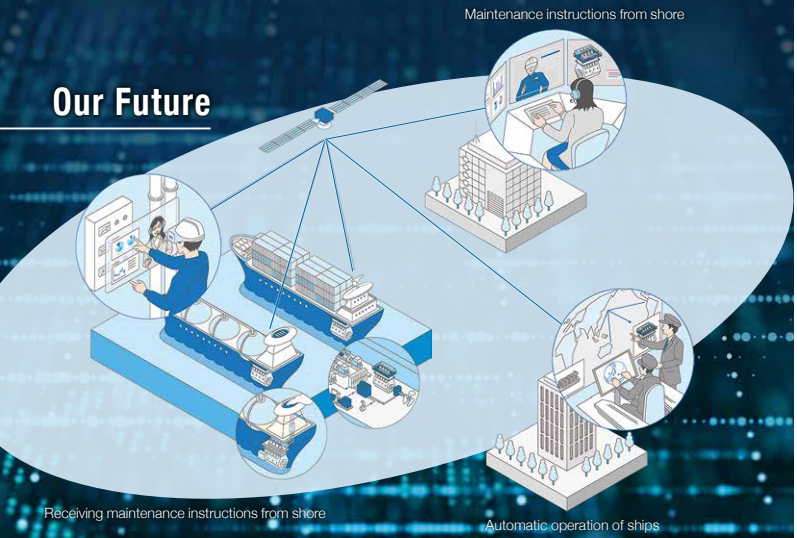
DX

Digital Transformation

脱炭素と並ぶ課題である「船舶のDX」にもぬかりはありません。
e-GICS Advance、CMAXS LC-Aは各機器のセンサーデータを
自動で収集･診断。エンジン状態を把握することで、異常の兆候を察知します。

We have spared no efforts in our digital transformation (DX) of ships,
which is an issue as important as decarbonization. e-GICS Advance and
CMAXS LC-A automatically collect and diagnose sensor data from each device.
By understanding the engine status, they can detect signs of abnormalities.

Our Future



e-GICS Advance
CMAXS LC-A

IoT/M2Mおよびビッグデータを活用した推進エンジン状態監視システム

Propulsion Engine Monitoring System Using IoT/M2M and Big Data Analysis

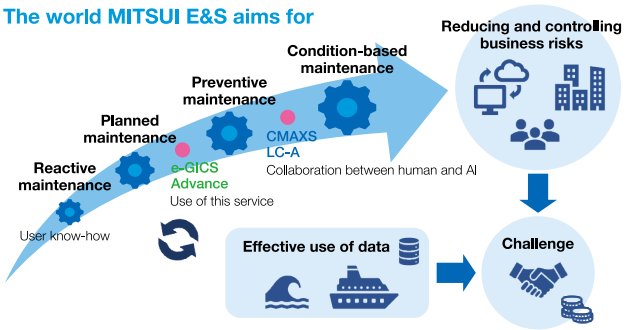
e-GICS AdvanceとCMAXS LC-A*は、推進エンジンのセンサーデータを自動収集し、解析・診断することで運転状態を把握し、タイムリーにお客様の船舶安全運航を支援するサービスです。異常を兆候の段階で捉え、更にCMAXS LC-Aでは船上での自動トラブルシュート支援により、予防保全の実現に貢献します。三井E&Sは、船舶の運航に支障をきたす重大な不具合を削減するとともに、推進機関のライフサイクルコストの低減に貢献します。

*日本海事協会と共同開発。CMAXS e-GICSXは2024年度を持ってCMAXS LC-Aに統合しました。

e-GICS Advance and CMAXS LC-A (*) are services that automatically collect, analyze and diagnose sensor data from propulsion engines to understand the operating conditions and support the safe operation of customers' ships at the right time. They help customers realize preventive maintenance by detecting abnormalities at an early stage and provide automatic troubleshooting support on board with CMAXS LC-A. MITSUI E&S will reduce serious malfunctions that impede ship operation and help reduce the life cycle costs of propulsion engines.

* The system used was jointly developed with Nippon Kaiji Kyokai. CMAXS e-GICSX was integrated into CMAXS LC-A in 2024.

The world MITSUI E&S aims for



サービス導入のメリット

Benefits of Introducing This Service

Improved Economic Efficiency

Reduced life cycle costs

Reduced Workload

Helps understand operating conditionss

Reduce Risk

Preventing ship delays

各サービスの特長　Features of Each Service

e-GICS Advance
三井E&S製推進エンジンに特化したリーズナブルなサービス

CMAXS LC-A
各社の推進エンジン・補機をカバーする汎用性の高い高機能サービス

e-GICS Advance
Reasonable services specializing in MITSUI propulsion engines

CMAXS LC-A
Highly functional and versatile service that covers the propulsion engines and auxiliary equipment from various manufacturers

Examples of advanced system integration using CMAXS LC-A

1. Automatic condition diagnosis function calculates condition index based on relevant measurement and inspection results.

2. If the condition index exceeds the threshold, a warning is issued and troubleshooting is performed.

3. The condition index is also referenced by the maintenance management and used to optimize maintenance and inspection timing.

各サービスで使用するシステムの機能

Functions of the Systems Used in Each Service

e-GICS Advance
状態診断、Dashboard、トレンドグラフ及びアルバム機能他

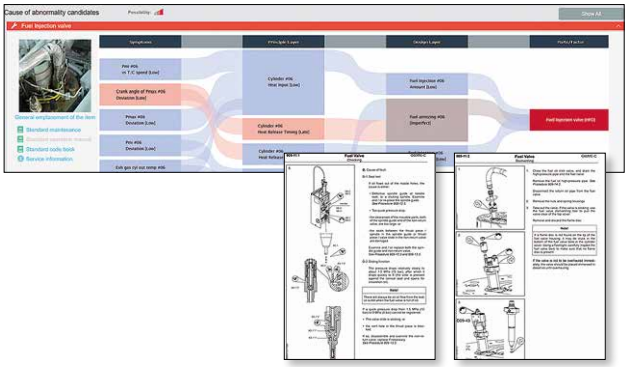
CMAXS LC-A
自動状態診断、トレンドグラフ、オンデマンドレポート機能、自動トラブルシューティング及び保守管理機能他

e-GICS Advance
Condition diagnosis, dashboard, trend graph, album function, etc.

CMAXS LC-A
Automatic condition diagnosis, trend graphs, on-demand report function, automatic troubleshooting and maintenance management function, etc.

Automatic Condition diagnosis function screen (CMAXS LC-A)

Troubleshooting function screen (CMAXS-LC-A)



BCM Option

Bearing Condition Monitoring System

摩耗・油中水分監視で事故防止

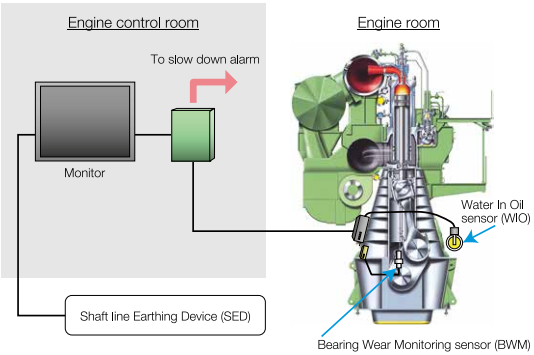
Monitoring Bearing Wear and Water in Oil

BCMは、クロスヘッド軸受、クランクピン軸受、主軸受の摩耗状態および油中水分を監視することで、クランク軸および上記軸受の重大事故の未然防止を図るシステムです。本システムは、ABS、BV、DNV、LRおよびNKの各船級協会の形式承認を取得しています。また、船級協会によっては、BCMを装備し、そのモニタ値が正常範囲にある間、軸受の解放点検間隔の延長や省略を認めています。BCMは次のシステムより構成されています。

- 軸受摩耗センサ（BWM）
- 油中水分センサ（WIO）
- 軸アース装置（SED）監視（追加オプション対応）

The Bearing Condition Monitoring system (BCM) can be optionally installed to prevent severe damage to the crankshaft and the crank-train bearings (main, crankpin and crosshead bearings). BCM is type approved by ABS, BV, DNV, LR and NK. Some of these classification societies have already approved an extension of the overhaul interval, or even the omission of bearing overhaul, while BCM indication is within the normal operation range. The BCM is composed of the following sub-systems.

- Bearing Wear Monitoring (BWM)
- Water In Oil monitoring (WIO)
- Monitoring of Shaft line Earthing Device (SED) (further option)



舶用エンジン遠隔操縦装置

Engine Remote Control System　BMS-2000Ⅳ, EMS-200Ⅳ Option

ME形エンジンをリモート操縦

Remote Control System for ME Engine

電子制御形舶用エンジン（ME形エンジン）のために開発された遠隔操縦装置です。ME制御装置と連携してエンジンの遠隔操縦を実現し、エンジンの保護機能、船橋・制御室・機側間のテレグラフ通信機能を持っています。本システムは、船舶搭載機器とサイバーセキュリティ*の各船級（ABS、BV、DNV、LR、NK）の型式承認を取得しています。

*BV、DNV、LR船級の承認取得は2025年を予定

The BMS-2000IV / EMS-200IV are remote control systems developed for electronically controlled marine engines (ME Engine). They works in close cooperation and conjunction with the ME control system to remotely control and protect the engine, and provide communication between the bridge, the control room and the engine side by the telegraph system.
The systems has obtained type-approved by ABS, BV, DNV, LR and NK for shipboard equipment and cybersecurity*
*Approval from BV, DNV, and LR classification organizations is scheduled for 2025.

特長 Features

- W/H, C/Rに大型カラー液晶表示を採用
- 図面やトラブルシューティング手順表示を標準装備
- ABS、BV、DNV、LR、NKの型式承認を取得
- IACS UR E10 Rev.9、E27 Rev.1に対応
- 船内制御室監視盤へ警報・表示内容を通信可（追加オプション対応）
- 制御室テレグラフ連動操縦を標準採用（BMS-2000Ⅳ）
- 燃費低減（ASR、ALC）機能を採用（追加オプション対応）

- Adoption of large color LCD screens to W/H and C/R
- Drawings and troubleshooting procedures are provided as standard
- Type approved by ABS, BV, DNV, LR and NK
- Complies with IACS UR E10 Rev.9 and E27 Rev.1
- Alarms and display contents can communicated to the onboard control room monitoring panel (additional options available)
- The telegraph in control room is incorporated in speed control dial as standard on BMS-2000IV
- Suppress deterioration of fuel efficiency (ASR and ALC) function can adopted(additional options available)

システム構成 System Configuration

BMS-2000Ⅳは次の3つのシステムより構成されています。

■ **遠隔制御システム（RCS）**
ME制御装置と連携して、エンジンの始動・停止・逆転等の制御を行います。

■ **機関保護システム（EPS）**
エンジンを保護する安全装置です。

■ **テレグラフシステム（ETS）**
船橋・制御室・機側間の通信を行います。

The BMS-2000IV is composed of the following three sub-systems.
- Remote Control System (RCS): Works together with the ME Control System (ME-ECS) to control the engine for starting, stopping or reversing.
- Engine Protecting System (EPS): A safety system that protects the engine from damage.
- Engine Telegraph System (ETS): Handles communication between the bridge, the control room and the engine side through the telegraph lines.

Mitsui E&S Systems Research Inc.

本装置を製造する三井E&Sシステム技研株式会社は、舶用エンジン機関遠隔操縦装置シリーズ累計4,500台以上の就航実績を有します。

Manufactured by MITSUI E&S Systems Research Inc., this equipment is backed by the proven success of over 4,500 marine engine remote control systems operating reliably worldwide.

「三井品質」を支える人々
PEOPLE BEHIND MITSUI QUALITY

摩耗鉄粉の監視で 運航を守る

PROTECTING OPERATIONS BY MONITORING WEAR IRON PARTICLES

舶用エンジンをはじめとした機械には回転装置が使われていますが、転がり軸受は消耗品で、メンテナンスを怠ると運転停止や破損などにつながりかねません。軸受は使用に伴い摩耗鉄粉が発生しますが、その濃度を高精度に監視するのが三井E&S DUが開発した「TF-Detector」です。回転装置の診断は異音や振動をモニタリングするのが一般的で、鉄粉濃度を高精度に連続して計測するのは困難でした。TF-Detectorは特許技術によって重量比で100万分の1（ppm）の分解能での連続計測を実現。事故防止やメンテナンス時期の最適化に貢献しています。

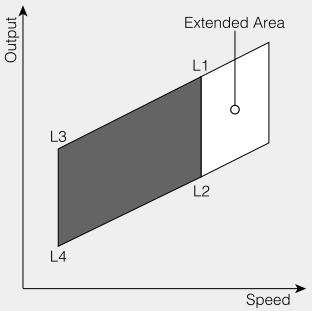
Rotating equipment is used in marine engines and other machinery. Rolling bearings are consumable items, and failure to maintain them can lead to operation stoppage or damage. Bearings generate wear iron powder as they are used, and the TF-Detector developed by Mitsui E&S DU monitors the concentration of this powder with high precision. The TF-Detector uses patented technology to achieve continuous measurement with a resolution of one millionth of a percent by weight (ppm), which allows for the prevention of accidents and the optimization of maintenance schedules.

技術補足
TECHNICAL SUPPLEMENT

レイアウトダイアグラム
Layout Diagram

下図のL1、L2、L3、L4点で定義されるレイアウトダイアグラム内の任意の点をMCRとして選ぶことで、船舶の計画にあたって最適な出力および回転速度の組み合わせを得ることができます。各エンジン形式におけるレイアウト点(L1、L2、L3、L4点)の出力および回転速度については、諸元表をご参照ください。

Any MCR point can be chosen within the right layout area defined on L1, L2, L3 and L4 point to obtain an optimum point (combination of output and speed) for laying out the propeller, engine and ship. For engine output and speed of layout points (L1, L2, L3 and L4 point) in each engine type, please refer the page of each engine type.



レイアウトダイアグラムの拡張
Layout Diagram with Extended Area

S50ME-C8.5形エンジンは、御要求によりL1-L2回転速度を左下図のように増加させることが可能です（MEPは変更されません）。

S50ME-C8.5 with increased speed and unchanged MEP are available on request.

Engine type	L1-L2 speed [min-1]	L1 output [kW/cyl.]	L2 output [kW/cyl.]
S50ME-C8.5	127	1,660	1,330
S50ME-C8.5 with Extended Area	135	1,770	1,410

燃料消費率データについて
About SFOC data

三井-Everllence B&Wエンジンの燃料消費率(燃費率)は、多くのエンジンにおいて連続常用出力(CSO)を燃費率保証点として設定いただいています。一方、近年ではEEDI規制による75%負荷の燃費 率や、減速運転が主流となったことによるCSO負荷よりも低い負荷における燃費率を注目されることが多くなっています。しかしながら、弊社から提出している各負荷の燃費率データは、それぞれの負荷を保証点として選択した場合の数値を示したものであり、トレランスは保証点として選択された負荷点のみ有効となります。従いまして、それらを連続的に繋げたカーブは、各プロジェクトのエンジンにおける低負荷から高負荷までの傾向を示すものではないことに留意してください。また、実運航を考慮し、CSO負荷ではない負荷の燃費率を重要視される場合は、その負荷を燃費率の保証点として設定することも可能です。

As for the guarantee of SFOC of the MITSUI-Everllence B&W engine, the continuous normal output (CSO) is set as the SFOC guarantee point in many engines. On the other hand, in recent years, the SFOC at 75% load according to the EEDI regulation and the low load operation have become mainstream, so the SFOC at the load lower than the CSO load is often focused on.
However, the SFOC of each load submitted by us shows the numerical value when each load is selected as the guarantee point, and the tolerance is valid only for the load point selected as the guarantee point.
In addition, if the SFOC of a load that is not a CSO load is important in consideration of actual operation, that load can be set as a guarantee point of the SFOC.

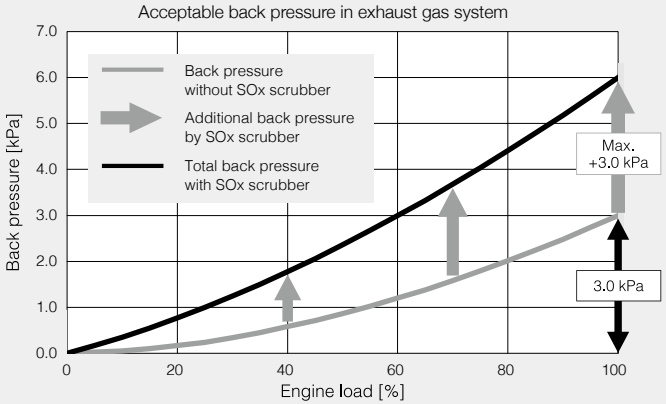
高硫黄燃料とSOxスクラバ適用
Application of High-Sulfur Fuels and SOx Scrubbers

本カタログに記載されている全てのエンジンに対してSOxスクラバを適用させることができます。SOxスクラバ設置は排気背圧の増大を招き、エンジン性能に影響を及ぼします。従って、SOxスクラバ設置による排気背圧の増大を100%負荷で3.0 kPa以内にする必要があります。

SOx scrubbers can be applied to all engines in this catalog. A SOx scrubber installation will increase the back pressure, thereby affecting engine performance. Accordingly, we require that a SOx scrubber installation does not increase the back pressure by more than 3.0 kPa at 100% load.

注記
・SOxスクラバを適用する場合、過給機の仕様を変更する必要があります（場合によっては過給機形式が変更となる可能性もあります）。SOxスクラバを搭載する場合は、弊社までご相談ください。
・EGRまたは高圧SCRを適用したTier IIIエンジンにおいて、NOx ECA内で高硫黄燃料油を使用する場合、EGR、高圧SCRシステムを高硫黄燃料仕様にする必要があります。EGRおよび高圧SCRについては88～89頁を参照下さい。

Note:
- In the case of applying SOx scrubbers, the specification of turbochargers must be changed. (In some cases, the turbocharger type can be changed) In the case of installing SOx scrubber, please contact us.
- For Tier III engines applying EGR or High-pressure SCR, in the case of using high-sulfur fuel in NOx ECA, high-sulfur EGR or SCR system are required. For EGR and high-pressure SCR, please refer pp.88-89.



アフターサービス

After-sales Service

納入後も機器をベストな状態に保ち、機能を最大限活用して運航コストを
削減するお手伝いをいたします。技術サービスや部品供給はもちろん
保守管理の専門研修や、就航船の燃費改善製品も提供します。

We ensure your equipment maintains peak performance long after delivery,
helping you maximize functionality and reduce operational costs.
Beyond technical services and parts supply,
we provide specialized maintenance training and
fuel efficiency solutions for vessels in service.

研修プログラム Training Program

長年蓄積してきた技術と経験を生かし、2006年からエンジン保守管理技術の専門研修コースを開講しています。主機・過給機・リモコン・ガバナ等について、座学講義や、実習センターでの解放／組立のトレーニングを提供しています。

We have been offering specialized training courses in engine maintenance and management technology since 2006 based on the wealth of technology and experience we have accumulated over many years. We offer classroom lectures on main engines, turbochargers, remote controls, governors, etc., as well as at our practical courses at training center where we offer training on disassembly/assembly of engine components.

ME-GI基本コース：2日間
ME-GI Basic Course: 2 days

ME-GIエンジンの基礎知識を習得します。二元燃料切替えシーケンス等の制御システムの機能や基本操作、及びガス関連機械部品の整備/保守についての実習コースを含みます。

研修内容

- ME-GIエンジンの一般説明
- ME-GIエンジンの構造、機能の詳細説明
- シミュレータによるMOP基本操作
  （二元燃料切り替えシーケンス説明等）
- ガス気密テスト、及びガス漏洩検知方法
- ガス噴射弁、ウィンドウ弁、パージ弁、ブローオフ弁の解放整備

This course provides basic knowledge of the ME-GI engine. It includes practical courses on control system functions and basic operation, such as dual fuel change-over sequence, as well as maintenance of gas injection parts.

Contents
- General introduction of ME-GI engine
- Details of ME-GI component and working function
- Basic operation of MOP (Change over sequence etc.) by simulator
- Practical training for gas tightness test & gas leak test
- Overhauling for fuel gas valve, window valve, Purge/blow off valve etc.

EGR基本コース：0.5日間
EGR Basic Course: 0.5 days

EGRの基礎知識を習得します。EGR運転シーケンス等の制御システムの機能や基本操作及びEGRユニット、水処理装置の整備保守について、説明します。

研修内容

- EGRの一般説明
- EGR機器の構造、機能の詳細説明
- シミュレータによるMOP基本操作
  （EGR運転シーケンス説明等）
- 掃気エア酸素センサ(OSU)、RTUのpHセンサ校正実習

This course provides basic knowledge of EGR. It includes explanations of the functions and basic operations of the control system, such as the EGR operation sequence, as well as the maintenance of the EGR unit and Water Treatment System.

Contents
- General introduction of EGR
- Details of EGR component and working function
- Basic operation of MOP (EGR operation sequence etc.) by simulator
- Calibration practice for sensor of Oxygen Sensor Unit and pH sensor of RTU

就航船の燃費改善

Providing Fuel-Saving Products to in Service Vessel

経験豊富な当社のエンジニアチームが、お客様のご質問・ご相談にすぐにお応えし、燃料効率の向上、環境保護、そして安全な航行のためのソリューションを提供いたします。代表的な燃費改善・燃費悪化抑制製品には以下のようなものがあります。

Our experienced and knowledgeable team of engineers is ready to answer your questions and provide solutions to improve fuel efficiency, protect the environment, and ensure safe navigation etc. Typical products that improve fuel efficiency or reduce fuel deterioration are as follows.

電気VIT

Electronic control VIT system (E-VIT)

機械式VITをI/P Convertorに換装することで噴射タイミングを最適化。エンジン75%負荷以下の筒内圧を上昇させることで、燃費改善が期待できます。

By replacing the mechanical VIT with an I/P Converter, fuel efficiency can be improved by optimizing the injection timing and increasing the cylinder pressure below 75% load of the main engine.

エコカム

EcoCam system

排気弁側面に電磁弁を増設し、排気弁の開閉に使う油圧を制御します。エンジン60%負荷以下の筒内圧を上昇させることで、燃費改善が期待できます。

By adding a solenoid valve to the exhaust valve and controlling the hydraulic pressure used to open and close the exhaust valve, the EcoCam system increases the cylinder pressure below 60% load of the main engine, which is expected to improve fuel efficiency.

ディレーティング

Derating

主機の圧縮比、カムタイミング変更と過給機の仕様変更等でMCOを再設定します。低負荷域のエンジン性能の最適化をすることで、燃費改善が期待出来ます。

Fuel efficiency can be improved by optimizing engine performance in the low load range by resetting the MCO, changing the compression ratio of the main engine, changing the cam timing, and changing the specifications of the supercharger.

船橋操縦装置の更新

Up-grading of Bridge Maneuvering System

Rough Sea Auto Speed Reduction（ASR）や Auto Engine Load Control（ALC）で、荒天時に自動減速したり、エンジンの負荷を一定にして燃費を抑制します。

Rough Sea Auto Speed Reduction (ASR) and Auto Engine Load Control (ALC) provide automatic deceleration in rough seas and constant load on the main engine to reduce fuel consumption.

部品販売 & 技術サービス

Parts Supply and Technical Services

三井E&Sグループは世界のトップメーカーとして、数多くの舶用エンジンを製造してきました。長年蓄積してきたノウハウを基に、迅速かつ高品質な技術サービスを提供しています。多種多様な主機・過給機を製造している利点を生かし、充実した体制による豊富な品揃え、短納期での部品供給サービスなどを、常に最高の技術レベルで提供しています。

部品販売

- 主機部品
- T/C部品
- リモコン及びガバナ製品
- 主機周りの設備·機器

技術サービス

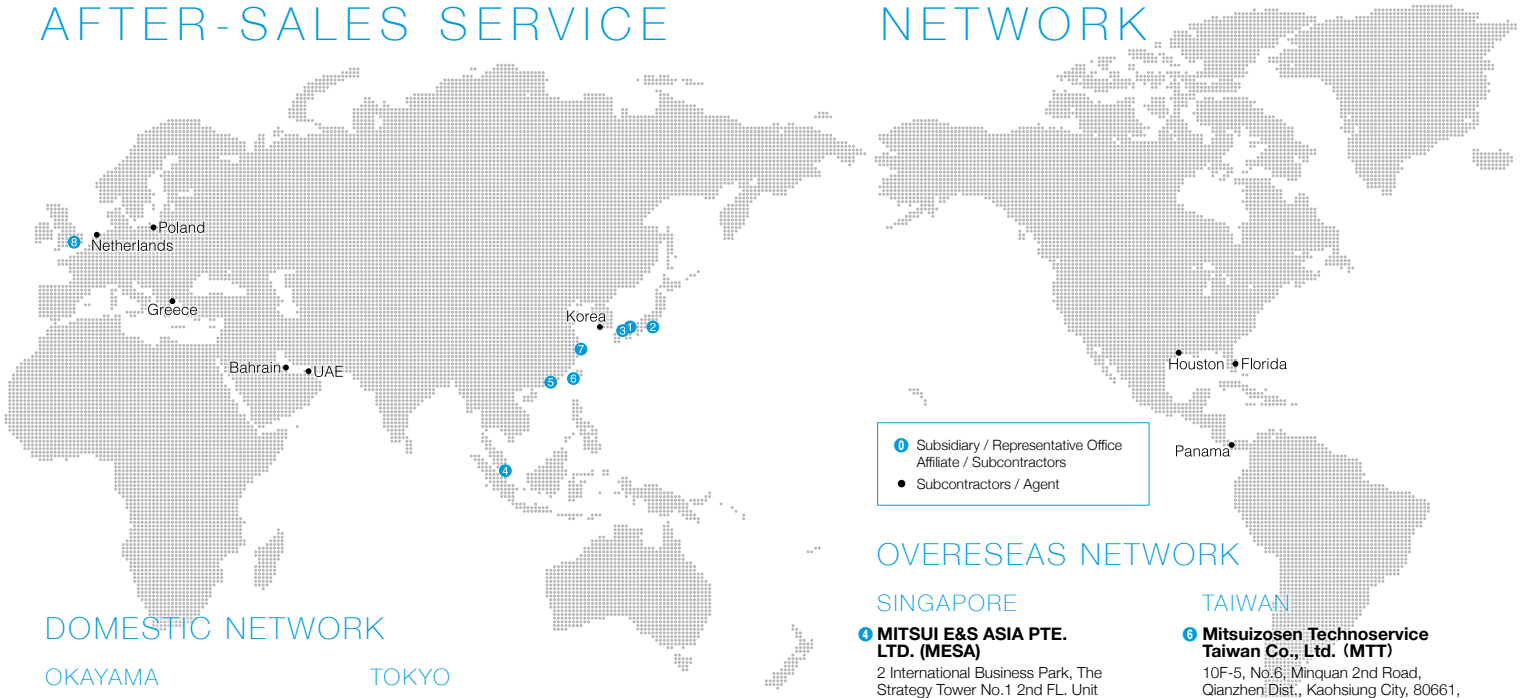
- 技術調査
- 整備·リコンディション
- 修理
- トラブルシュート
- エンジンの状態改善

MITSUI E&S Group have produced a large number of marine engines. We provide quick, high-quality technical services based on our accumulated experience. Over the years we have produced a variety of main engines and turbochargers, allowing us to draw on this experience to provide the highest level of service at all times, including our parts supply with short delivery lead times based on a system that is prepared for anything and keeps ample parts in stock.

Parts Supply
- Main engine parts
- Turbo charger parts
- Remote control & Governor parts
- Facilities and equipment around the main engine

Technical Services
- Technical survey
- Maintenance & recondition
- Trouble shoot
- Improvement engine condition

AFTER-SALES SERVICE NETWORK



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累計生産 1億2千万馬力への歩み

三井-Everllence B&Wエンジン

MITSUI-Everllence B&W Engine History of 120 million Horsepower Production

三井E&Sは、国内企業として初めて単一ブランドの舶用2ストロークエンジン生産「累計1億2000万馬力」を達成しました。1928年の1号機以来95年を超えるご愛顧に感謝し、世界トップメーカーとしての責任を今後も果たしてまいります。

MITSUI E&S is the first Japanese company to achieve single-brand marine two-stroke engine production "total 120 million horsepower." We are grateful for over 95 years of patronage since our first engine in 1928, and we will continue to fulfill our responsibilities as a world-leading manufacturer.

120 mil hp production

1億2千万馬力達成

2018

2015

80 mil hp production(2012)

二元燃料エンジンの連続製造

Continuous production of dual fuel engine utilizing methanol, LNG and ethane

50 mil hp production(2005)

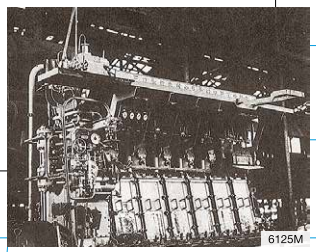
Tier III EGR適用1番機

1st Tier III engine with EGR

2004

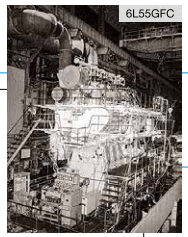
三井-B&Wエンジン **1号機**

1st MITSUI-B&W engine



MC形エンジン1番機

1st MC type engine



静圧過給方式導入

Introducing constant pressure turbocharging

1997

初の電子制御エンジン

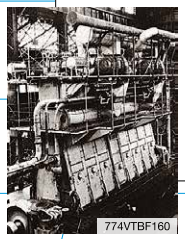
1st MITSUI-MAN B&W electronically controlled engine

World's 1st S-MC-C type engine

世界初S-MC-C形

Japan's 1st engine with turbocharger

日本初の過給機付



1983

10 mil hp production(1976)

1978

1928 1953 1960 1970 1980 1990 2000 2010 2020

← Check out the video of engine assembly process!

2025

MITSUI E&S