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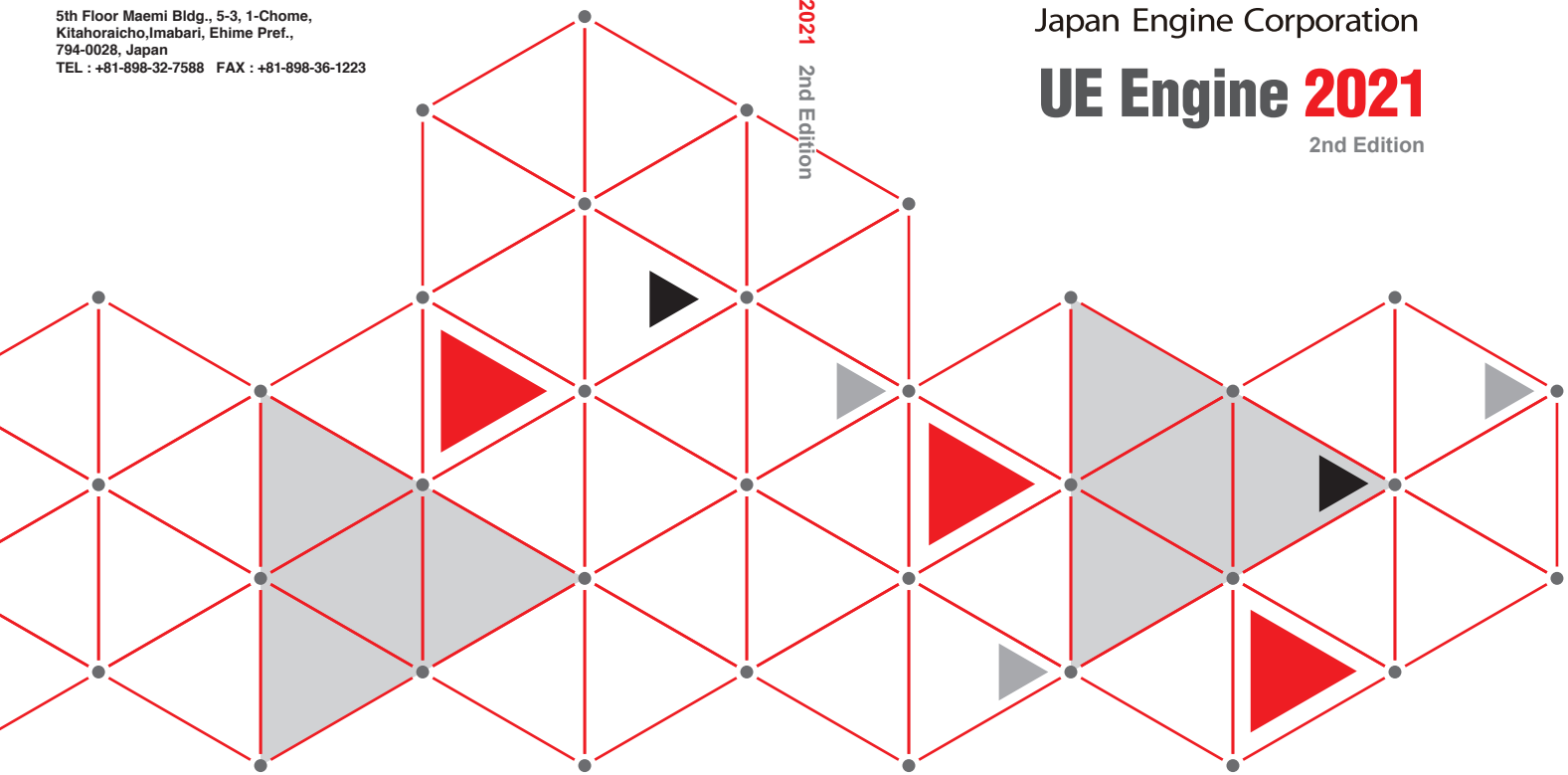
JAPAN ENGINE CORPORATION UE Engine 2021 2nd Edition





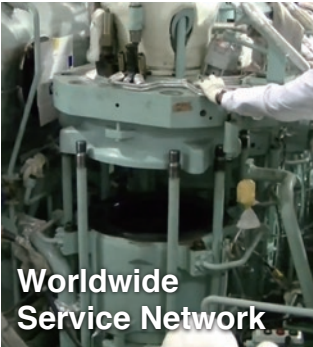
Japan Engine Corporation

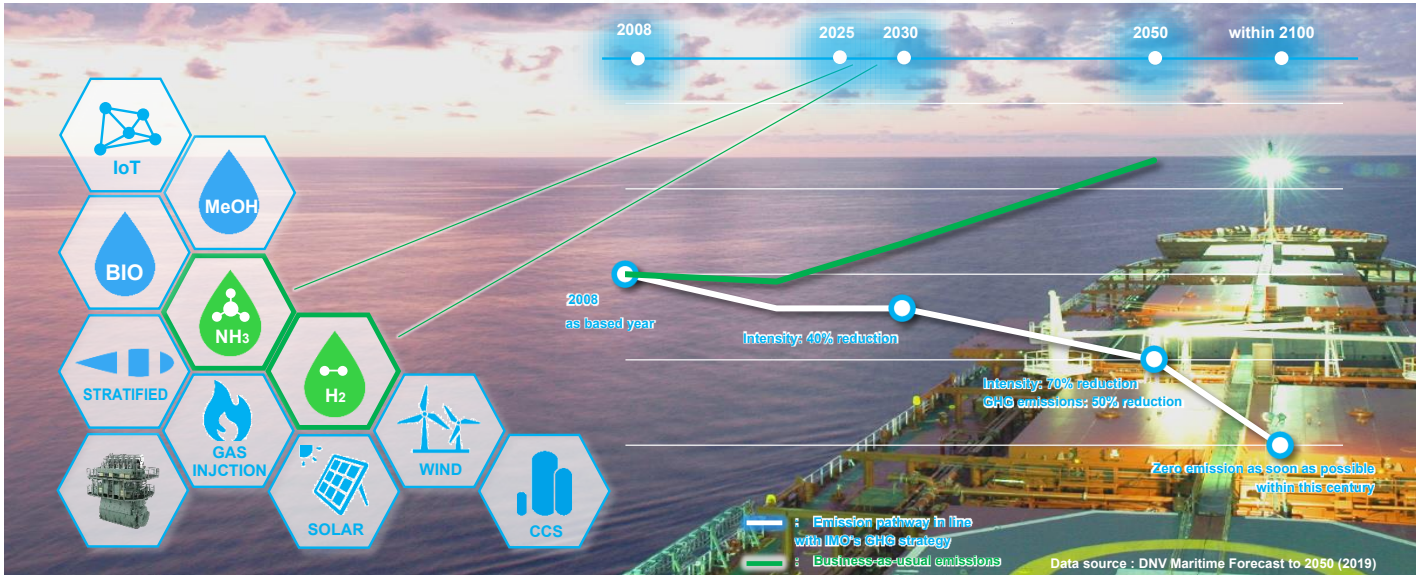
# UE Engine 2021

2nd Edition





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Paris Agreement was adopted in 2015, and the IMO adopted an initial strategy for emission reduction from shipping at MEPC72 held in 2018. This strategy aims to reduce the total annual GHG emissions from international shipping by at least 50% by 2050, and to reduce the average carbon intensity by at least 40% by 2030 while aiming for 70% in 2050 (all figures compared to 2008). Furthermore, it is planning to move the schedule of GHG emission reduction forward (e.g. achieving GHG zero emission by 2050) at MEPC.

**Alternative fuels** such as **LNG, LPG, methanol, bio-fuels** etc. are already beginning to be used in the shipping industry, but synthetic fuels such as ammonia and hydrogen from renewable energies are needed to reach the GHG reduction target.

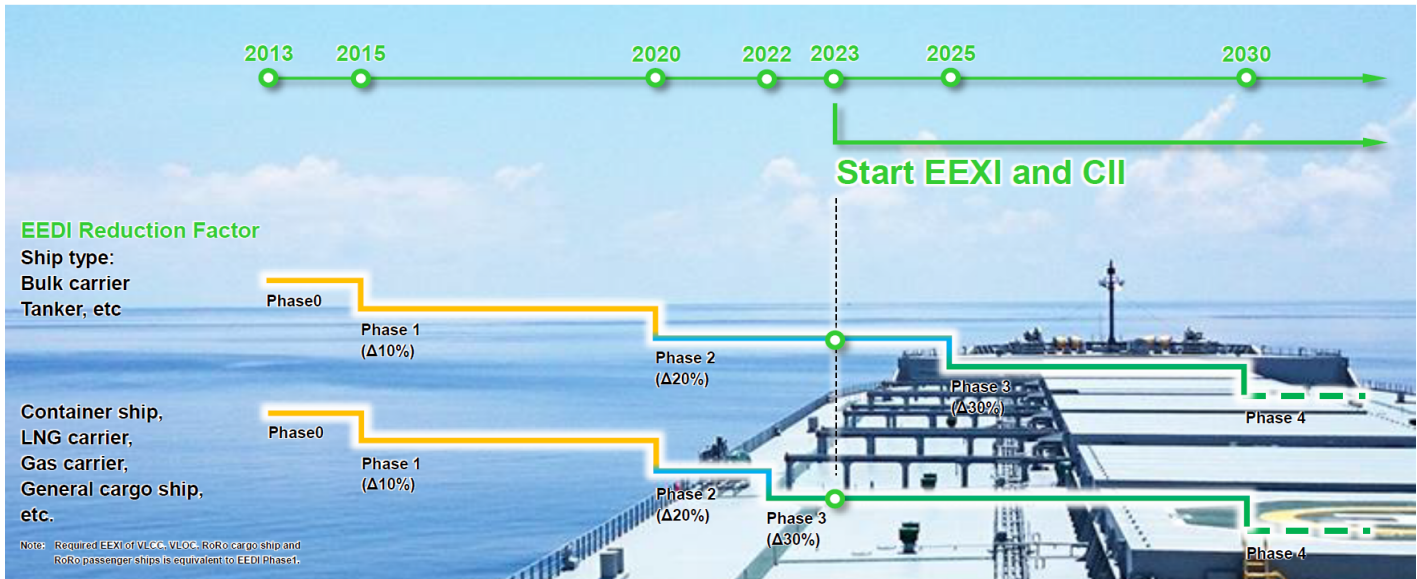
**Japan Engine Corporation** will continue to develop engines that can operate by burning these Alternative fuels. So far, we had developed dual fuel combustion technology for LNG fuels, and then have developed LSJ engines equipped with stratified fuel-water injection technology that can be applied to two different fuel combustion technologies. Then, in 2021, we started development of ammonia fuel engine and hydrogen fuel engine in order to contribute to the achievement of sustainable shipping and GHG zero emission.

### Ammonia fuel engine :

Ammonia fuel engines will be developed by applying our unique stratified fuel injection technology. Flame-retardant ammonia and pilot fuel are layered in the fuel valve to completely burn ammonia during combustion. This stratified fuel injection technology is also being studied for application to liquid fuels such as **LPG, methanol, bio-fuels** etc. which are expected to contribute to GHG reduction as well as ammonia. First ammonia fuel engine will complete full-scale engine testing around 2025.

### Hydrogen fuel engine :

For the hydrogen fuel engines, the technology cultivated in the development of the DF engine in the past will be applied in the first stage, and the combustion technology without fossil fuel will be applied in the second stage to achieve the goal of GHG zero emission. For developing the hydrogen fuel engine, we formed a consortium with two Japanese engine manufacturers (Kawasaki Heavy Industries, Ltd. and Yanmar Power Technology, Co., Ltd.) and established a joint development company HyEng corp. in 2021. First engine will complete full-scale engine testing around 2026.



**EEDI (Energy Efficiency Design Index) and SEEMP (Ship Energy Efficiency Management Plan)** have been applied to new ships engaged in international voyages since 2013 because of regulating CO<sub>2</sub> emissions from shipping and, for specific ship type, moving schedule of EEDI Phase 3 forward was adopted at MEPC75 (2020). Furthermore, in order to achieve the IMO 2030 targets, the EEXI and CII for existing ship have been adopted at MEPC76 (2021). UE engines with low SFOC contribute to GHG emissions reduction.

**EEXI (Energy Efficiency EXisting ship Index):**

The EEXI requirements shall apply to all ships of 400 GT and above which are engaged in the international voyages, regardless of delivery data. The EEXI verification shall take place at first annual, intermediate or renewal survey of the International Air Pollution Certificate (IAPP Certificate), whichever is the first, on or after January 1, 2023.

EEXI is introduced as the energy efficiency index for existing ship and is calculated and evaluated by the same formula as EEDI. As a result, CO<sub>2</sub> emission from existing ships will be regulated by the same level as CO<sub>2</sub> emission from new ships as of 2023.

**CII (Carbon Intensity Indicator):**

The CII rating shall apply to all ships of 5,000 GT and above which are engaged in international voyage, regardless of delivery data. Each ship will be rated on five-tiered scale (A to E) by the CII guidelines from 2023 consumption data, based on data of IMO DCS (Data Collection System). Low rating ships (E or D for 3 consecutive years) should be developed the corrective action plan as a part of SEEMP and need to be operated with the corrective action plan.

**Short-term Measures for the IMO 2030 target:**

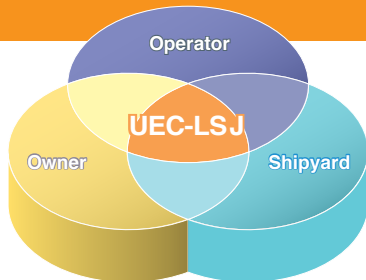
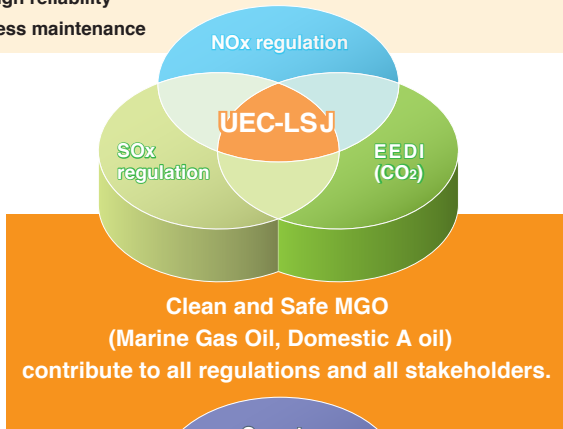
According to the common concept of EEDI/EEXI formula, reducing the engine output, fuel consumption and/or CO<sub>2</sub> conversion factor is the common measures. For a new ship, installing the latest LSH series and LSJ series which is applied the layered water injection system, de-rating and the use of low carbon fuels (eventually, zero carbon fuels) is effective. For an existing ship which is difficult to change the engine specification and to convert to alternative low carbon fuels, EPL (Engine Power Limitation) as regulating the maximum continuous output of the main engine is an effective and realistic measure, but, we can propose **the further measures (e.g. changing the engine tuning, retrofit items)** for reducing CO<sub>2</sub> emission, due to each UE engine type.



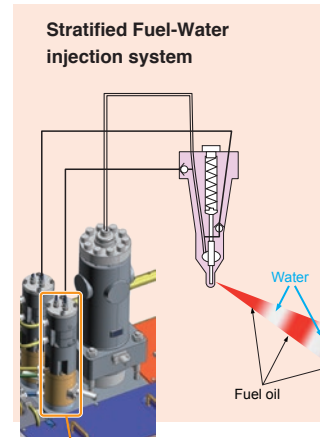
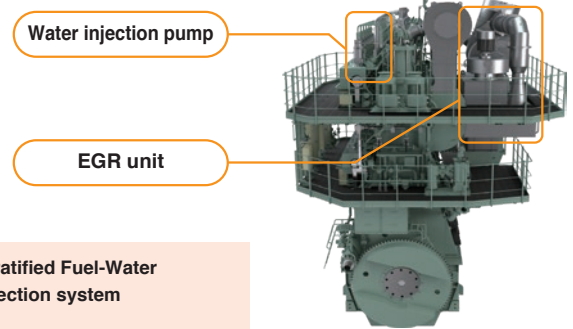
# MGO mono-fuel engine, UEC60LSJ/50LSJ/42LSJ/35LSJ, the best solution for SOx regulation 2020

Features

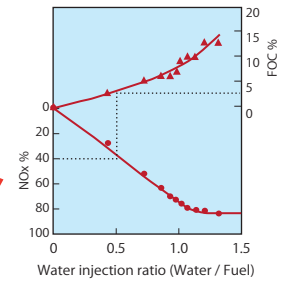
- One of the best GHG reduction measures for ships that have difficulty installing LNG fuel engines.
- Compliant with SOx regulation 2020
- Compliant with NOx regulation Tier II / Tier III
- Extra low SFOC, contribute to EEDI, by ultimate combustion technology and stratified Fuel-Water injection system
- SOx scrubber-less
- Simple engine room by mono-fuel without heating.
- High reliability
- Less maintenance



Correspondence table for each Tier III technologies



Less trade-off between SFOC and NOx reduction



Water Injection pump



J-ENG is jumping toward the world ocean, by the Unique Marine Power.

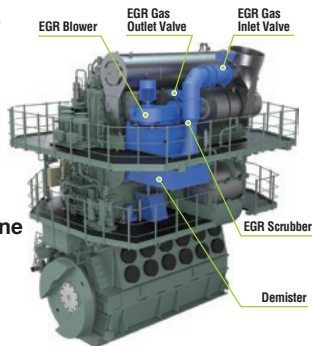


MGO mono-fuel engines

MGO mono-fuel engines

# Low Pressure EGR system

Low Pressure EGR gas line is located off the Turbocharger. EGR Unit is installed on the engine as shown in the right figure.



### Features

#### Simple System

- Low pressure and low temperature require less equipment & pipes, allowing for a simple structure.

#### Simple Operation

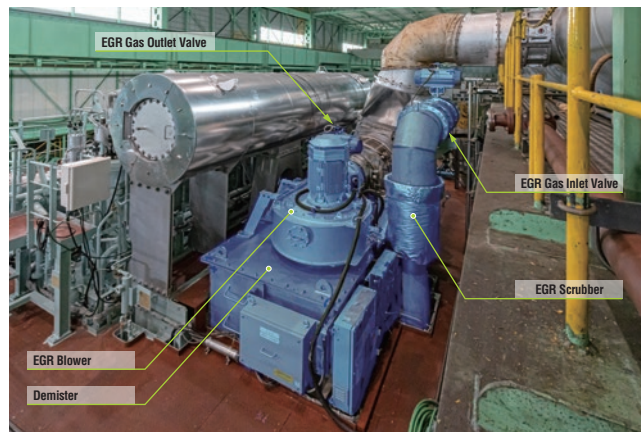
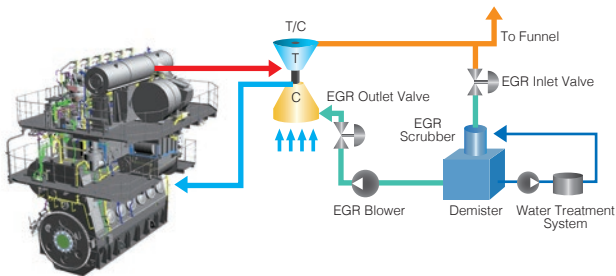
- Operation is executed by an on/off control of the EGR valves.

#### Low CAPEX, Low OPEX

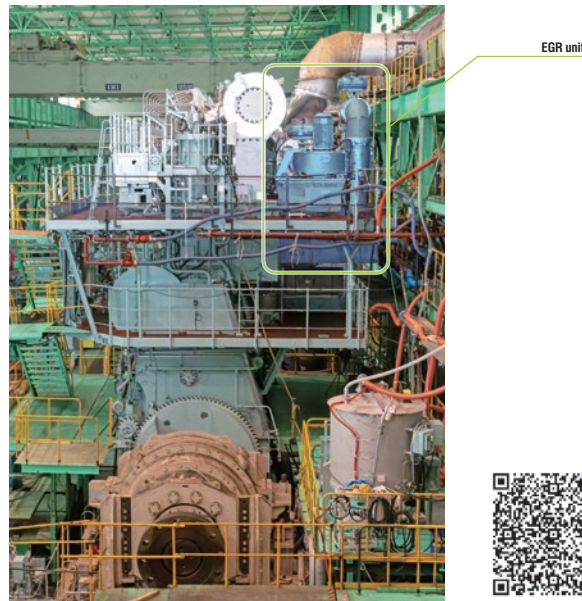
- Low capital expenditure required to produce this simple system.
- The EGR blower's low electric power consumption, coupled with no requirement for additional boiling for steam allows for low operating costs.

#### Applicable to a Variety of Engines

- Low Pressure EGR System fits well with any low speed marine engine.



First integrated EGR unit on 6UEC50LSH-Eco-C2-EGR



6UEC50LSH-Eco-C2-EGR overview



J-ENG  
LP-EGR

# SCR system

UEC small bore-size engines have applied the LP-SCR system as standard Tier III solution. Other size engines (over 40 cm bore-size) have applied LP-EGR system, but, from now on, the specific engines will also be able to select the HP-SCR system. The specific engines, which can apply the HP-SCR system, shows on the table of next page.

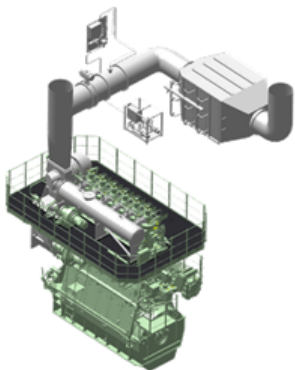
SCR reactor



Overview of 6UEC33LSE-C2-SCR in work shop

## ■ HP-SCR system

The components of the HP-SCR system are installed before turbocharger(s) on high pressure exhaust side. A part of the HP-SCR system is integrated in engine configuration and the HP-SCR system works with engine control. The reactor for HP-SCR is designed to be more compact than that of LP-SCR, due to the higher density of the exhaust gas.



## ■ LP-SCR system

The components of the LP-SCR system are installed after turbocharger(s) on low pressure exhaust side. The LP-SCR system separates from engine configuration and control. Therefore, the arrangement and control of the LP-SCR system is simple.

## ■ Correspondence table for each Tier III technologies

Tier III solution is due to the engine type, as shown in the below table. For medium or large bore-size engines, the EGR system is available. In addition, the HP-SCR are available for specified engines in medium or large bore-size engines.

The LP-SCR system is recommended for small bore size engines and mechanically controlled engines (camshaft driven). If you would like to apply the solution which is not applicable to the engines in the below table, J-ENG will consider applying it. Please contact J-ENG and/or licensees.

Engine type	Applied Tier III technology		
	EGR	HP-SCR	LP-SCR
UEC60LSJ	✓	✓	
UEC50LSJ	✓	✓	
UEC42LSJ	✓	✓	
UEC35LSJ		on request	✓
UEC50LSH-Eco-C3/C4	✓	✓	
UEC50LSH-Eco-C2	✓		✓
UEC42LSH-Eco	✓	✓	
UEC33LSH			✓
UEC80LSE-Eco	on request	✓	
UEC60LSE-Eco	✓	✓	
UEC50LSE-Eco	on request	✓	
UEC45LSE-Eco-B2/C1	✓	✓	
UEC45LSE-Eco-1			✓
UEC45LSE			✓
UEC35LSE-Eco		on request	✓
UEC35LSE			✓
UEC33LSE			✓
UEC33LSII-Eco		on request	✓
UEC33LSII			✓

## ■ Technical documentation

"Technical Data" for Tier III application is available on our web site.

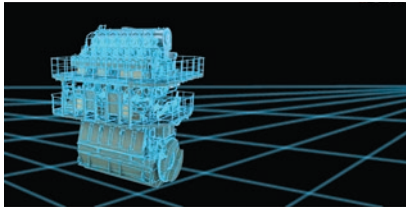
<https://www.j-eng.co.jp/en/technical/index.html>



Technical Data

## Utilizing the digital data and creating new value

J-ENG have applied the various computerized system to UE engine for supporting the customers, so far. J-ENG is continuing to develop the new system not only collecting, monitoring and analyzing the engine data, but creating the new valuable and real-time information for the customer, which may contribute to the preventive maintenance and further optimized operation.



**Phase 1**

**CONNECT**  
Measure and store the operating data

**Phase 2**

**VISUALIZE**  
Accumulate and visualize the operating data

**Phase 3**

**ANALYZE**  
Predict the condition and prescribe the next action

**Phase 4**

**CREATE**  
Further optimize the operating condition  
New valuable information

Eco Engine waveform monitoring system



Bearing temperature monitoring system



Bearing wear monitoring system



Cylinder pressure control and monitoring system



Main engine diagnostic system



Upcoming: CBM system



Upcoming: New system, using digital twin technology

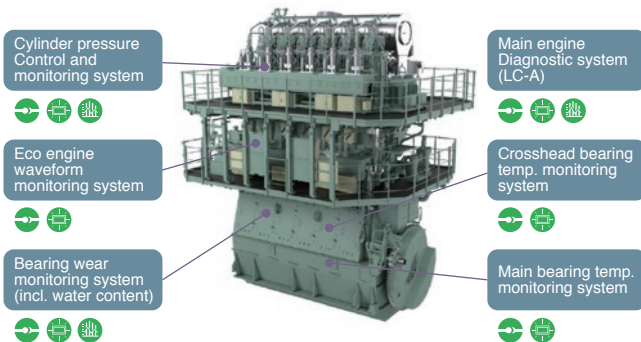




## IoT Initiatives

We are taking initiatives for research and development, and data analysis, with the goal of creating new value using operational data.

In recent years, sensing technology and analysis have been developed due to the growing interest in IoT and AI technology application, and we aim for customer satisfaction by introducing these technologies and integrating them with our know-how.



## CBM Initiatives

We are taking CBM initiatives using the main engine diagnostic system and monitoring system.

### Main Engine Diagnostic System

The integrated support system is a navigation support system for the main engine by remote monitoring, using the internal and external networks, and is a total-support package where the following effects can be expected.

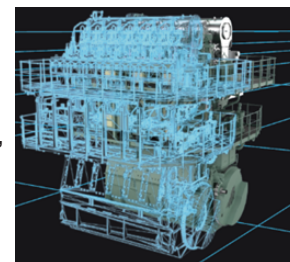
### Monitoring System Initiatives

As a part of IoT and AI technology applications, we are developing monitoring technologies such as in-cylinder pressure control, electronic control engine waveform monitoring, bearing wear monitoring, and bearing temperature monitoring systems.

### Next Generation 5G Eco Control System

J-ENG is focusing on the development of Condition Based Maintenance (CBM) and digital twins technologies, in order to provide more convenient after-sales service to customers. And, J-ENG is developing the 5th generation electronically-control system (5G Eco-system) based on the current 4G Eco-system, so that this CBM and digital twin can be implemented in the future.

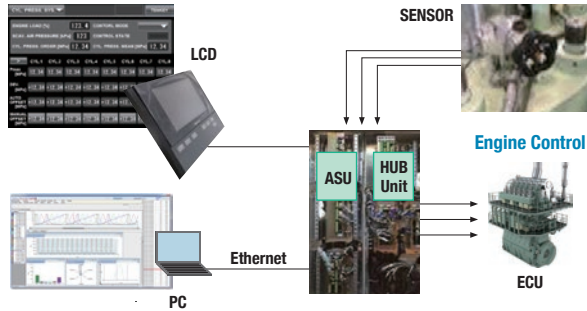
By providing this 5G Eco-system and introducing CBM and digital twin technologies, J-ENG can contribute to the optimization of safe operation, energy saving operation, maintenance cost and life cycle cost of customers.



## Cylinder pressure control and monitoring system



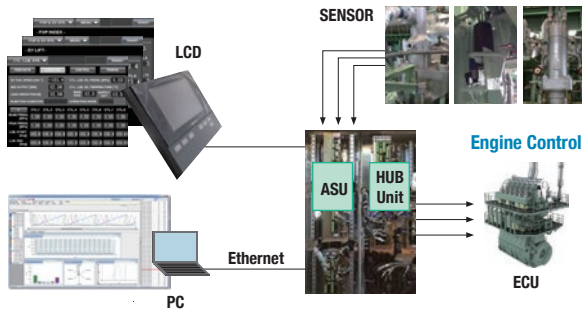
This system is installed as an additional system of Eco control system, and consists of cylinder pressure sensor, Analogue Sampling Unit (ASU), HUB unit and PC.



## Eco engine waveform monitoring system



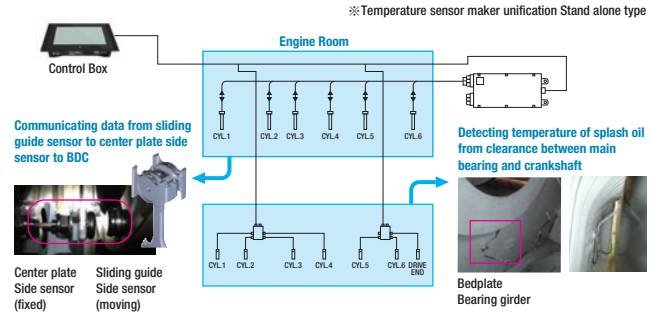
This system is installed as an additional system as well as cylinder pressure control and monitoring system, and consists of lift sensors of fuel injection pump / upper exhaust valve driving system, pressure sensor of cylinder lubricator, ASU, HUB unit and PC.



## Bearing temperature monitoring system



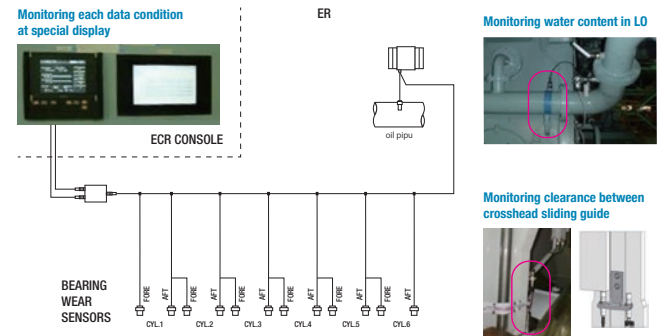
This system consists of sensors and signal transformer installing each bearing in crankcase.



## Bearing wear monitoring system



This system consists of bearing wear sensor, water content in LO sensor, relay unit and special display.



# UE Engines

UE Engine is a large sized, two-stroke and low speed engine type developed in-house using our own technologies. It is widely used in bulk carriers, oil/chemical tankers, pure car & truck carriers, containerhips, LPG carriers, multi-purpose carriers and many other types of vessel.

## Main Features of UE Engines

- Economical
- Environmentally friendly
- Highly reliable
- Compact design
- Easy maintenance



## UE-Eco Engine

In addition to the features of UE Engine, the UE Eco-Engine provide the following benefits:

- **Ecological**
  - Low NOx emissions
  - Smokeless operation
- **Economical**
  - Low fuel consumption
  - Low maintenance costs
  - Low cylinder oil consumption
- **Excellent condition**
  - Reliable
  - Early failure warning system
- **Easy to control**
  - Stable low-load operation
  - Excellent startup and crush astern

## CYLINDER LUBRICATION

The A-ECL (Advanced Electronically Controlled Lubricating) system can reduce the explicit minimum dosage down to 0.5g/kWh, depending on engine conditions. The A-ECL system can further reduce the cylinder oil feed rate, compared with a mechanical lubricating system, particularly under partial load operation, by controlling cylinder oil consumption according to the mean effective pressure.

Available for Retrofitting



## LOW LOAD OPERATION

When undertaking continuous low load operations, UE engine components (e.g. fuel nozzle, fuel injection valve) do not need to be changed to the special ones. In order to keep the engine components in optimum condition, regular load up should be performed as follows:

If you need to further reduce the continuous operating load or extend the operation time limit, please contact J-ENG.

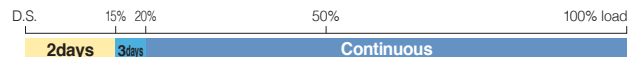
### Cam type Engines (Conventional engine)

D.S.\*-30%: Load up to over 50%, two hours operation every two days  
30-40%: Load up to over 50%, two hours operation every three days



### Electronically-controlled Engines (Eco-Engine)

D.S.\*-15%: Load up to over 50%, two hours operation every two days  
15-20%: Load up to over 50%, two hours operation every three days



※D.S.: Dead slow ahead (about 5% engine load)

## DIMENSIONS AND WEIGHT

- The engine weight is net in metric tonnes (t), without oil and water.
- The engine weight and dimensions do not include torsional damper, axial damper, tuning wheel and compensator, etc., subject to the design of each project.

L.C.C.: the distance between cylinder centers.

F1: Standard lifting height      F2: Special lifting height

As shown below, UE Engine offers welded block and cast iron, depending on the engine types. In this booklet, the weight of the engine made by cast iron is shown in brackets.

Engine type	Welded	Cast iron	Engine type	Welded	Cast iron
UEC60LSJ	✓		UEC50LSE-Eco-B1	✓	✓
UEC50LSJ	✓		UEC50LSE-Eco-A2	✓	✓
UEC42LSJ	✓		UEC45LSE-C1	✓	
UEC35LSJ	✓	✓*2	UEC45LSE-Eco-C1	✓	
UEC50LSH-Eco-C3/C4	✓		UEC45LSE-C1	✓	
UEC50LSH-Eco-C2	✓		UEC45LSE-Eco-C1	✓	
UEC42LSH-Eco-D3/D4	✓		UEC45LSE-B2	✓	
UEC33LSH-C2		✓	UEC45LSE-Eco-B2	✓	
UEC80LSE-Eco-B1	✓		UEC45LSE-1	✓*1	
UEC80LSE-Eco-A2	✓		UEC45LSE-Eco-1	✓	
UEC60LSE-Eco-B1	✓		UEC35LSE-C1	✓	✓*2
UEC60LSE-Eco-A2	✓		UEC35LSE-Eco-C1	✓	✓*2
			UEC35LSE-B2	✓	
			UEC35LSE-Eco-B2	✓	✓*2
			UEC33LSE-C2	✓	✓*2
			UEC33LSII	✓	✓
			UEC33LSII-Eco	✓	✓

\*1 : Bedplate can be made by cast iron (Eco-Engine). (Column is made by welded block only.)

\*2 : Bedplate can be made by cast iron. (Column is made by welded block only.)

All UE engine described in this booklet are fully compliant with IMO NOx Tier II regulations in ANNEX VI of the MARPOL 73/78.

The specific fuel oil consumption ("SFOC") figures are based on the below conditions,

- ISO standard condition
- Diesel fuel oil
- Lower calorific value of fuel (42,700 kJ/kg)

**ISO Standard Reference Condition**

Total barometric pressure	1.0 bar
Ambient temperature	25 °C
Cooling water temperature	25 °C

**Tolerance**

For UE engines, new SFOC tolerance is applied. SFOC guarantee tolerances are as follows;

- 5% tolerance for 100 - 85% engine load
- 6% tolerance for <85 - 65% engine load
- 7% tolerance for <65 - 25% engine load

SFOC guarantee can only be at one load point (either MCR or NCR) for Tier II engine or with Tier II mode for Tier III engine.

**SFOC optimize**

We have added the fuel optimized "Low-SFOC" version, etc. to UE Engine line-up in order to bring maximum benefit to our customers. By changing some engine parts and optimizing the electronically controlled system, the SFOC can be reduced when compared with a conventional "Standard" version. The figures for SFOC for a representative version are described in this booklet.

In addition, the UE Engine has also improved part-load and low-load SFOC by introducing tuning methods such as the LLO (Low Load Optimize), EGB, the turbocharger cut-out system, and so on. Details of each can be discussed with regard to each individual project according to each customer's requirements.

**■ EPD (Engine Planning Data) Calculator**

J-ENG's Engine Planning Data ("EPD") calculator is an application to obtain the technical information and data for installing the UE engine at an initial stage for new project.

The operation of the EPD calculator is intuitive and visual, so you can obtain the SFOC, engine performance data, auxiliary system, etc. as PDF file, only by selecting or entering the basic specifications of the new project.

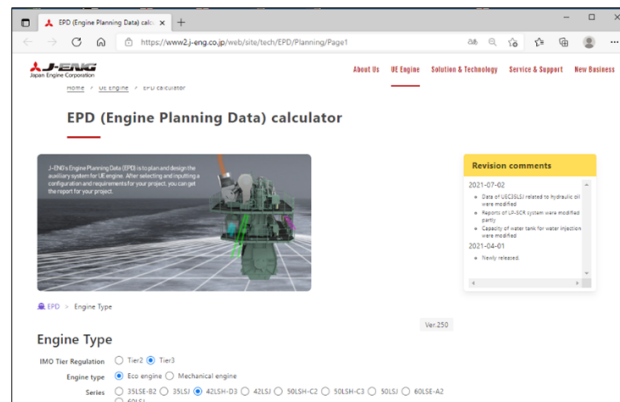
The data in this catalog is subject to change without prior notice. For the latest data, please check the data in the EPD calculator.

EPD calculator can be started by accessing the below address or scanning the below QR-code.



EPD calculator

<https://www2.j-eng.co.jp/web/site/tech/EPD/Planning/Page1>



**■ Other technical information is available**

<https://www.j-eng.co.jp/en/index.html>



Technical Data



Installation drawings

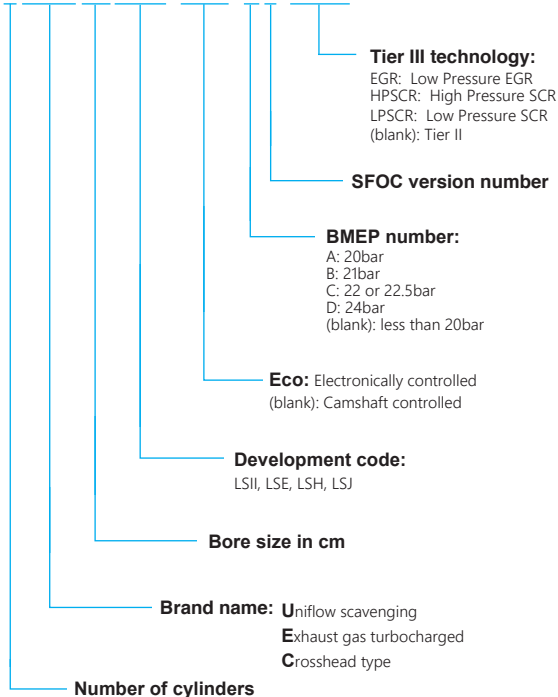


Extent of Delivery



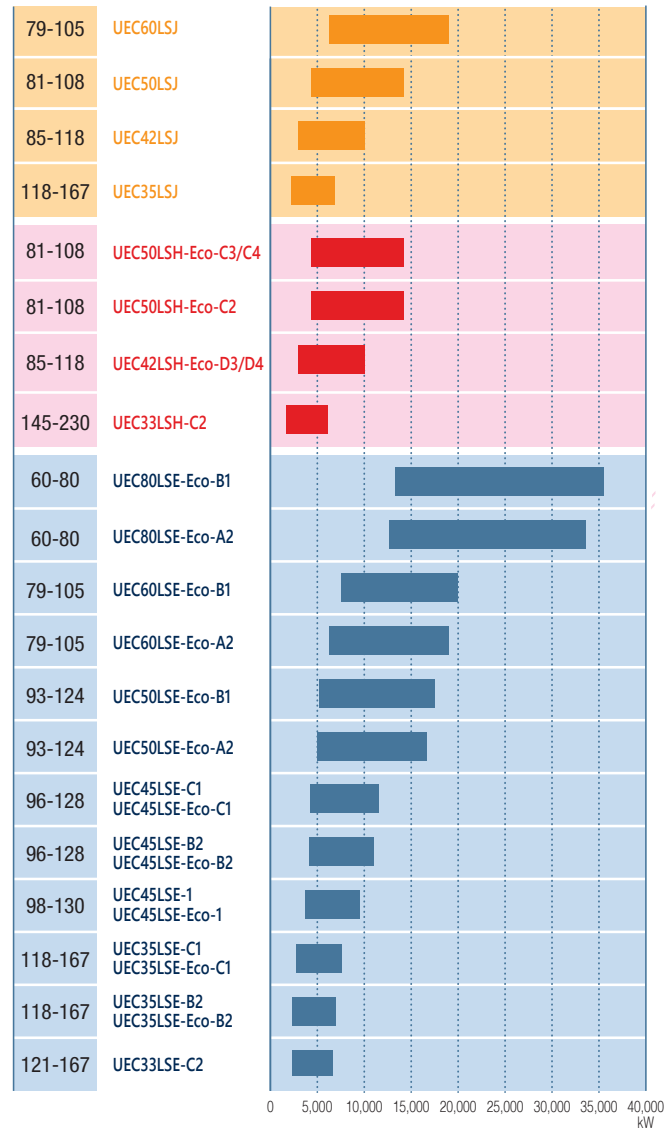
e.g. **6UEC42LSH-Eco-D4-EGR**

UE Engines  
LSJ  
LSH  
LSE  
LSII



Engine Speed  
(P4-P1/min<sup>-1</sup>)

kW



UE Engines  
LSJ  
LSH  
LSE  
LSII

SFOC version

■ Addition of new SFOC version 4

For UEC50LSH / UEC42LSH, the specific fuel oil consumption has been further improved by upgrading the fuel injection system.

By individually changing the fuel injection pattern from multiple fuel injection valves, the shape of heat release rate in the cylinder is improved and the trade-off between NOx and SFOC is improved.

The UEC50LSH-Eco-C4 and UEC42LSH-Eco-D4 engines equipped with the above fuel injection system have been added to the UE engine lineup.

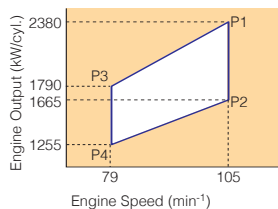
# UEC60LSJ

## Main data

Cylinder bore	600 mm
Piston stroke	2 400 mm
Stroke / bore	4.00
BMEP at P1	20.0 bar

Tier II

Tier III

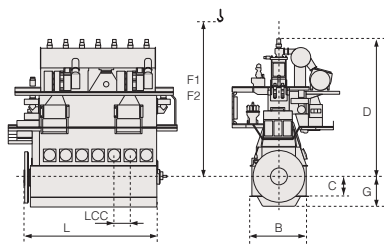


## Rated power

Speed	105 min <sup>-1</sup>		79 min <sup>-1</sup>	
	Piston Speed			
Cyl.	8.4 m/s		6.3 m/s	
	P1	P2	P3	P4
	kW	kW	kW	kW
5	11 900	8 325	8 950	6 275
6	14 280	9 990	10 740	7 530
7	16 660	11 655	12 530	8 785
8	19 040	13 320	14 320	10 040

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	F2	G	LCC	Weight
5	6 780	3 770	1 300	8 903	10 800	10 040	1 944	1 086	302
6	7 866	3 770	1 300	8 903	10 800	10 040	1 944	1 086	352
7	8 952	3 770	1 300	8 903	10 800	10 040	1 944	1 086	402
8	10 038	3 770	1 300	8 903	10 800	10 040	1 944	1 086	451



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	12	*
6	14	*
7	17	*
8	19	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC)

### UEC60LSJ

	P1	P2	P3	P4
100% load, g/kWh	158.8	152.8	158.8	152.8
75% load, g/kWh	153.3	147.3	153.3	147.3
50% load, g/kWh	154.8	148.8	154.8	148.8

Tier III

## Specific fuel oil consumption (SFOC)

### UEC60LSJ-EGR

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	158.8	152.8	158.8	152.8
75% load, g/kWh	153.3	147.3	153.3	147.3
50% load, g/kWh	154.8	148.8	154.8	148.8
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	160.4	154.4	160.4	154.4
75% load, g/kWh	154.9	148.9	154.9	148.9
50% load, g/kWh	156.4	150.4	156.4	150.4

## Specific fuel oil consumption (SFOC)

### UEC60LSJ-HPSCR

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	158.8	152.8	158.8	152.8
75% load, g/kWh	153.3	147.3	153.3	147.3
50% load, g/kWh	154.8	148.8	154.8	148.8
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	159.1	153.1	159.1	153.1
75% load, g/kWh	153.5	147.5	153.5	147.5
50% load, g/kWh	155.2	149.2	155.2	149.6

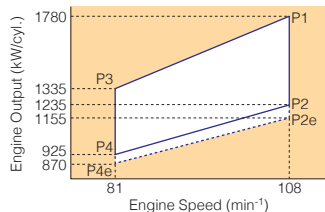
# UEC50LSJ

## Main data

Cylinder bore	500 mm
Piston stroke	2 300 mm
Stroke / bore	4.60
BMEP at P1	21.9 bar

Tier II

Tier III

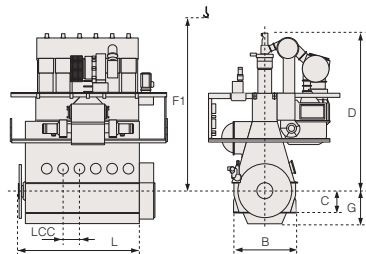


## Rated power

Speed	108 min <sup>-1</sup>			81 min <sup>-1</sup>		
Piston Speed	8.3 m/s			6.2 m/s		
Cyl.	P1	P2	P2e	P3	P4	P4e
	kW	kW	kW	kW	kW	kW
5	8 900	6 175	5 775	6 675	4 625	4 350
6	10 680	7 410	6 930	8 010	5 550	5 220
7	12 460	8 645	8 085	9 345	6 475	6 090
8	14 240	9 880	9 240	10 680	7 400	6 960

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 547	3 350	1 190	8 448	10 050	1 700	870	199
6	6 417	3 350	1 190	8 448	10 050	1 700	870	231
7	7 287	3 350	1 190	8 448	10 050	1 700	870	264
8	8 157	3 350	1 190	8 448	10 050	1 700	870	297



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	9	*
6	11	*
7	12	*
8	14	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC)

### UEC50LSJ

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	157.0	151.1	151.5	157.0	151.1	151.5
75% load, g/kWh	151.5	145.6	146.0	151.5	145.6	146.0
50% load, g/kWh	153.0	147.1	147.5	153.0	147.1	147.5

Tier III

## Specific fuel oil consumption (SFOC)

### UEC50LSJ-EGR

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	157.0	151.1	151.5	157.0	151.1	151.5
75% load, g/kWh	151.5	145.6	146.0	151.5	145.6	146.0
50% load, g/kWh	153.0	147.1	147.5	153.0	147.1	147.5
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	158.6	152.7	153.1	158.6	152.7	153.1
75% load, g/kWh	153.1	147.2	147.6	153.1	147.2	147.6
50% load, g/kWh	154.6	148.7	149.1	154.6	148.7	149.1

## Specific fuel oil consumption (SFOC)

### UEC50LSJ-HPSCR

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	157.0	151.1	151.5	157.0	151.1	151.5
75% load, g/kWh	151.5	145.6	146.0	151.5	145.6	146.0
50% load, g/kWh	153.0	147.1	147.5	153.0	147.1	147.5
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	157.3	151.4	151.8	157.3	151.4	151.8
75% load, g/kWh	151.7	145.8	146.2	151.7	145.8	146.2
50% load, g/kWh	153.4	147.5	147.9	153.4	147.5	148.0

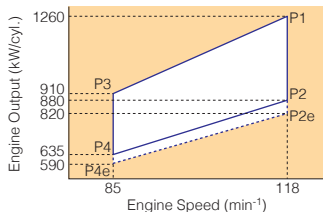
# UEC42LSJ

## Main data

Cylinder bore	420 mm
Piston stroke	1930 mm
Stroke / bore	4.60
BMEP at P1	24.0 bar

Tier II

Tier III

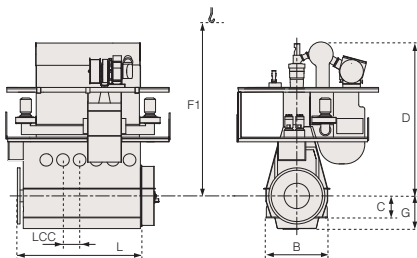


## Rated power

Speed	118 min <sup>-1</sup>			85 min <sup>-1</sup>		
	7.6 m/s			5.5 m/s		
Cyl.	P1	P2	P2e	P3	P4	P4e
	kW	kW	kW	kW	kW	kW
5	6 300	4 400	4 100	4 550	3 175	2 950
6	7 560	5 280	4 920	5 460	3 810	3 540
7	8 820	6 160	5 740	6 370	4 445	4 130
8	10 080	7 040	6 560	7 280	5 080	4 720

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 857	2 800	1 000	6 952	8 700	1 490	760	149
6	5 617	2 800	1 000	6 952	8 700	1 490	760	174
7	6 337	2 800	1 000	6 952	8 700	1 490	760	200
8	7 137	2 800	1 000	6 952	8 700	1 490	760	224



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	6	*
6	8	*
7	9	*
8	10	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC)

### UEC42LSJ

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	157.0	151.0	151.5	157.0	151.0	151.5
75% load, g/kWh	151.5	145.5	146.0	151.5	145.5	146.0
50% load, g/kWh	153.0	147.0	147.5	153.0	147.0	147.5

Tier III

## Specific fuel oil consumption (SFOC)

### UEC42LSJ-EGR

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	157.0	151.0	151.5	157.0	151.0	151.5
75% load, g/kWh	151.5	145.5	146.0	151.5	145.5	146.0
50% load, g/kWh	153.0	147.0	147.5	153.0	147.0	147.5
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	158.6	152.6	153.1	158.6	152.6	153.1
75% load, g/kWh	153.1	147.1	147.6	153.1	147.1	147.6
50% load, g/kWh	154.6	148.6	149.1	154.6	148.6	149.1

## Specific fuel oil consumption (SFOC)

### UEC42LSJ-HPSCR

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	157.0	151.0	151.5	157.0	151.0	151.5
75% load, g/kWh	151.5	145.5	146.0	151.5	145.5	146.0
50% load, g/kWh	153.0	147.0	147.5	153.0	147.0	147.5
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	157.3	151.3	151.8	157.3	151.3	151.8
75% load, g/kWh	151.7	145.7	146.2	151.7	145.7	146.2
50% load, g/kWh	153.4	147.4	147.9	153.4	147.4	147.9



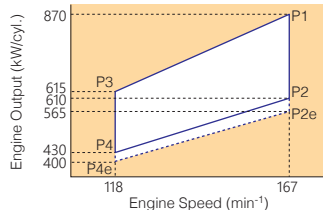
# UEC35LSJ

## Main data

Cylinder bore	350 mm
Piston stroke	1 550 mm
Stroke / bore	4.43
BMEP at P1	21.0 bar

Tier II

Tier III



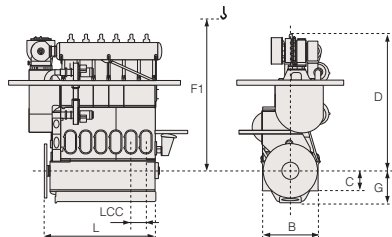
## Rated power

Speed	167 min <sup>-1</sup>			118 min <sup>-1</sup>		
	Piston Speed					
Cyl.	P1	P2	P2e	P3	P4	P4e
	kW	kW	kW	kW	kW	kW
5	4 350	3 050	2 825	3 075	2 150	2 000
6	5 220	3 660	3 390	3 690	2 580	2 400
7	6 090	4 270	3 955	4 305	3 010	2 800
8	6 960	4 880	4 520	4 920	3 440	3 200

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 398	2 284	830	5 623	6 725	1 326	612	83 (85)
6	5 010	2 284	830	5 623	6 725	1 326	612	93 (95)
7	5 622	2 284	830	5 623	6 725	1 326	612	104 (107)
8	6 234	2 284	830	5 623	6 725	1 326	612	116 (119)

Weight in ( ) is for engine of bedplate, made by cast iron.



Tier II

## Specific fuel oil consumption (SFOC) UEC35LSJ

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	163.3	157.3	157.8	163.3	157.3	157.8
75% load, g/kWh	157.8	151.8	152.3	157.8	151.8	152.3
50% load, g/kWh	159.4	153.4	153.9	159.4	153.4	153.9

Tier III

## Specific fuel oil consumption (SFOC) UEC35LSJ-LPSCR

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	163.3	157.3	157.8	163.3	157.3	157.8
75% load, g/kWh	157.8	151.8	152.3	157.8	151.8	152.3
50% load, g/kWh	159.4	153.4	153.9	159.4	153.4	153.9
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	163.3	158.1	158.8	163.5	158.6	159.3
75% load, g/kWh	158.8	153.1	153.6	159.4	153.6	154.1
50% load, g/kWh	159.9	154.1	154.6	160.7	154.8	155.2

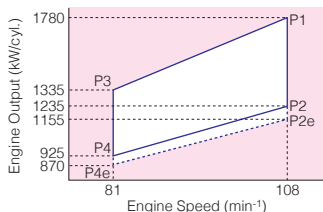
# UEC50LSH-Eco-C4

## Main data

Cylinder bore	500 mm
Piston stroke	2 300 mm
Stroke / bore	4.60
BMEP at P1	21.9 bar

Tier II

Tier III



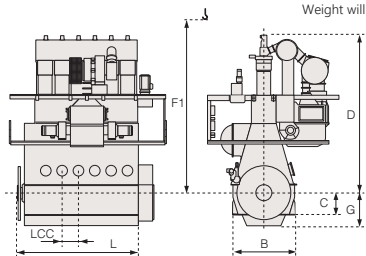
## Rated power

Speed	108 min <sup>-1</sup>			81 min <sup>-1</sup>		
	Piston Speed					
Cyl.	P1	P2	P2e	P3	P4	P4e
	5	8 900	6 175	5 775	6 675	4 625
6	10 680	7 410	6 930	8 010	5 550	5 220
7	12 460	8 645	8 085	9 345	6 475	6 090
8	14 240	9 880	9 240	10 680	7 400	6 960

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 547	3 350	1 190	8 448	10 050	1 700	870	194
6	6 417	3 350	1 190	8 448	10 050	1 700	870	225
7	7 287	3 350	1 190	8 448	10 050	1 700	870	257
8	8 157	3 350	1 190	8 448	10 050	1 700	870	289

Weight will be changed during development period.



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	9	*
6	11	*
7	12	*
8	14	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C4 with standard

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	162.0	155.3	155.8	162.0	155.3	155.7
75% load, g/kWh	156.5	149.8	150.3	156.5	149.8	150.2
50% load, g/kWh	158.0	151.3	151.8	158.0	151.3	151.7

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C4 with LLO+EGB

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.1	158.4	158.9	165.1	158.4	158.8
75% load, g/kWh	155.3	148.6	149.1	155.3	148.6	149.0
50% load, g/kWh	154.6	148.7	149.1	154.6	148.7	149.1

Tier III

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C4-EGR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.1	158.4	158.9	165.1	158.4	158.8
75% load, g/kWh	155.3	148.6	149.1	155.3	148.6	149.0
50% load, g/kWh	154.6	148.7	149.1	154.6	148.7	149.1
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.2	158.5	159.0	165.2	158.5	158.9
75% load, g/kWh	157.4	150.7	151.2	157.4	150.7	151.1
50% load, g/kWh	157.3	150.6	151.1	157.3	150.6	151.0

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C4-HPSCR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.1	158.4	158.9	165.1	158.4	158.8
75% load, g/kWh	155.3	148.6	149.1	155.3	148.6	149.0
50% load, g/kWh	154.6	148.7	149.1	154.6	148.7	149.1
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.4	158.7	159.2	165.4	158.7	159.1
75% load, g/kWh	155.5	148.8	149.3	155.5	148.8	149.2
50% load, g/kWh	155.0	149.1	149.5	155.0	149.1	149.5

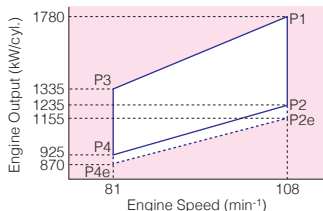
# UEC50LSH-Eco-C3

## Main data

Cylinder bore	500 mm
Piston stroke	2 300 mm
Stroke / bore	4.60
BMEP at P1	21.9 bar

Tier II

Tier III

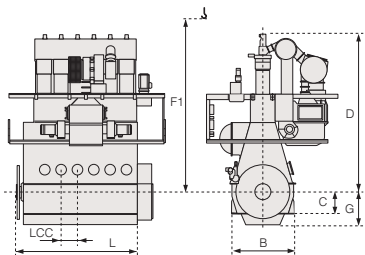


## Rated power

Speed	108 min <sup>-1</sup>			81 min <sup>-1</sup>		
	Piston Speed					
Cyl.	P1	P2	P2e	P3	P4	P4e
	5	8 900	6 175	5 775	6 675	4 625
6	10 680	7 410	6 930	8 010	5 550	5 220
7	12 460	8 645	8 085	9 345	6 475	6 090
8	14 240	9 880	9 240	10 680	7 400	6 960

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 547	3 350	1 190	8 448	10 050	1 700	870	194
6	6 417	3 350	1 190	8 448	10 050	1 700	870	225
7	7 287	3 350	1 190	8 448	10 050	1 700	870	257
8	8 157	3 350	1 190	8 448	10 050	1 700	870	289



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	9	*
6	11	*
7	12	*
8	14	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C3 with standard

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	164.0	157.3	157.8	164.0	157.3	157.7
75% load, g/kWh	158.5	151.8	152.3	158.5	151.8	152.2
50% load, g/kWh	160.0	153.3	153.8	160.0	153.3	153.7

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C3 with LLO+EGB

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.1	160.4	160.9	167.1	160.4	160.8
75% load, g/kWh	157.3	150.6	151.1	157.3	150.6	151.0
50% load, g/kWh	156.6	149.9	150.4	156.6	149.9	150.3

Tier III

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C3-EGR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.1	160.4	160.9	167.1	160.4	160.8
75% load, g/kWh	157.3	150.6	151.1	157.3	150.6	151.0
50% load, g/kWh	156.6	149.9	150.4	156.6	149.9	150.3
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.2	160.5	161.0	167.2	160.5	160.9
75% load, g/kWh	159.4	152.7	153.2	159.4	152.7	153.1
50% load, g/kWh	159.3	152.6	153.1	159.3	152.6	153.0

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C3-HPSCR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.1	160.4	160.9	167.1	160.4	160.8
75% load, g/kWh	157.3	150.6	151.1	157.3	150.6	151.0
50% load, g/kWh	156.6	149.9	150.4	156.6	149.9	150.3
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.4	160.7	161.2	167.4	160.7	161.1
75% load, g/kWh	157.5	150.8	151.3	157.5	150.8	151.2
50% load, g/kWh	157.0	150.3	150.8	157.0	150.3	150.7

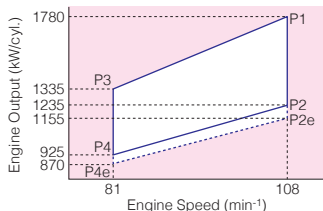
# UEC50LSH-Eco-C2

## Main data

Cylinder bore	500 mm
Piston stroke	2 300 mm
Stroke / bore	4.60
BMEP at P1	21.9 bar

Tier II

Tier III

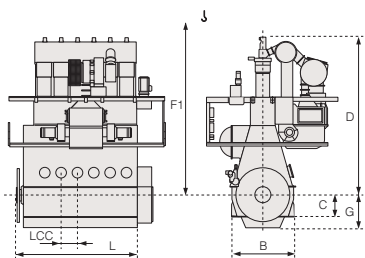


## Rated power

Speed	108 min <sup>-1</sup>			81 min <sup>-1</sup>		
	Piston Speed					
Cyl.	P1	P2	P2e	P3	P4	P4e
	kW	kW	kW	kW	kW	kW
5	8 900	6 175	5 775	6 675	4 625	4 350
6	10 680	7 410	6 930	8 010	5 550	5 220
7	12 460	8 645	8 085	9 345	6 475	6 090
8	14 240	9 880	9 240	10 680	7 400	6 960

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 547	3 350	1 190	8 448	10 050	1 700	870	194
6	6 417	3 350	1 190	8 448	10 050	1 700	870	225
7	7 287	3 350	1 190	8 448	10 050	1 700	870	257
8	8 157	3 350	1 190	8 448	10 050	1 700	870	289



## Tier III added weight (tonnes)

Cyl.	EGR	LPSCR
5	9	-
6	11	-
7	12	-
8	14	-



Tier II

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C2 with standard

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	164.0	158.1	158.5	164.0	158.1	158.5
75% load, g/kWh	158.5	152.6	153.0	158.5	152.6	153.0
50% load, g/kWh	160.0	154.1	154.5	160.0	154.1	154.5

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C2 with LLO+EGB

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.6	159.7	160.1	165.6	159.7	160.1
75% load, g/kWh	157.8	151.9	152.3	157.8	151.9	152.3
50% load, g/kWh	156.6	150.7	151.1	156.6	150.7	151.1

Tier III

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C2-EGR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.2	161.3	161.7	167.2	161.3	161.7
75% load, g/kWh	159.4	153.5	153.9	159.4	153.5	153.9
50% load, g/kWh	158.2	152.3	152.7	158.2	152.3	152.7
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	168.8	162.9	163.3	168.8	162.9	163.3
75% load, g/kWh	161.0	155.1	155.5	161.0	155.1	155.5
50% load, g/kWh	160.9	155.0	155.4	160.9	155.0	155.4

## Specific fuel oil consumption (SFOC) UEC50LSH-Eco-C2-LPSCR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.6	159.7	160.1	165.6	159.7	160.1
75% load, g/kWh	157.8	151.9	152.3	157.8	151.9	152.3
50% load, g/kWh	156.6	150.7	151.1	156.6	150.7	151.1
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.6	159.7	160.1	165.6	159.9	160.4
75% load, g/kWh	158.1	152.7	153.1	158.7	153.2	153.6
50% load, g/kWh	157.3	151.8	152.3	158.0	152.4	152.9



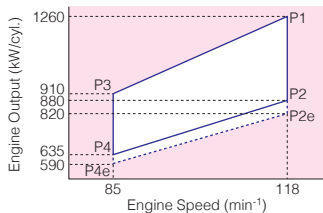
# UEC42LSH-Eco-D4

## Main data

Cylinder bore	420 mm
Piston stroke	1 930 mm
Stroke / bore	4.60
BMEP at P1	24.0 bar

Tier II

Tier III



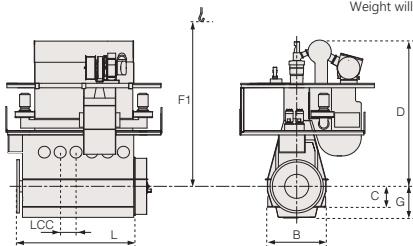
## Rated power

Speed	118 min <sup>-1</sup>			85 min <sup>-1</sup>		
	7.6 m/s			5.5 m/s		
Cyl.	P1	P2	P2e	P3	P4	P4e
	kW	kW	kW	kW	kW	kW
5	6 300	4 400	4 100	4 550	3 175	2 950
6	7 560	5 280	4 920	5 460	3 810	3 540
7	8 820	6 160	5 740	6 370	4 445	4 130
8	10 080	7 040	6 560	7 280	5 080	4 720

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 857	2 800	1 000	6 952	8 700	1 490	760	146
6	5 617	2 800	1 000	6 952	8 700	1 490	760	170
7	6 337	2 800	1 000	6 952	8 700	1 490	760	195
8	7 137	2 800	1 000	6 952	8 700	1 490	760	219

Weight will be changed during development period.



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	6	*
6	8	*
7	9	*
8	10	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC) UEC42LSH-Eco-D4 with standard

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	162.0	156.0	156.5	162.0	156.0	156.5
75% load, g/kWh	156.5	150.5	151.0	156.5	150.5	151.0
50% load, g/kWh	158.0	152.0	152.5	158.0	152.0	152.5

## Specific fuel oil consumption (SFOC) UEC42LSH-Eco-D4 with LLO+EGB

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.1	159.1	159.6	165.1	159.1	159.6
75% load, g/kWh	155.3	149.3	149.8	155.3	149.3	149.8
50% load, g/kWh	154.6	148.6	149.1	154.6	148.6	149.1

Tier III

## Specific fuel oil consumption (SFOC) UEC42LSH-Eco-D4-EGR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.1	159.1	159.6	165.1	159.1	159.6
75% load, g/kWh	155.3	149.3	149.8	155.3	149.3	149.8
50% load, g/kWh	154.6	148.6	149.1	154.6	148.6	149.1
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.2	159.2	159.7	165.2	159.2	159.7
75% load, g/kWh	157.4	151.4	151.9	157.4	151.4	151.9
50% load, g/kWh	157.3	151.3	151.8	157.3	151.3	151.8

## Specific fuel oil consumption (SFOC) UEC42LSH-Eco-D4-HPSCR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.1	159.1	159.6	165.1	159.1	159.6
75% load, g/kWh	155.3	149.3	149.8	155.3	149.3	149.8
50% load, g/kWh	154.6	148.6	149.1	154.6	148.6	149.1
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	165.4	159.4	159.9	165.4	159.4	159.9
75% load, g/kWh	155.5	149.5	150.0	155.5	149.5	150.0
50% load, g/kWh	155.0	149.0	149.5	155.0	149.0	149.5

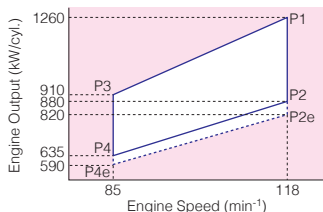
# UEC42LSH-Eco-D3

## Main data

Cylinder bore	420 mm
Piston stroke	1 930 mm
Stroke / bore	4.60
BMEP at P1	24.0 bar

Tier II

Tier III

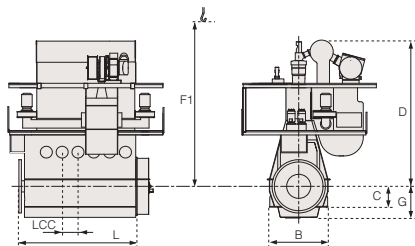


## Rated power

Speed	118 min <sup>-1</sup>			85 min <sup>-1</sup>		
	Piston Speed					
Cyl.	P1	P2	P2e	P3	P4	P4e
	kW	kW	kW	kW	kW	kW
5	6 300	4 400	4 100	4 550	3 175	2 950
6	7 560	5 280	4 920	5 460	3 810	3 540
7	8 820	6 160	5 740	6 370	4 445	4 130
8	10 080	7 040	6 560	7 280	5 080	4 720

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 857	2 800	1 000	6 952	8 700	1 490	760	146
6	5 617	2 800	1 000	6 952	8 700	1 490	760	170
7	6 337	2 800	1 000	6 952	8 700	1 490	760	195
8	7 137	2 800	1 000	6 952	8 700	1 490	760	219



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	6	*
6	8	*
7	9	*
8	10	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC) UEC42LSH-Eco-D3 with standard

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	164.0	158.0	158.5	164.0	158.0	158.5
75% load, g/kWh	158.5	152.5	153.0	158.5	152.5	153.0
50% load, g/kWh	160.0	154.0	154.5	160.0	154.0	154.5

## Specific fuel oil consumption (SFOC) UEC42LSH-Eco-D3 with LLO+EGB

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.1	161.1	161.6	167.1	161.1	161.6
75% load, g/kWh	157.3	151.3	151.8	157.3	151.3	151.8
50% load, g/kWh	156.6	150.6	151.1	156.6	150.6	151.1

Tier III

## Specific fuel oil consumption (SFOC) UEC42LSH-Eco-D3-EGR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.1	161.1	161.6	167.1	161.1	161.6
75% load, g/kWh	157.3	151.3	151.8	157.3	151.3	151.8
50% load, g/kWh	156.6	150.6	151.1	156.6	150.6	151.1
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.2	161.2	161.7	167.2	161.2	161.7
75% load, g/kWh	159.4	153.4	153.9	159.4	153.4	153.9
50% load, g/kWh	159.3	153.3	153.8	159.3	153.3	153.8

## Specific fuel oil consumption (SFOC) UEC42LSH-Eco-D3-HPSCR with LLO+EGB

Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.1	161.1	161.6	167.1	161.1	161.6
75% load, g/kWh	157.3	151.3	151.8	157.3	151.3	151.8
50% load, g/kWh	156.6	150.6	151.1	156.6	150.6	151.1
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.4	161.4	161.9	167.4	161.4	161.9
75% load, g/kWh	157.5	151.5	152.0	157.5	151.5	152.0
50% load, g/kWh	157.0	151.0	151.5	157.0	151.0	151.5

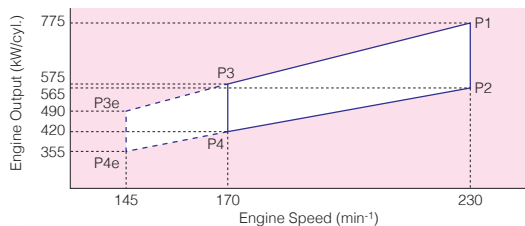
# UEC33LSH-C2

## Main data

Cylinder bore	330 mm
Piston stroke	1 050 mm
Stroke / bore	3.18
BMEP at P1	22.5 bar

Tier II

Tier III

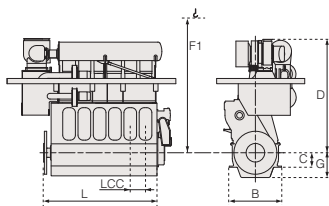


## Rated power

Cyl.	230 min <sup>-1</sup>		170 min <sup>-1</sup>		145 min <sup>-1</sup>	
	P1	P2	P3	P4	P3e	P4e
	8.1 m/s		6.0 m/s		5.1 m/s	
	kW	kW	kW	kW	kW	kW
5	3 875	2 825	2 875	2 100	2 450	1 775
6	4 650	3 390	3 450	2 520	2 940	2 130
7	5 425	3 955	4 025	2 940	3 430	2 485
8	6 200	4 520	4 600	3 360	3 920	2 840

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	3 720	1 980	550	4 300	5 100	940	580	51
6	4 300	1 980	550	4 300	5 100	940	580	59
7	4 880	1 980	550	4 300	5 100	940	580	67
8	5 460	1 980	550	4 300	5 100	940	580	77



Tier II

## Specific fuel oil consumption (SFOC) UEC33LSH-C2

	P1	P2	P3	P4	P3e	P4e
100% load, g/kWh	172.0	168.0	172.0	168.0	174.0	170.0
75% load, g/kWh	167.5	163.5	167.5	163.5	169.5	165.5
50% load, g/kWh	169.1	165.1	169.1	165.1	171.1	167.1

Tier III

## Specific fuel oil consumption (SFOC) UEC33LSH-C2-LPSCR

Tier II mode	P1	P2	P3	P4	P3e	P4e
100% load, g/kWh	172.0	168.0	172.0	168.0	174.0	170.0
75% load, g/kWh	167.5	163.5	167.5	163.5	169.5	165.5
50% load, g/kWh	169.1	165.1	169.1	165.1	171.1	167.1
Tier III mode	P1	P2	P3	P4	P3e	P4e
100% load, g/kWh	172.0	168.0	172.0	168.4	174.0	170.6
75% load, g/kWh	167.6	164.2	168.4	164.7	170.6	166.9
50% load, g/kWh	169.1	165.1	169.7	165.8	171.9	168.1

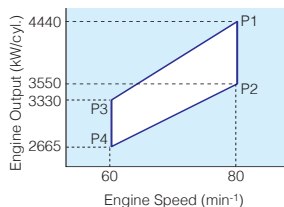
# UEC80LSE-Eco-B1

## Main data

Cylinder bore	800 mm
Piston stroke	3 150 mm
Stroke / bore	3.94
BMEP at P1	21.0 bar

Tier II

Tier III

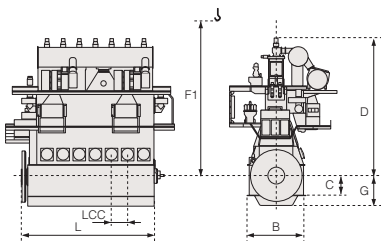


## Rated power

Speed	80 min <sup>-1</sup>		60 min <sup>-1</sup>	
	8.4 m/s		6.3 m/s	
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	22 200	17 750	16 650	13 325
6	26 640	21 300	19 980	15 990
7	31 080	24 850	23 310	18 655
8	35 520	28 400	26 640	21 320

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	8 658	5 000	1 736	11 725	14 247	2 524	1 380	693
6	10 038	5 000	1 736	11 725	14 247	2 524	1 380	794
7	11 418	5 000	1 736	11 725	14 247	2 524	1 380	895
8	12 798	5 000	1 736	11 725	14 247	2 524	1 380	996



## Tier III added weight (tonnes)

Cyl.	HPSCR
5	*
6	*
7	*
8	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC) UEC80LSE-Eco-B1 with standard

	P1	P2	P3	P4
100% load, g/kWh	163.0	157.7	163.0	157.7
75% load, g/kWh	158.3	154.2	158.3	154.2
50% load, g/kWh	160.1	157.1	160.1	157.1

## Specific fuel oil consumption (SFOC) UEC80LSE-Eco-B1 with LLO+EGB

	P1	P2	P3	P4
100% load, g/kWh	164.6	159.3	164.6	159.3
75% load, g/kWh	157.6	153.5	157.6	153.5
50% load, g/kWh	156.4	153.4	156.4	153.4

Tier III

## Specific fuel oil consumption (SFOC) UEC80LSE-Eco-B1-HPSCR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	164.6	159.3	164.6	159.3
75% load, g/kWh	157.6	153.5	157.6	153.5
50% load, g/kWh	156.4	153.4	156.4	153.4
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	164.9	159.6	164.9	159.6
75% load, g/kWh	157.8	153.7	157.8	153.7
50% load, g/kWh	156.8	153.8	156.8	153.8

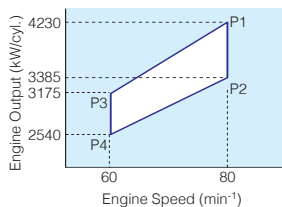
# UEC80LSE-Eco-A2

## Main data

Cylinder bore	800 mm
Piston stroke	3 150 mm
Stroke / bore	3.94
BMEP at P1	20.0 bar

Tier II

Tier III

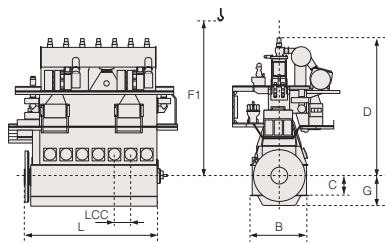


## Rated power

Speed	80 min <sup>-1</sup>		60 min <sup>-1</sup>	
	Piston Speed			
Cyl.	8.4 m/s		6.3 m/s	
	P1	P2	P3	P4
	kW	kW	kW	kW
5	21 150	16 925	15 875	12 700
6	25 380	20 310	19 050	15 240
7	29 610	23 695	22 225	17 780
8	33 840	27 080	25 400	20 320

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	8 658	5 000	1 736	11 725	14 247	2 524	1 380	693
6	10 038	5 000	1 736	11 725	14 247	2 524	1 380	794
7	11 418	5 000	1 736	11 725	14 247	2 524	1 380	895
8	12 798	5 000	1 736	11 725	14 247	2 524	1 380	996



## Tier III added weight (tonnes)

Cyl.	HPSCR
5	*
6	*
7	*
8	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC)

### UEC80LSE-Eco-A2 with standard

	P1	P2	P3	P4
100% load, g/kWh	163.0	157.0	163.0	157.0
75% load, g/kWh	157.5	151.5	157.5	151.5
50% load, g/kWh	159.1	153.1	159.1	153.1

## Specific fuel oil consumption (SFOC)

### UEC80LSE-Eco-A2 with LLO+EGB

	P1	P2	P3	P4
100% load, g/kWh	164.6	158.6	164.6	158.6
75% load, g/kWh	156.8	150.8	156.8	150.8
50% load, g/kWh	155.4	149.4	155.4	149.4

Tier III

## Specific fuel oil consumption (SFOC)

### UEC80LSE-Eco-A2-HPSCR with LLO+EGB

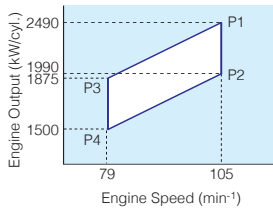
Tier II mode	P1	P2	P3	P4
100% load, g/kWh	164.6	158.6	164.6	158.6
75% load, g/kWh	156.8	150.8	156.8	150.8
50% load, g/kWh	155.4	149.4	155.4	149.4
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	164.9	158.9	164.9	158.9
75% load, g/kWh	157.0	151.0	157.0	151.0
50% load, g/kWh	155.8	149.8	155.8	149.8

# UEC60LSE-Eco-B1

## Main data

Cylinder bore	600 mm
Piston stroke	2 400 mm
Stroke / bore	4.00
BMEP at P1	21.0 bar

**Tier II**  
**Tier III**

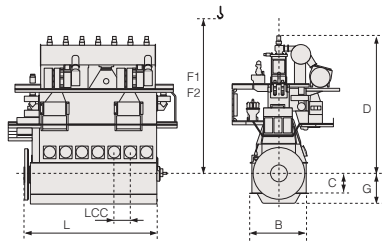


## Rated power

Speed	105 min <sup>-1</sup>		79 min <sup>-1</sup>	
	Piston Speed			
Cyl.	8.4 m/s		6.3 m/s	
	P1	P2	P3	P4
	kW	kW	kW	kW
5	12 450	9 950	9 375	7 500
6	14 940	11 940	11 250	9 000
7	17 430	13 930	13 125	10 500
8	19 920	15 920	15 000	12 000

## Principal engine dimension (mm) and weight (tonnes)

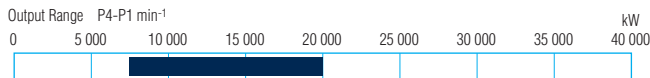
Cyl.	L	B	C	D	F1	F2	G	LCC	Weight
5	6 780	3 770	1 300	8 903	10 800	10 040	1 944	1 086	300
6	7 866	3 770	1 300	8 903	10 800	10 040	1 944	1 086	349
7	8 952	3 770	1 300	8 903	10 800	10 040	1 944	1 086	399
8	10 038	3 770	1 300	8 903	10 800	10 040	1 944	1 086	447



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	12	*
6	15	*
7	17	*
8	20	*

\* : To be determined



## Tier II

### Specific fuel oil consumption (SFOC) UEC60LSE-Eco-B1 with standard

	P1	P2	P3	P4
100% load, g/kWh	166.0	160.7	166.0	160.7
75% load, g/kWh	161.3	157.2	161.3	157.2
50% load, g/kWh	163.1	160.1	163.1	160.1

### Specific fuel oil consumption (SFOC) UEC60LSE-Eco-B1 with LLO+EGB

	P1	P2	P3	P4
100% load, g/kWh	167.6	162.3	167.6	162.3
75% load, g/kWh	160.6	156.5	160.6	156.5
50% load, g/kWh	159.4	156.4	159.4	156.4

## Tier III

### Specific fuel oil consumption (SFOC) UEC60LSE-Eco-B1-EGR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	167.6	162.3	167.6	162.3
75% load, g/kWh	160.6	156.5	160.6	156.5
50% load, g/kWh	159.4	156.4	159.4	156.4
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	169.2	163.9	169.2	163.9
75% load, g/kWh	162.2	158.1	162.2	158.1
50% load, g/kWh	162.4	159.4	162.4	159.4

### Specific fuel oil consumption (SFOC) UEC60LSE-Eco-B1-HPSCR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	167.6	162.3	167.6	162.3
75% load, g/kWh	160.6	156.5	160.6	156.5
50% load, g/kWh	159.4	156.4	159.4	156.4
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	167.9	162.6	167.9	162.6
75% load, g/kWh	160.8	156.7	160.8	156.7
50% load, g/kWh	159.8	156.8	159.8	156.8

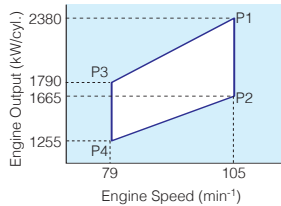


# UEC60LSE-Eco-A2

## Main data

Cylinder bore	600 mm
Piston stroke	2 400 mm
Stroke / bore	4.00
BMEP at P1	20.0 bar

**Tier II**  
**Tier III**

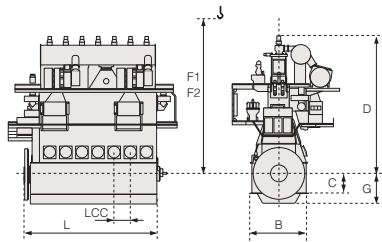


## Rated power

Speed	105 min <sup>-1</sup>		79 min <sup>-1</sup>	
	Piston Speed			
Cyl.	P1	P2	P3	P4
	5	11 900	8 325	8 950
6	14 280	9 990	10 740	7 530
7	16 660	11 655	12 530	8 785
8	19 040	13 320	14 320	10 040

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	F2	G	LCC	Weight
5	6 780	3 770	1 300	8 903	10 800	10 040	1 944	1 086	300
6	7 866	3 770	1 300	8 903	10 800	10 040	1 944	1 086	349
7	8 952	3 770	1 300	8 903	10 800	10 040	1 944	1 086	399
8	10 038	3 770	1 300	8 903	10 800	10 040	1 944	1 086	447



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	12	*
6	14	*
7	17	*
8	19	*

\* : To be determined



## Tier II

### Specific fuel oil consumption (SFOC)

#### UEC60LSE-Eco-A2 with standard

	P1	P2	P3	P4
100% load, g/kWh	166.0	160.0	166.0	160.0
75% load, g/kWh	160.5	154.5	160.5	154.5
50% load, g/kWh	162.0	156.0	162.0	156.0

### Specific fuel oil consumption (SFOC)

#### UEC60LSE-Eco-A2 with LLO+EGB

	P1	P2	P3	P4
100% load, g/kWh	169.9	163.9	169.9	163.9
75% load, g/kWh	158.8	152.8	158.8	152.8
50% load, g/kWh	155.5	149.5	155.5	149.5

## Tier III

### Specific fuel oil consumption (SFOC)

#### UEC60LSE-Eco-A2-EGR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	169.9	163.9	169.9	163.9
75% load, g/kWh	158.8	152.8	158.8	152.8
50% load, g/kWh	155.5	149.5	155.5	149.5
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	169.7	163.7	169.7	163.7
75% load, g/kWh	161.2	155.2	161.2	155.2
50% load, g/kWh	160.4	154.4	160.4	154.4

### Specific fuel oil consumption (SFOC)

#### UEC60LSE-Eco-A2-HPSCR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	169.9	163.9	169.9	163.9
75% load, g/kWh	158.8	152.8	158.8	152.8
50% load, g/kWh	155.5	149.5	155.5	149.5
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	170.2	164.2	170.2	164.2
75% load, g/kWh	159.0	153.0	159.0	153.0
50% load, g/kWh	155.9	149.9	155.9	150.1

# UEC50LSE-Eco-B1

## Main data

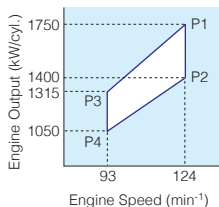
Cylinder bore	500 mm
Piston stroke	2 050 mm
Stroke / bore	4.10
BMEP at P1	21.0 bar

Tier II

Tier III

## Rated power

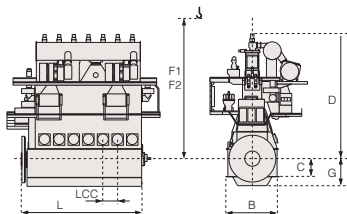
Speed	124 min <sup>-1</sup>		93 min <sup>-1</sup>	
	Piston Speed 8.5 m/s 6.4 m/s			
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	8 750	7 000	6 575	5 250
6	10 500	8 400	7 890	6 300
7	12 250	9 800	9 205	7 350
8	14 000	11 200	10 520	8 400
9	15 750	12 600	11 835	9 450
10	17 500	14 000	13 150	10 500



## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	F2	G	LCC	Weight
5	5 550 (5 575)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	188 (215)
6	6 430 (6 455)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	219 (250)
7	7 310 (7 335)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	251 (287)
8	8 190 (8 215)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	281 (321)
9	9 070 (9 095)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	312 (356)
10	9 950 (9 975)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	356 (405)

Dimensions and weight in ( ) are for engine of bedplate and column, made by cast iron.



## Tier III added weight (tonnes)

Cyl.	HPSCR
5	*
6	*
7	*
8	*
9	*
10	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC) UEC50LSE-Eco-B1 with standard

	P1	P2	P3	P4
100% load, g/kWh	167.0	161.7	167.0	161.7
75% load, g/kWh	162.3	158.2	162.3	158.2
50% load, g/kWh	164.1	161.1	164.1	161.1

## Specific fuel oil consumption (SFOC) UEC50LSE-Eco-B1 with LLO+EGB

	P1	P2	P3	P4
100% load, g/kWh	168.6	163.3	168.6	163.3
75% load, g/kWh	161.6	157.5	161.6	157.5
50% load, g/kWh	160.4	157.4	160.4	157.4

Tier III

## Specific fuel oil consumption (SFOC) UEC50LSE-Eco-B1-HPSCR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	168.6	163.3	168.6	163.3
75% load, g/kWh	161.6	157.5	161.6	157.5
50% load, g/kWh	160.4	157.4	160.4	157.4
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	168.9	163.6	168.9	163.6
75% load, g/kWh	161.8	157.7	161.8	157.7
50% load, g/kWh	160.8	157.8	160.8	157.8

# UEC50LSE-Eco-A2

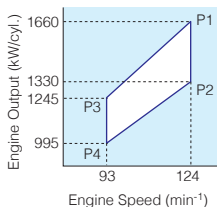
## Main data

Cylinder bore	500 mm
Piston stroke	2 050 mm
Stroke / bore	4.10
BMEP at P1	20.0 bar

**Tier II**  
**Tier III**

## Rated power

Speed	124 min <sup>-1</sup>				93 min <sup>-1</sup>			
	Piston Speed 8.5 m/s / 6.4 m/s							
Cyl.	P1	P2	P3	P4	P1	P2	P3	P4
	kW	kW	kW	kW	kW	kW	kW	kW
5	8 300	6 650	6 225	4 975				
6	9 960	7 980	7 470	5 970				
7	11 620	9 310	8 715	6 965				
8	13 280	10 640	9 960	7 960				
9	14 940	11 970	11 205	8 955				
10	16 600	13 300	12 450	9 950				



## Principal engine dimension (mm) and weight (tonnes)

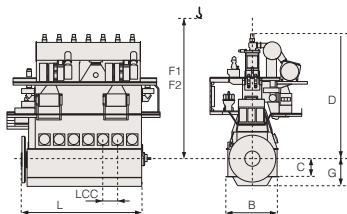
Cyl.	L	B	C	D	F1	F2	G	LCC	Weight
5	5 550 (5 575)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	188 (215)
6	6 430 (6 455)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	219 (250)
7	7 310 (7 335)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	251 (287)
8	8 190 (8 215)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	281 (321)
9	9 070 (9 095)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	312 (356)
10	9 950 (9 975)	3 150	1 088	7 688	9 250	8 409	1 636 (1 704)	880	356 (405)

Dimensions and weight in ( ) are for engine of bedplate and column, made by cast iron.

## Tier III added weight (tonnes)

Cyl.	HPSCR
5	*
6	*
7	*
8	*
9	*
10	*

\* : To be determined



## Tier II

### Specific fuel oil consumption (SFOC) UEC50LSE-Eco-A2 with standard

	P1	P2	P3	P4
100% load, g/kWh	167.0	161.0	167.0	161.0
75% load, g/kWh	161.5	155.5	161.5	155.5
50% load, g/kWh	163.1	157.1	163.1	157.1

### Specific fuel oil consumption (SFOC) UEC50LSE-Eco-A2 with LLO+EGB

	P1	P2	P3	P4
100% load, g/kWh	168.6	162.6	168.6	162.6
75% load, g/kWh	160.8	154.8	160.8	154.8
50% load, g/kWh	159.4	153.4	159.4	153.4

## Tier III

### Specific fuel oil consumption (SFOC) UEC50LSE-Eco-A2-HPSCR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	168.6	162.6	168.6	162.6
75% load, g/kWh	160.8	154.8	160.8	154.8
50% load, g/kWh	159.4	153.4	159.4	153.4
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	168.9	162.9	168.9	162.9
75% load, g/kWh	161.0	155.0	161.0	155.0
50% load, g/kWh	159.8	153.8	159.8	153.8

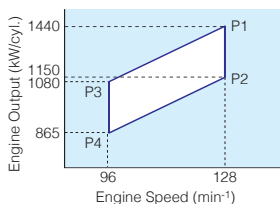
# UEC45LSE-Eco-C1

## Main data

Cylinder bore	450 mm
Piston stroke	1 930 mm
Stroke / bore	4.29
BMEP at P1	22.0 bar

Tier II

Tier III

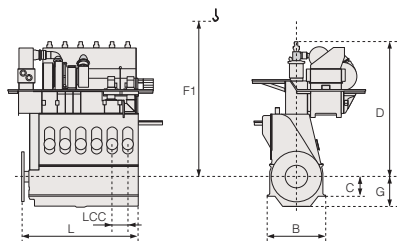


## Rated power

Speed	128 min <sup>-1</sup>		96 min <sup>-1</sup>	
	Piston Speed			
Cyl.	8.2 m/s		6.2 m/s	
	P1	P2	P3	P4
5	7 200	5 750	5 400	4 325
6	8 640	6 900	6 480	5 190
7	10 080	8 050	7 560	6 055
8	11 520	9 200	8 640	6 920

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 102	3 000	1 000	7 185	8 860	1 540	792	161
6	5 894	3 000	1 000	7 185	8 860	1 540	792	187
7	6 686	3 000	1 000	7 185	8 860	1 540	792	212
8	7 478	3 000	1 000	7 185	8 860	1 540	792	240



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	7	*
6	9	*
7	10	*
8	12	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC) UEC45LSE-Eco-C1 with standard

	P1	P2	P3	P4
100% load, g/kWh	171.0	165.7	171.0	165.7
75% load, g/kWh	166.3	162.2	166.3	162.2
50% load, g/kWh	168.1	165.1	168.1	165.1

## Specific fuel oil consumption (SFOC) UEC45LSE-Eco-C1 with LLO+EGB

	P1	P2	P3	P4
100% load, g/kWh	172.6	167.3	172.6	167.3
75% load, g/kWh	165.6	161.5	165.6	161.5
50% load, g/kWh	164.4	161.4	164.4	161.4

Tier III

## Specific fuel oil consumption (SFOC) UEC45LSE-Eco-C1-EGR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	172.6	167.3	172.6	167.3
75% load, g/kWh	165.6	161.5	165.6	161.5
50% load, g/kWh	164.4	161.4	164.4	161.4
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	174.2	168.9	174.2	168.9
75% load, g/kWh	167.2	163.1	167.2	163.1
50% load, g/kWh	167.4	164.4	167.4	164.4

## Specific fuel oil consumption (SFOC) UEC45LSE-Eco-C1-HPSCR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	172.6	167.3	172.6	167.3
75% load, g/kWh	165.6	161.5	165.6	161.5
50% load, g/kWh	164.4	161.4	164.4	161.4
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	172.9	167.6	172.9	167.6
75% load, g/kWh	165.8	161.7	165.8	161.7
50% load, g/kWh	164.8	161.8	164.8	161.8

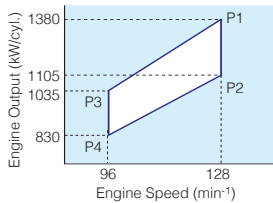
# UEC45LSE-Eco-B2

## Main data

Cylinder bore	450 mm
Piston stroke	1 930 mm
Stroke / bore	4.29
BMEP at P1	21.1 bar

Tier II

Tier III

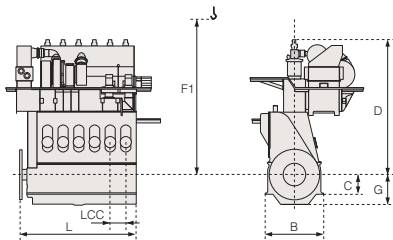


## Rated power

Speed	128 min <sup>-1</sup>		96 min <sup>-1</sup>	
	Piston Speed			
Cyl.	8.2 m/s		6.2 m/s	
	P1	P2	P3	P4
	kW	kW	kW	kW
5	6 900	5 525	5 175	4 150
6	8 280	6 630	6 210	4 980
7	9 660	7 735	7 245	5 810
8	11 040	8 840	8 280	6 640

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 102	3 000	1 000	7 185	8 860	1 540	792	161
6	5 894	3 000	1 000	7 185	8 860	1 540	792	187
7	6 686	3 000	1 000	7 185	8 860	1 540	792	212
8	7 478	3 000	1 000	7 185	8 860	1 540	792	240



## Tier III added weight (tonnes)

Cyl.	EGR	HPSCR
5	7	*
6	8	*
7	10	*
8	11	*

\* : To be determined



Tier II

## Specific fuel oil consumption (SFOC)

### UEC45LSE-Eco-B2 with standard

	P1	P2	P3	P4
100% load, g/kWh	169.0	163.0	169.0	163.1
75% load, g/kWh	163.5	157.5	163.5	157.6
50% load, g/kWh	165.1	159.1	165.1	159.2

## Specific fuel oil consumption (SFOC)

### UEC45LSE-Eco-B2 with LLO+EGB

	P1	P2	P3	P4
100% load, g/kWh	170.6	164.6	170.6	164.7
75% load, g/kWh	162.8	156.8	162.8	156.9
50% load, g/kWh	161.4	155.4	161.4	155.5

Tier III

## Specific fuel oil consumption (SFOC)

### UEC45LSE-Eco-B2-EGR with LLO+EGB

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	170.6	164.6	170.6	164.7
75% load, g/kWh	162.8	156.8	162.8	156.9
50% load, g/kWh	161.4	155.4	161.4	155.5
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	172.2	166.2	172.2	166.3
75% load, g/kWh	164.4	158.4	164.4	158.5
50% load, g/kWh	164.4	158.4	164.4	158.5

## Specific fuel oil consumption (SFOC)

### UEC45LSE-Eco-B2-HPSCR with LLO+EGB

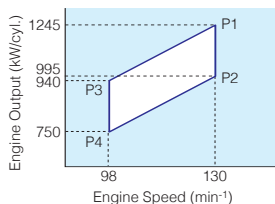
Tier II mode	P1	P2	P3	P4
100% load, g/kWh	170.6	164.6	170.6	164.7
75% load, g/kWh	162.8	156.8	162.8	156.9
50% load, g/kWh	161.4	155.4	161.4	155.5
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	170.9	164.9	170.9	165.0
75% load, g/kWh	163.0	157.0	163.0	157.1
50% load, g/kWh	161.8	155.8	161.8	155.9

# UEC45LSE-Eco-1

## Main data

Cylinder bore	450 mm
Piston stroke	1 840 mm
Stroke / bore	4.09
BMEP at P1	19.6 bar

**Tier II**  
**Tier III**



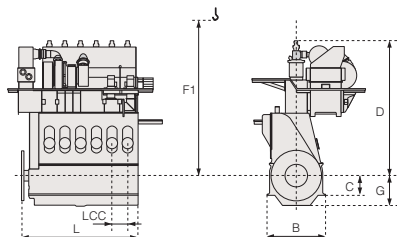
## Rated power

Speed	130 min <sup>-1</sup>		98 min <sup>-1</sup>	
	8.0 m/s		6.0 m/s	
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	6 225	4 975	4 700	3 750
6	7 470	5 970	5 640	4 500
7	8 715	6 965	6 580	5 250
8	9 960	7 960	7 520	6 000

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 102	3 000	1 000	6 900	8 600	1 560	792	162
6	5 894	3 000	1 000	6 900	8 600	1 560	792	189
7	6 686	3 000	1 000	6 900	8 600	1 560	792	215
8	7 478	3 000	1 000	6 900	8 600	1 560	792	243

Dimensions and weight are for engine of bedplate, made by cast iron.



## Tier II

### Specific fuel oil consumption (SFOC) UEC45LSE-Eco-1 with standard

	P1	P2	P3	P4
100% load, g/kWh	172.0	166.7	172.0	166.7
75% load, g/kWh	167.3	163.2	167.3	163.2
50% load, g/kWh	169.1	166.1	169.1	166.1

### Specific fuel oil consumption (SFOC) UEC45LSE-Eco-1 with LLO

	P1	P2	P3	P4
100% load, g/kWh	173.6	168.3	173.6	168.3
75% load, g/kWh	166.6	162.5	166.6	162.5
50% load, g/kWh	167.6	164.6	167.6	164.6

## Tier III

### Specific fuel oil consumption (SFOC) UEC45LSE-Eco-1-LPSCR with LLO

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	173.6	168.3	173.6	168.3
75% load, g/kWh	166.6	162.5	166.6	162.5
50% load, g/kWh	167.6	164.6	167.6	164.6
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	173.6	168.9	173.7	169.4
75% load, g/kWh	167.2	163.1	167.9	163.7
50% load, g/kWh	167.6	164.6	168.3	165.2



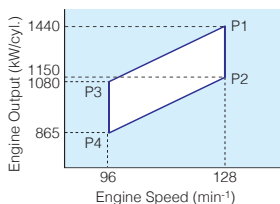
# UEC45LSE-C1

## Main data

Cylinder bore	450 mm
Piston stroke	1 930 mm
Stroke / bore	4.29
BMEP at P1	22.0 bar

Tier II

Tier III

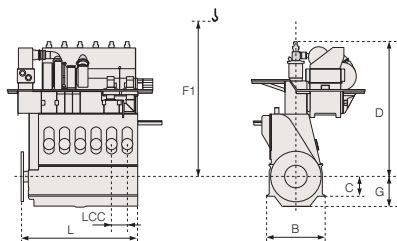


## Rated power

Speed	128 min <sup>-1</sup>		96 min <sup>-1</sup>	
Piston Speed	8.2 m/s		6.2 m/s	
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	7 200	5 750	5 400	4 325
6	8 640	6 900	6 480	5 190
7	10 080	8 050	7 560	6 055
8	11 520	9 200	8 640	6 920

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 102	3 000	1 000	7 080	8 860	1 540	792	158
6	5 894	3 000	1 000	7 080	8 860	1 540	792	183
7	6 686	3 000	1 000	7 080	8 860	1 540	792	208
8	7 478	3 000	1 000	7 080	8 860	1 540	792	236



Tier II

## Specific fuel oil consumption (SFOC)

### UEC45LSE-C1

	P1	P2	P3	P4
100% load, g/kWh	173.0	167.7	173.0	167.7
75% load, g/kWh	169.1	165.4	169.1	165.4
50% load, g/kWh	170.4	168.0	170.4	168.0

Tier III

## Specific fuel oil consumption (SFOC)

### UEC45LSE-C1-LPSCR

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	173.0	167.7	173.0	167.7
75% load, g/kWh	169.1	165.4	169.1	165.4
50% load, g/kWh	170.4	168.0	170.4	168.0
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	173.0	168.6	173.1	169.1
75% load, g/kWh	170.4	166.9	171.0	167.5
50% load, g/kWh	171.3	168.8	172.1	169.6

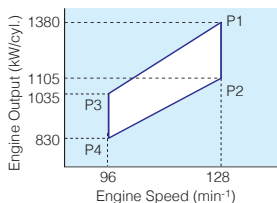
# UEC45LSE-B2

## Main data

Cylinder bore	450 mm
Piston stroke	1 930 mm
Stroke / bore	4.29
BMEP at P1	21.1 bar

Tier II

Tier III

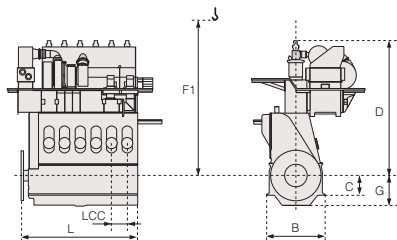


## Rated power

Speed	128 min <sup>-1</sup>		96 min <sup>-1</sup>	
	Piston Speed			
Cyl.	8.2 m/s		6.2 m/s	
	P1	P2	P3	P4
	kW	kW	kW	kW
5	6 900	5 525	5 175	4 150
6	8 280	6 630	6 210	4 980
7	9 660	7 735	7 245	5 810
8	11 040	8 840	8 280	6 640

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 102	3 000	1 000	7 080	8 860	1 540	792	158
6	5 894	3 000	1 000	7 080	8 860	1 540	792	183
7	6 686	3 000	1 000	7 080	8 860	1 540	792	208
8	7 478	3 000	1 000	7 080	8 860	1 540	792	236



Tier II

## Specific fuel oil consumption (SFOC)

### UEC45LSE-B2

	P1	P2	P3	P4
100% load, g/kWh	171.0	165.0	171.0	165.1
75% load, g/kWh	166.5	160.5	166.5	160.6
50% load, g/kWh	168.1	162.1	168.1	162.2

Tier III

## Specific fuel oil consumption (SFOC)

### UEC45LSE-B2-LPSCR

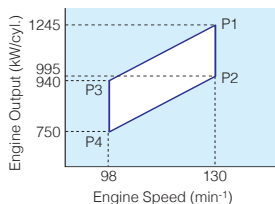
Tier II mode	P1	P2	P3	P4
100% load, g/kWh	171.0	165.0	171.0	165.1
75% load, g/kWh	166.5	160.5	166.5	160.6
50% load, g/kWh	168.1	162.1	168.1	162.2
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	171.0	166.0	171.3	166.6
75% load, g/kWh	167.9	162.1	168.5	162.7
50% load, g/kWh	169.1	162.9	169.8	163.7

# UEC45LSE-1

## Main data

Cylinder bore	450 mm
Piston stroke	1 840 mm
Stroke / bore	4.09
BMEP at P1	19.6 bar

**Tier II**  
**Tier III**



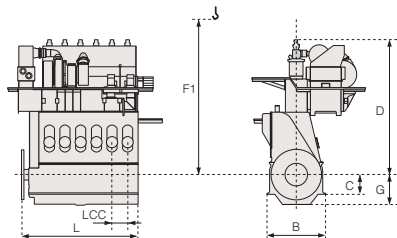
## Rated power

Speed	130 min <sup>-1</sup>		98 min <sup>-1</sup>	
	8.0 m/s			
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	6 225	4 975	4 700	3 750
6	7 470	5 970	5 640	4 500
7	8 715	6 965	6 580	5 250
8	9 960	7 960	7 520	6 000

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	5 102	3 000	1 000	6 900	8 600	1 560	792	168
6	5 894	3 000	1 000	6 900	8 600	1 560	792	195
7	6 686	3 000	1 000	6 900	8 600	1 560	792	222
8	7 478	3 000	1 000	6 900	8 600	1 560	792	252

Dimensions and weight are for engine of bedplate and column, made by cast iron.



**Tier II**

## Specific fuel oil consumption (SFOC)

### UEC45LSE-1

	P1	P2	P3	P4
100% load, g/kWh	174.0	168.7	174.0	168.7
75% load, g/kWh	170.1	166.4	170.1	166.4
50% load, g/kWh	171.4	169.0	171.4	169.0

**Tier III**

## Specific fuel oil consumption (SFOC)

### UEC45LSE-1-LPSCR

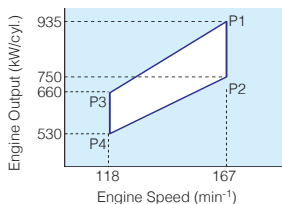
Tier II mode	P1	P2	P3	P4
100% load, g/kWh	174.0	168.7	174.0	168.7
75% load, g/kWh	170.1	166.4	170.1	166.4
50% load, g/kWh	171.4	169.0	171.4	169.0
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	174.0	169.3	174.3	169.8
75% load, g/kWh	170.7	167.1	171.4	167.7
50% load, g/kWh	171.4	169.0	172.1	169.6

# UEC35LSE-Eco-C1

## Main data

Cylinder bore	350 mm
Piston stroke	1 550 mm
Stroke / bore	4.43
BMEP at P1	22.5 bar

**Tier II**  
**Tier III**



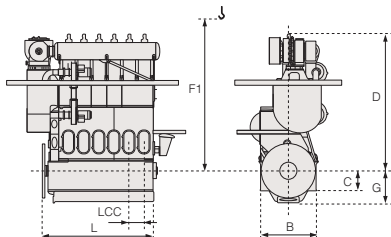
## Rated power

Speed	167 min <sup>-1</sup>		118 min <sup>-1</sup>	
	Piston Speed 8.6 m/s			
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	4 675	3 750	3 300	2 650
6	5 610	4 500	3 960	3 180
7	6 545	5 250	4 620	3 710
8	7 480	6 000	5 280	4 240

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 398	2 284	830	5 623	6 725	1 326	612	79 (81)
6	5 010	2 284	830	5 623	6 725	1 326	612	88 (90)
7	5 622	2 284	830	5 623	6 725	1 326	612	98(101)
8	6 234	2 284	830	5 623	6 725	1 326	612	109(112)

Weight in ( ) is for engine of bedplate, made by cast iron.



## Tier II

### Specific fuel oil consumption (SFOC) UEC35LSE-Eco-C1 with standard

	P1	P2	P3	P4
100% load, g/kWh	168.0	162.8	168.0	162.8
75% load, g/kWh	163.3	159.3	163.3	159.3
50% load, g/kWh	165.1	162.2	165.1	162.2

### Specific fuel oil consumption (SFOC) UEC35LSE-Eco-C1 with LLO

	P1	P2	P3	P4
100% load, g/kWh	169.6	164.4	169.6	164.4
75% load, g/kWh	162.6	158.6	162.6	158.6
50% load, g/kWh	163.6	160.7	163.6	160.7

## Tier III

### Specific fuel oil consumption (SFOC) UEC35LSE-Eco-C1-LPSCR with LLO

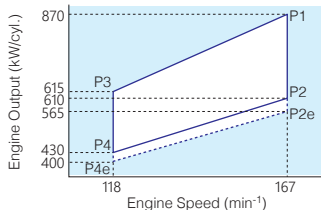
Tier II mode	P1	P2	P3	P4
100% load, g/kWh	169.6	164.4	169.6	164.4
75% load, g/kWh	162.6	158.6	162.6	158.6
50% load, g/kWh	163.6	160.7	163.6	160.7
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	169.6	164.4	169.6	165.1
75% load, g/kWh	163.2	159.4	164.0	160.2
50% load, g/kWh	163.6	161.0	164.6	161.9

# UEC35LSE-Eco-B2

## Main data

Cylinder bore	350 mm
Piston stroke	1 550 mm
Stroke / bore	4.43
BMEP at P1	21.0 bar

**Tier II**  
**Tier III**



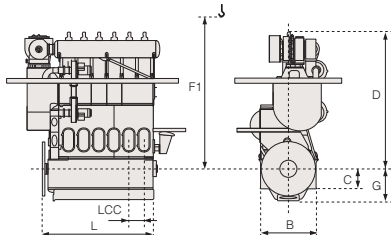
## Rated power

Speed	167 min <sup>-1</sup>			118 min <sup>-1</sup>		
	8.6 m/s			6.1 m/s		
Piston Speed						
Cyl.	P1	P2	P2e	P3	P4	P4e
	kW	kW	kW	kW	kW	kW
5	4 350	3 050	2 825	3 075	2 150	2 000
6	5 220	3 660	3 390	3 690	2 580	2 400
7	6 090	4 270	3 955	4 305	3 010	2 800
8	6 960	4 880	4 520	4 920	3 440	3 200

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 398	2 284	830	5 623	6 725	1 326	612	79 (81)
6	5 010	2 284	830	5 623	6 725	1 326	612	88 (90)
7	5 622	2 284	830	5 623	6 725	1 326	612	98(101)
8	6 234	2 284	830	5 623	6 725	1 326	612	109(112)

Weight in ( ) is for engine of bedplate, made by cast iron.



## Tier II

### Specific fuel oil consumption (SFOC) UEC35LSE-Eco-B2 with standard

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	167.0	161.0	161.5	167.0	161.0	161.5
75% load, g/kWh	161.5	155.5	156.0	161.5	155.5	156.0
50% load, g/kWh	163.1	157.1	157.6	163.1	157.1	157.6

### Specific fuel oil consumption (SFOC) UEC35LSE-Eco-B2 with LLO

	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	168.6	162.6	163.1	168.6	162.6	163.1
75% load, g/kWh	160.8	154.8	155.3	160.8	154.8	155.3
50% load, g/kWh	161.6	155.6	156.1	161.6	155.6	156.1

## Tier III

### Specific fuel oil consumption (SFOC) UEC35LSE-Eco-B2-LPSCR with LLO

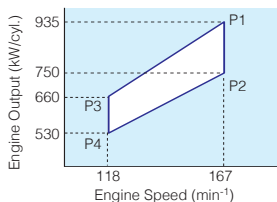
Tier II mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	168.6	162.6	163.1	168.6	162.6	163.1
75% load, g/kWh	160.8	154.8	155.3	160.8	154.8	155.3
50% load, g/kWh	161.6	155.6	156.1	161.6	155.6	156.1
Tier III mode	P1	P2	P2e	P3	P4	P4e
100% load, g/kWh	168.6	163.2	163.9	168.6	163.7	164.4
75% load, g/kWh	161.6	155.9	156.4	162.3	156.5	157.0
50% load, g/kWh	161.8	156.0	156.5	162.7	156.8	157.2

# UEC35LSE-C1

## Main data

Cylinder bore	350 mm
Piston stroke	1 550 mm
Stroke / bore	4.43
BMEP at P1	22.5 bar

**Tier II**  
**Tier III**



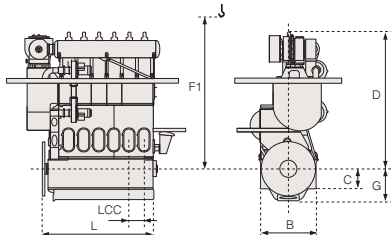
## Rated power

Cyl.	167 min <sup>-1</sup>		118 min <sup>-1</sup>	
	P1	P2	P3	P4
5	4 675	3 750	3 300	2 650
6	5 610	4 500	3 960	3 180
7	6 545	5 250	4 620	3 710
8	7 480	6 000	5 280	4 240

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 398	2 284	830	5 623	6 725	1 326	612	80 (82)
6	5 010	2 284	830	5 623	6 725	1 326	612	89 (91)
7	5 622	2 284	830	5 623	6 725	1 326	612	98(101)
8	6 234	2 284	830	5 623	6 725	1 326	612	108(111)

Weight in ( ) is for engine of bedplate, made by cast iron.



## Tier II

### Specific fuel oil consumption (SFOC)

#### UEC35LSE-C1

	P1	P2	P3	P4
100% load, g/kWh	171.0	165.8	171.0	165.8
75% load, g/kWh	167.1	163.4	167.1	163.4
50% load, g/kWh	168.4	166.0	168.4	166.0

## Tier III

### Specific fuel oil consumption (SFOC) UEC35LSE-C1-LPSCR

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	171.0	165.8	171.0	165.8
75% load, g/kWh	167.1	163.4	167.1	163.4
50% load, g/kWh	168.4	166.0	168.4	166.0
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	171.0	165.8	171.0	166.6
75% load, g/kWh	167.7	164.3	168.5	165.0
50% load, g/kWh	168.4	166.4	169.5	167.3



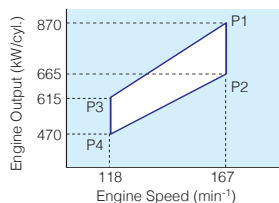
# UEC35LSE-B2

## Main data

Cylinder bore	350 mm
Piston stroke	1 550 mm
Stroke / bore	4.43
BMEP at P1	21.0 bar

Tier II

Tier III



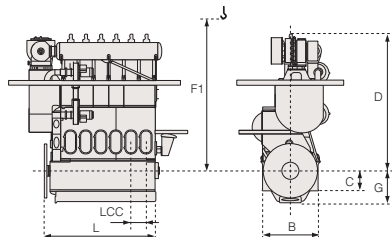
## Rated power

Speed	167 min <sup>-1</sup>		118 min <sup>-1</sup>	
	8.6 m/s			
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	4 350	3 325	3 075	2 350
6	5 220	3 990	3 690	2 820
7	6 090	4 655	4 305	3 290
8	6 960	5 320	4 920	3 760

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 398	2 284	830	5 623	6 725	1 326	612	80 (82)
6	5 010	2 284	830	5 623	6 725	1 326	612	89 (91)
7	5 622	2 284	830	5 623	6 725	1 326	612	98(101)
8	6 234	2 284	830	5 623	6 725	1 326	612	108(111)

Weight in ( ) is for engine of bedplate, made by cast iron.



Tier II

## Specific fuel oil consumption (SFOC)

### UEC35LSE-B2

	P1	P2	P3	P4
100% load, g/kWh	170.0	166.0	170.0	166.0
75% load, g/kWh	165.5	161.5	165.5	161.5
50% load, g/kWh	167.1	163.1	167.1	163.1

Tier III

## Specific fuel oil consumption (SFOC)

### UEC35LSE-B2-LPSCR

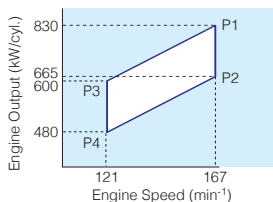
Tier II mode	P1	P2	P3	P4
100% load, g/kWh	170.0	166.0	170.0	166.0
75% load, g/kWh	165.5	161.5	165.5	161.5
50% load, g/kWh	167.1	163.1	167.1	163.1
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	170.0	166.4	170.0	167.0
75% load, g/kWh	166.2	162.6	167.0	163.2
50% load, g/kWh	167.3	163.6	168.3	164.4

# UEC33LSE-C2

## Main data

Cylinder bore	330 mm
Piston stroke	1 550 mm
Stroke / bore	4.70
BMEP at P1	22.5 bar

**Tier II**  
**Tier III**



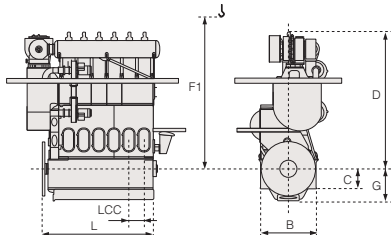
## Rated power

Speed	167 min <sup>-1</sup>		121 min <sup>-1</sup>	
	8.6 m/s			
Piston Speed	6.3 m/s			
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	4 150	3 325	3 000	2 400
6	4 980	3 990	3 600	2 880
7	5 810	4 655	4 200	3 360
8	6 640	5 320	4 800	3 840

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	4 398	2 284	830	5 576	6 725	1 326	612	79 (81)
6	5 010	2 284	830	5 576	6 725	1 326	612	88 (90)
7	5 622	2 284	830	5 576	6 725	1 326	612	97(100)
8	6 234	2 284	830	5 576	6 725	1 326	612	107(110)

Weight in ( ) is for engine of bedplate, made by cast iron.



## Tier II

### Specific fuel oil consumption (SFOC)

#### UEC33LSE-C2

	P1	P2	P3	P4
100% load, g/kWh	171.0	167.0	171.0	167.0
75% load, g/kWh	166.5	162.5	166.5	162.5
50% load, g/kWh	168.1	164.1	168.1	164.1

## Tier III

### Specific fuel oil consumption (SFOC)

#### UEC33LSE-C2-LPSCR

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	171.0	167.0	171.0	167.0
75% load, g/kWh	166.5	162.5	166.5	162.5
50% load, g/kWh	168.1	164.1	168.1	164.1
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	171.0	167.0	171.0	167.0
75% load, g/kWh	166.9	163.2	167.5	163.8
50% load, g/kWh	168.1	164.2	168.9	165.0

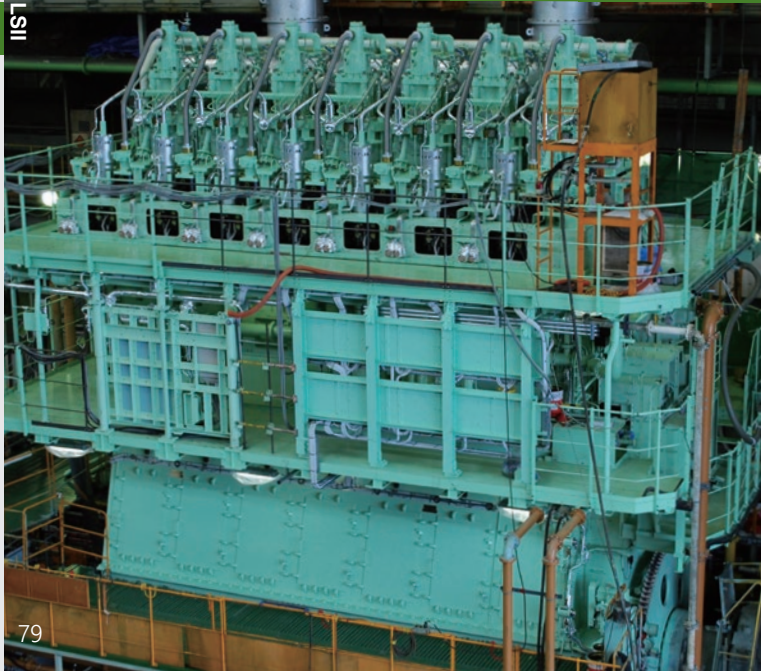
# UE Engines

## UEC-LSII Series

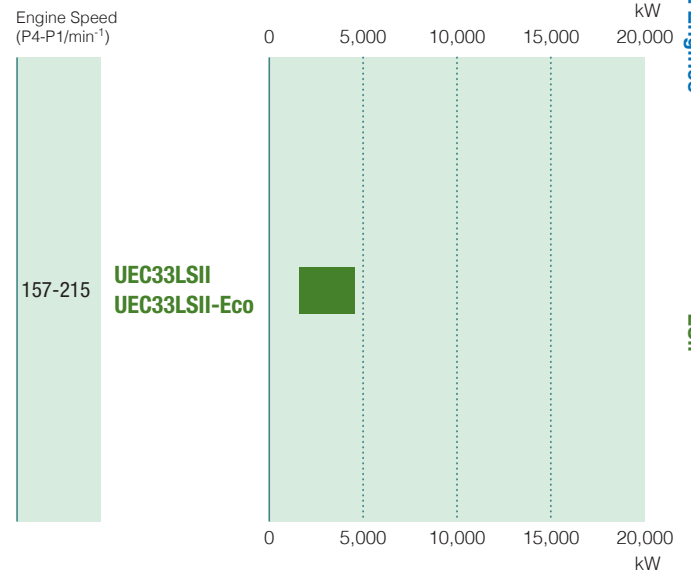
UE Engines

UEC-LSII Series are valued by customers as well as proven engines which have excellent service experiences.

LSII



### UEC-LSII Series Output Range



UE Engines

LSII

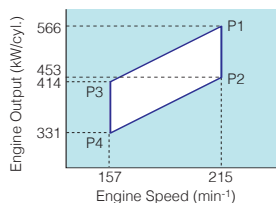
# UEC33LSII-Eco

## Main data

Cylinder bore	330 mm
Piston stroke	1 050 mm
Stroke / bore	3.18
BMEP at P1	17.6 bar

Tier II

Tier III

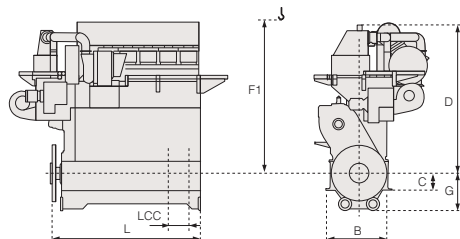


## Rated power

Speed	215 min <sup>-1</sup>		157 min <sup>-1</sup>	
	Piston Speed 7.5 m/s			
Cyl.	P1	P2	P3	P4
	kW	kW	kW	kW
5	2 830	2 265	2 070	1 655
6	3 400	2 720	2 480	1 985
7	3 965	3 170	2 895	2 315
8	4 530	3 625	3 310	2 645

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	3 765	1 900	500	4 301	5 150	906	580	57
6	4 345	1 900	500	4 301	5 150	906	580	65
7	4 925	1 900	500	4 301	5 150	906	580	73
8	5 505	1 900	500	4 301	5 150	906	580	83



Tier II

## Specific fuel oil consumption (SFOC) UEC33LSII-Eco with standard

	P1	P2	P3	P4
100% load, g/kWh	172.0	166.7	172.0	166.7
75% load, g/kWh	167.3	163.2	167.3	163.2
50% load, g/kWh	169.1	166.1	169.1	166.1

## Specific fuel oil consumption (SFOC) UEC33LSII-Eco with LLO

	P1	P2	P3	P4
100% load, g/kWh	173.6	168.3	173.6	168.3
75% load, g/kWh	166.6	162.5	166.6	162.5
50% load, g/kWh	167.6	164.6	167.6	164.6

Tier III

## Specific fuel oil consumption (SFOC) UEC33LSII-Eco-LPSCR with LLO

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	173.6	168.3	173.6	168.3
75% load, g/kWh	166.6	162.5	166.6	162.5
50% load, g/kWh	167.6	164.6	167.6	164.6
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	173.7	168.9	174.5	169.5
75% load, g/kWh	166.7	162.6	167.5	163.4
50% load, g/kWh	167.6	164.6	167.7	164.7

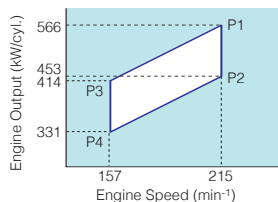
# UEC33LSII

## Main data

Cylinder bore	330 mm
Piston stroke	1 050 mm
Stroke / bore	3.18
BMEP at P1	17.6 bar

Tier II

Tier III

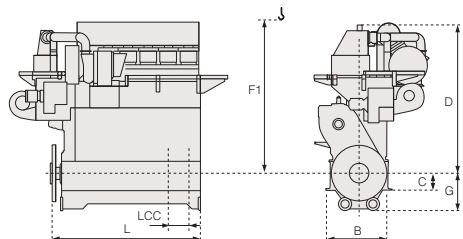


## Rated power

Speed	215 min <sup>-1</sup>		157 min <sup>-1</sup>	
	Piston Speed			
Cyl.	7.5 m/s		5.5 m/s	
	P1	P2	P3	P4
	kW	kW	kW	kW
5	2 830	2 265	2 070	1 655
6	3 400	2 720	2 480	1 985
7	3 965	3 170	2 895	2 315
8	4 530	3 625	3 310	2 645

## Principal engine dimension (mm) and weight (tonnes)

Cyl.	L	B	C	D	F1	G	LCC	Weight
5	3 765	1 900	500	4 301	5 150	906	580	52
6	4 345	1 900	500	4 301	5 150	906	580	60
7	4 925	1 900	500	4 301	5 150	906	580	68
8	5 505	1 900	500	4 301	5 150	906	580	78



Tier II

## Specific fuel oil consumption (SFOC)

### UEC33LSII

	P1	P2	P3	P4
100% load, g/kWh	179.0	173.7	179.0	173.7
75% load, g/kWh	175.1	171.4	175.1	171.4
50% load, g/kWh	176.4	174.0	176.4	174.0

Tier III

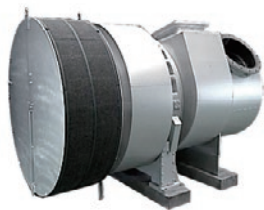
## Specific fuel oil consumption (SFOC)

### UEC33LSII-LPSCR

Tier II mode	P1	P2	P3	P4
100% load, g/kWh	179.0	173.7	179.0	173.7
75% load, g/kWh	175.1	171.4	175.1	171.4
50% load, g/kWh	176.4	174.0	176.4	174.0
Tier III mode	P1	P2	P3	P4
100% load, g/kWh	179.0	174.1	179.8	174.8
75% load, g/kWh	175.1	171.4	175.9	172.2
50% load, g/kWh	176.4	174.0	176.4	174.0

# METurbo

Global standard exhaust gas turbochargers used widely for marine and stationary engines.



### Features

- Applicable to all major engines (MAN ES, WinGD and J-ENG)
- Advanced aerodynamic design based on numerous tests and analysis results
- Long lifetime and High reliability
- Low noise silencer application
- Simple and compact
- High robustness of bearing pedestal type structure

## Integrated EGB Turbochargers

Ordinary, exhaust bypass line has been installed between exhaust gas receiver and exhaust gas duct of the engine.

Integrated EGB enables to bypass the exhaust gas by integrating the bypass pipe and open/close valve on turbocharger in between gas inlet casing and outlet gas casing.

Integrated EGB is also available by retrofitting from standard MET turbocharger by just changing several parts. Also, this system could be applicable to temperature increment procedure at 2-stroke engine with Low Pressure SCR system.

### Features

- Connected directly to turbocharger
- No EGB pipe (engine side)

**Also Available  
for Retrofitting**



### Contacts

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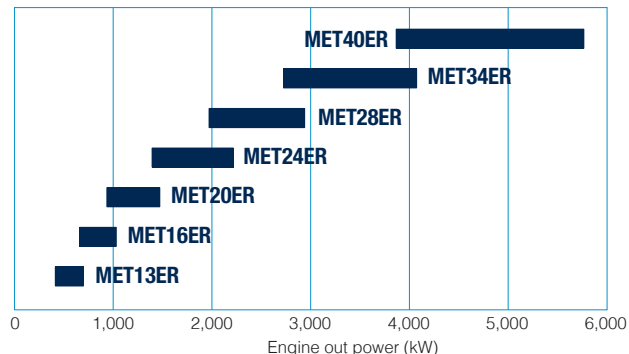
# MET-ER Series

MET-ER Series, a new type of radial turbocharger succeed the high reliability and maintainability of MET-SRC series. This new turbocharger has improved it's responsiveness and reduces the number of parts to achieve a more compact design and high maintainability. MET-ER Series has been developed based on high pressure ratio requirements for turbochargers, in order to improve the performance of and reduce the NOx emissions of engines.



### Features

- MET-ER takes advantage of MET-SCR features
- Compact design (about 40%)
- Optimized to engine power range
- Applicable to high pressure ratio
- Reduced number of parts by 30%
- Excellent performance and better transient response



# MET-SRC Series

Developed to meet the demand for higher performance and reliability, well proven by the excellent service records of axial type MET turbochargers.



### Features

- Applicable to high pressure ratio
- Non-water cooling
- Easy overhaul
- Crew-maintainable design
- Condition based maintenance
- High reliability
- High efficiency
- Applicable to heavy fuel oil

Type		MET18SRC	MET22SRC		MET26SRC	MET30SRC	MET37SRC
Max. Pressure Ratio	—	5.5			5.5		
Engine Output Range per Turbocharger	kW	400 - 1,100	650 - 1,600		850 - 2,200	1,150 - 3,300	2,000 - 4,400
Maximum Continuous Gas Temperature before Turbine	°C	610					
Momentary Maximum Temperature before Turbine	°C	640					
Length	mm	712	835		1,075	1,368	1,661
Breadth	mm	510	605		735	860	1,070
Height	mm	510	605		735	860	1,070

\* Engine Output Range is the reference values subject to pressure ratio 3.5.



# MET-MBII Series

MET-MBII Series, a new type of axial turbocharger for achieving a further increase in air flow volume while maintaining the reliability and ease of maintenance of the MET-MB turbocharger.

The MBII turbocharger provides 16% larger air flow volume than the MET-MB Series, which leads one or two models more compact compared to previous models.

### Features

- MET-MBII takes advantage of MET-MB features
- Increased air-flow rate by 16%
- Downsizing by increasing air flow



Type		MET33MBII	MET37MBII	MET42MBII	MET48MBII		MET53MBII	MET60MBII	MET66MBII	MET71MBII	MET83MBII	MET90MBII	
Max. Pressure Ratio	—	5.0					5.0						
Engine Output Range per Turbocharger	kW	3,400-6,000	4,600-7,600	5,600-9,300	7,200-11,900		9,000-14,900	11,200-18,400	14,000-23,100	16,400-27,100	22,500-37,100	27,400-45,200	
Maximum Continuous Gas Temperature before Turbine	°C	580					580						
Momentary Maximum Temperature before Turbine	°C	610					610						
Length	mm	1,740	1,940	2,020	2,400		2,610	2,960	3,200	3,290	3,940	4,440	
Breadth	mm	899	998	1,094	1,255		1,390	1,530	1,718	1,820	2,233	2,465	
Height	mm	945	1,095	1,171	1,330		1,439	1,570	1,780	1,865	2,225	2,410	

\* Engine Output Range is the reference values subject to pressure ratio 4.0.

# MET-MB Series

Global standard turbochargers for marine and stationary engines for J-ENG, WinGD and MAN Energy Solutions.

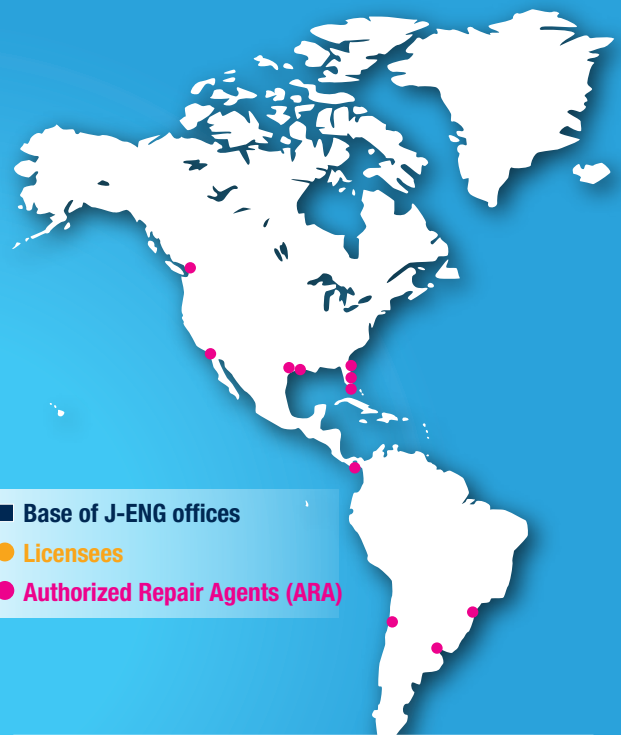
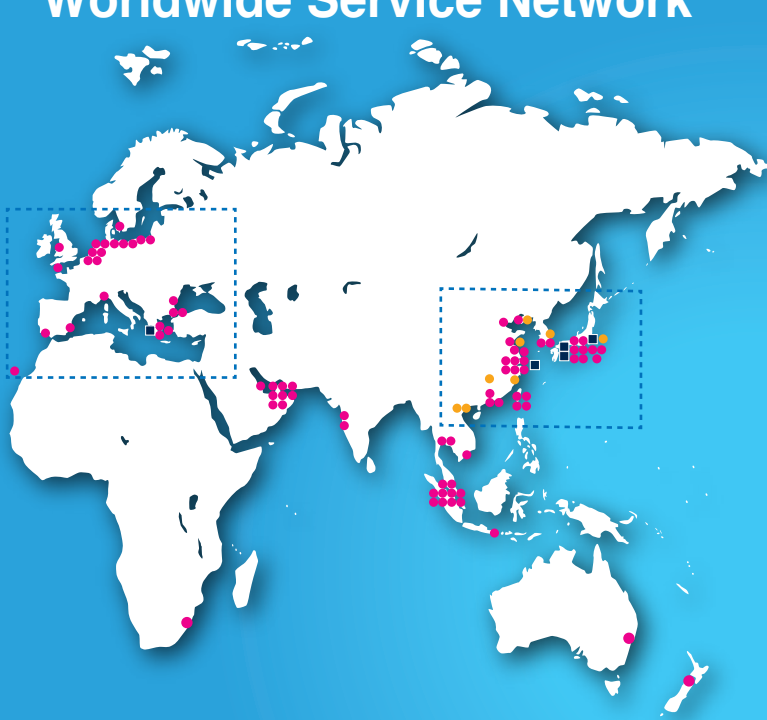
### Features

- Applicable to all major engines (J-ENG, WinGD, MAN ES)
- Crew-maintainable design
- Condition based maintenance
- Advanced aerodynamic design based on numerous tests and analysis results
- High reliability
- High efficiency
- Easy overhaul
- Applicable to heavy fuel oil

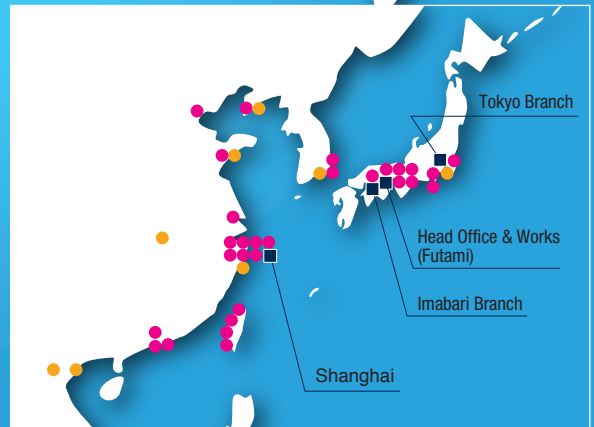
Type		MET33MB	MET37MB	MET42MB	MET48MB		MET53MB	MET60MB	MET66MB	MET71MB	MET83MB	MET90MB	
Max. Pressure Ratio	—	5.0					5.0						
Engine Output Range per Turbocharger	kW	2,600-4,600	3,800-6,300	4,700-7,700	6,000-10,000		7,500-12,500	9,300-15,500	11,700-19,400	13,700-22,700	18,800-31,100	22,900-37,900	
Maximum Continuous Gas Temperature before Turbine	°C	580					580						
Momentary Maximum Temperature before Turbine	°C	610					610						
Length	mm	1,661	1,851	1,944	2,280		2,504	2,825	3,065	3,143	3,771	4,241	
Breadth	mm	899	998	1,134	1,255		1,417	1,530	1,785	1,820	2,233	2,465	
Height	mm	945	1,095	1,155	1,330		1,435	1,540	1,720	1,865	2,180	2,410	

\* Engine Output Range is the reference values subject to pressure ratio 4.0.

# Worldwide Service Network



- Base of J-ENG offices
- Licensees
- Authorized Repair Agents (ARA)



# Contacts of JAPAN ENGINE CORPORATION

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**E-mail** [kitamura.takashi@iss-shipping.com](mailto:kitamura.takashi@iss-shipping.com)

# After-Sales Services

## Marine Engines (UE Engines and Mitsubishi-Wärtsilä Diesel Engines)

### China

#### Spare parts and service engineers, and technical inquiries

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URL : <http://www.mhi.com.cn>

### Japan and Other Countries

#### Spare parts and service engineers

##### **After-Sales Department**

Tel :+81-78-949-0808

E-mail : [sales2@j-eng.co.jp](mailto:sales2@j-eng.co.jp)

#### Technical inquiries

##### **Service Engineering Department**

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#### **Hyundai Heavy Industries Co., Ltd.**

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#### **Shipbuilding Industry Corporation (SBIC)**

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# J-ENG UE & MHI-MME MET

## Authorized Repair Agents (ARA)

### Europe

#### Belgium

##### MAN Energy Solutions Belgium N.V.

Noorderlaan 181, 2030 Antwerp, Belgium  
 Tel:+32-3543-8500  
 E-mail:service-benelux@man-es.com  
<http://benelux.man-es.com/>

MET

#### Bulgaria

##### ReTech SD Ltd.

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 Tel:+359-52-616-669  
 E-mail:retech@retech.bg  
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UE

#### Denmark

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#### Germany

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 Tel:+49-40-317-7100  
 E-mail:info@nds-marine.com  
<http://nds-marine.com>

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##### Scan Motoren Handels und Service GmbH

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##### Scan Turbo Handels-und Service GmbH

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<http://www.mtd.it>

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##### TSI Turbo Service International B.V.

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MET

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### Tallers Sanper, S.L.

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UE MET

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MET

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MET

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MET

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UE MET

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### Gulf Turbo Repair & Service FZC

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UE MET

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**MET**

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**MET**

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**UE**

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**MET**

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**UE**

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**UE MET**

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**UE**

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**Ningbo DMI Ship Services & Engineering Co., Ltd.**

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## Oceania

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