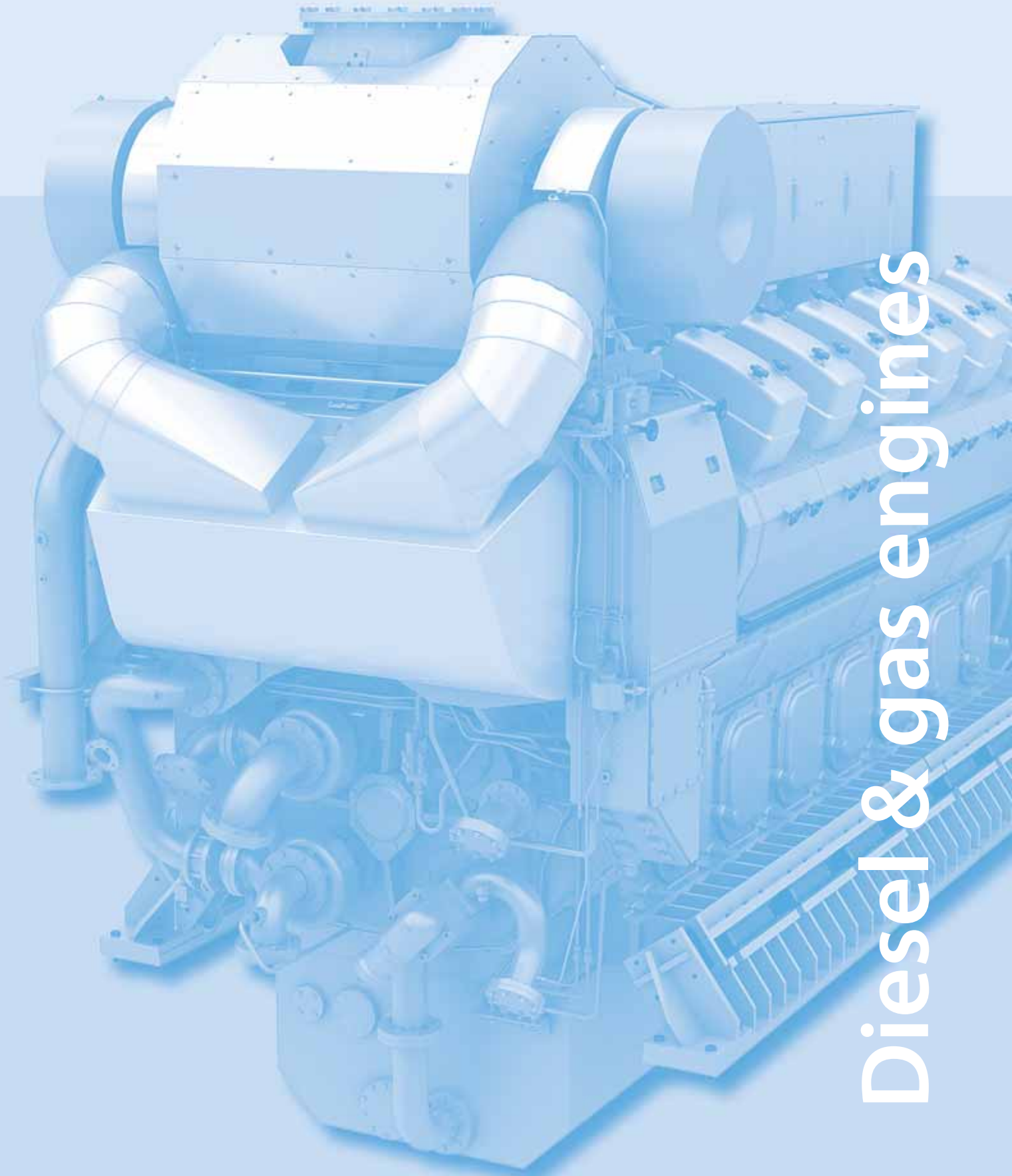




Rolls-Royce

Reliable power



Diesel & gas engines

A force in marine propulsion

Rolls-Royce is a leading developer and producer of medium speed diesel and gas propulsion engines and generator sets. A supplier with the capability to meet your requirements regarding performance and cost-effectiveness.

Continual research and development is a key to Rolls-Royce success, with an investment in the whole product range exceeding GBP 6 billion in the last decade. This is combined with a technology and skill base built up over more than a hundred years. Today, Rolls-Royce provides the broadest range of marine products in the industry.

Our commitment to customer satisfaction is your assurance of the highest levels of quality, performance and applications expertise, and Rolls-Royce has a truly international presence providing service and maintenance support worldwide.

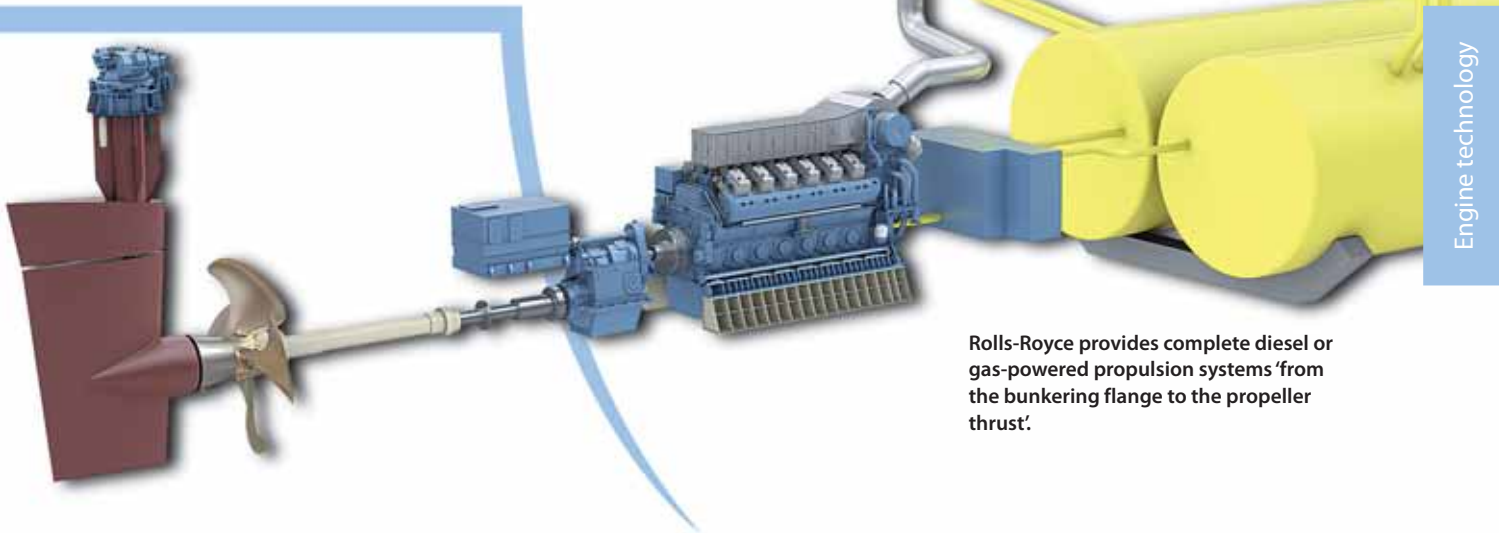


Bergen engines are type-approved for operation as emergency generator sets on mobile offshore drilling units after successful testing at 25 degrees of inclination.

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At the leading edge of engine and propulsion technology



Engine technology

Rolls-Royce provides complete diesel or gas-powered propulsion systems 'from the bunkering flange to the propeller thrust'.

There is a proud tradition behind the Rolls-Royce Bergen engine series. Since 1946 we have developed, manufactured and installed engines, meeting the requirement of ship-owners and operators for robust, reliable and economical engines. These engines meet the most stringent environmental requirements while delivering high performance.

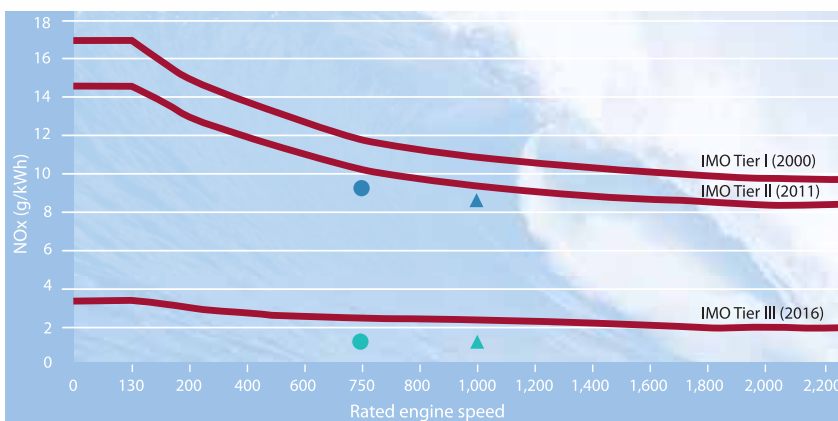
In the early 1980's, the company developed a lean burn combustion system and applied it to engines using various types of gas as fuel.

The system combines a high thermal efficiency with high power density and low emissions. The first Bergen gas engines went into service in 1991. This has given Rolls-Royce an

unrivalled track record and expertise as the marine industry turns towards engines burning natural gas for propulsion, with the aim of drastically reducing exhaust emissions of carbon dioxide, NO_x, SO_x and soot.

Diesel engines are available in the 1,800 – 8,000kW power range and gas engines from 1,400 – 7,000kW.

NO_x emission for Bergen engines

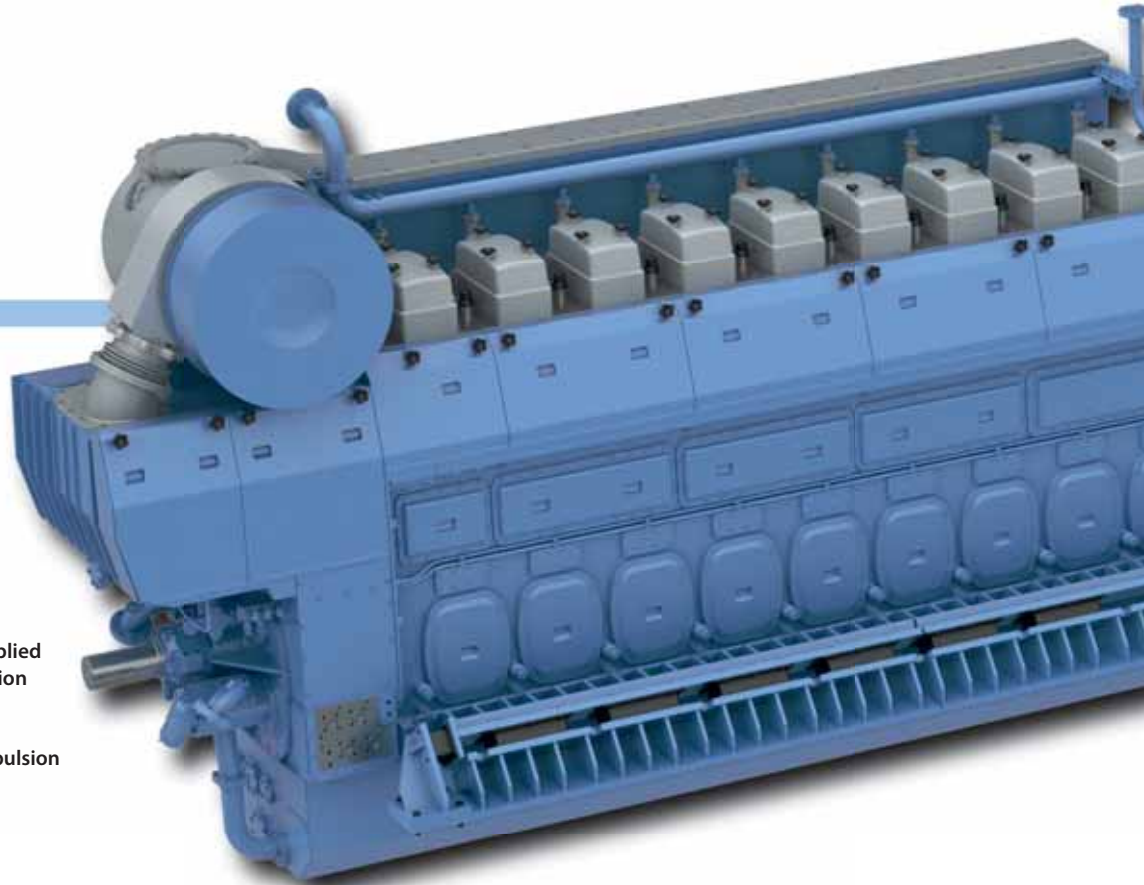


- IMO limits for diesel engines
- B32:40 diesel with Clean Design notation
- ▲ C25:33 diesel with Clean Design notation
- B35:40 gas
- ▲ C25:33 gas



A number of Norwegian double-ended ferries are powered by Bergen natural gas engines.

Rolls-Royce diesel & gas engines



Bergen marine engines are supplied either for mechanical transmission driving the propeller through a reduction gear, or as complete generating sets for electric propulsion or power generation.

All Bergen engines are designed under a common philosophy:

- Optimum load response
- Environmentally friendly, IMO Tier II-compliant
- Optimum fuel economy
- High power to weight ratio
- Great durability and mechanical strength
- Easy maintenance
- Maximum reliability
- Super-resilient mounting option
- No leakage of fuel into the main lube oil system
- Minimised lube oil consumption
- Control system with redundancy
- Meets all major class requirements
- Proven low life-cycle cost



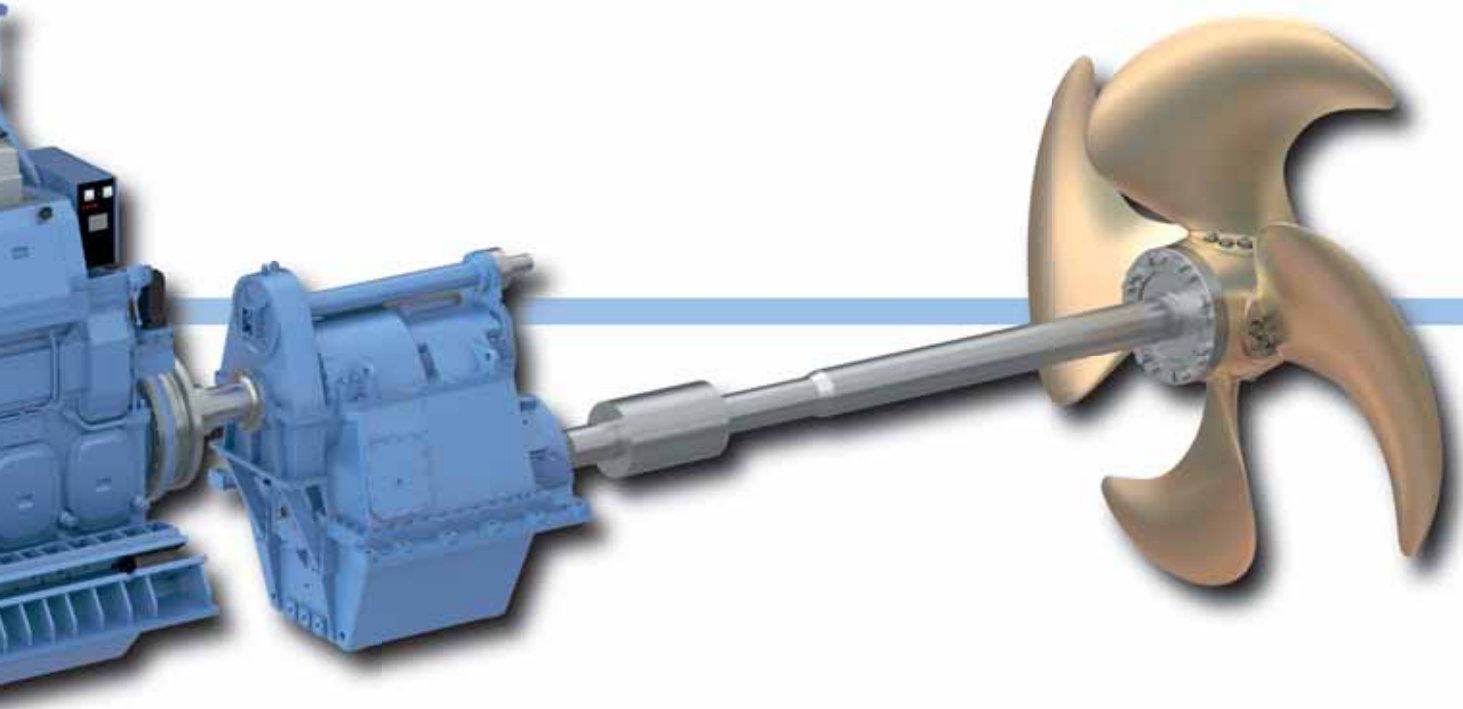
No fuel leakage into the main oil lube system is due to the Bergen Cofferdam system which ensures safe and reliable operation.

Typical applications:

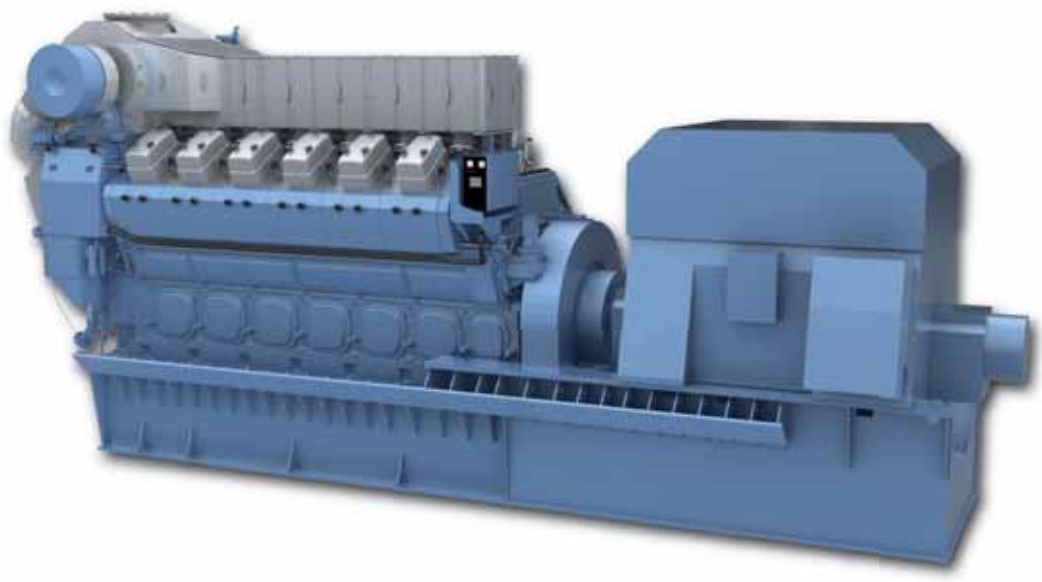
- Suitable for:
- offshore support vessels
 - offshore rigs and platforms
 - tankers
 - cargo vessels
 - fishing vessels
 - passenger ships
 - yachts
 - ferries
 - tugs
 - various types of naval vessels



Optimum load response is based on the Pulse turbocharging system. This enables the engine to respond rapidly to load changes, and offers high performance under normal part load operation.



Engine technology



Propulsion engines can be supplied with resilient mountings. This is standard on all generating sets.



Pulsation dampers effectively reduce fuel pulses for improved safety.



A pipe connection plate module carries all the fuel channels, for safe and easy installation and overhaul.

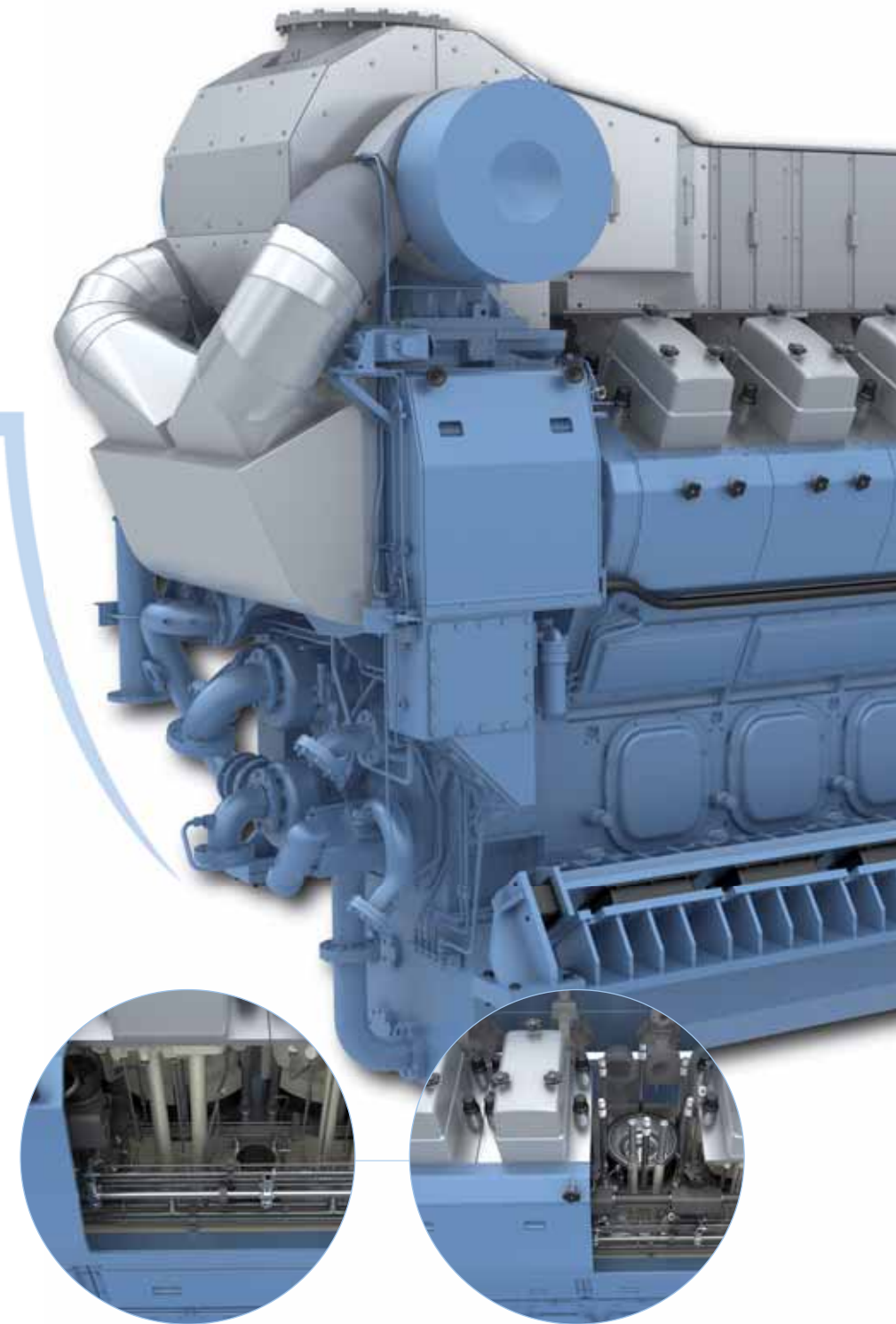
Bergen BL- and BV-series engines

The compact and powerful Bergen B32:40 engine range is produced in 6, 8 and 9 cylinder in-line, and V12 and V16 configurations to provide powers of 3,000 to 8,000kW.

All engines have a bore of 320mm with a 400mm stroke and deliver 500kW per cylinder at 750rpm.

The 'Clean Design' engines offer NOx emissions 20% below the IMO Tier II NOx curve. Stringent emission levels are met through careful control of combustion and on-engine measures, keeping the same power. Additional sub-systems are not required.

Bergen B-series engines are supplied either as generating sets or for mechanical transmission with reduction gear and controllable pitch propeller, allowing simple installation.

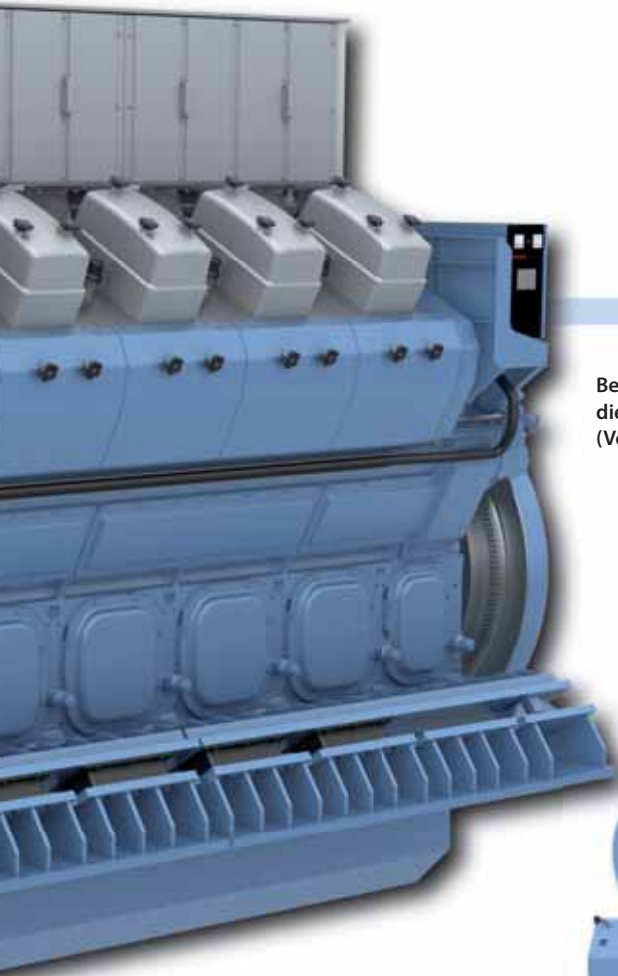


The B-series offers easy exchange of fuel injection pumps.

Quick and easy removal of cylinder head.

Benefits of selecting a Bergen B engine:

- World-leading fast load response
- Extremely stable frequency, important for frequency-sensitive equipment
- Low vibration/structural noise level due to super-resilient mounting
- Certified to meet IMO Tier II requirements
- Competitive fuel and lubricating oil consumption
- No fuel oil leakage from fuel injection pumps into the lubricating oil system, unique Bergen deflector/collector system
- Single-bearing alternator option for in-line engines with benefit of reduced genset length, and reduced cost through elimination of flexible coupling between engine and alternator
- High power to weight ratio
- Proven low life-cycle cost
- Service-friendly
- 24/7 support from the Rolls-Royce global service network

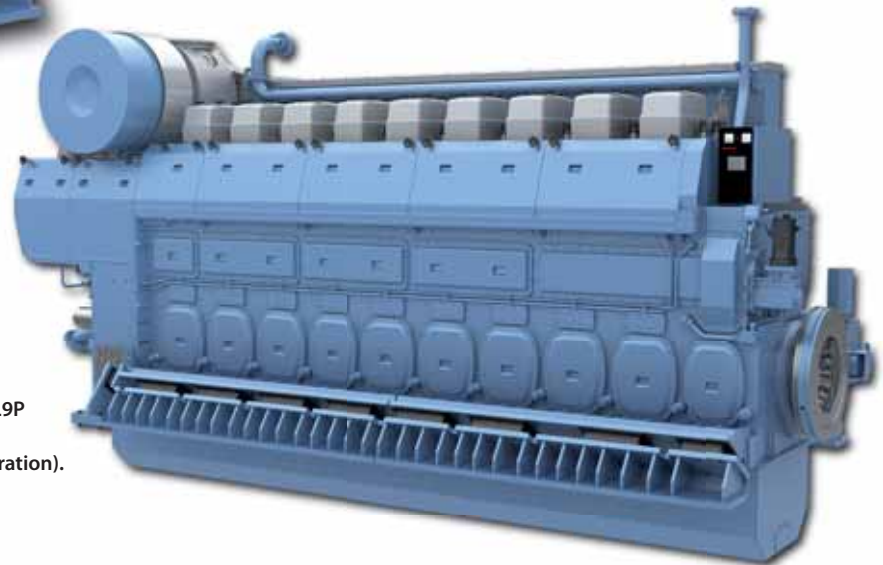


**Bergen B32:40V12P
diesel engine
(Vee-configuration).**

Typical applications:

Suitable for:

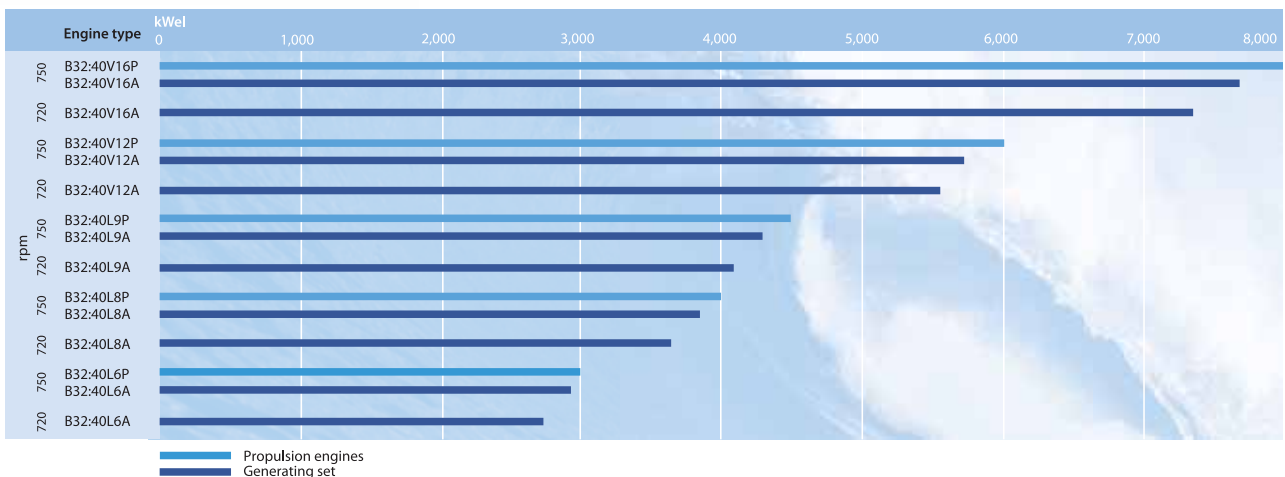
- offshore support vessels
- offshore rigs and platforms
- tankers
- cargo vessels
- fishing vessels
- passenger ships
- yachts
- ferries
- tugs
- various types of naval vessels



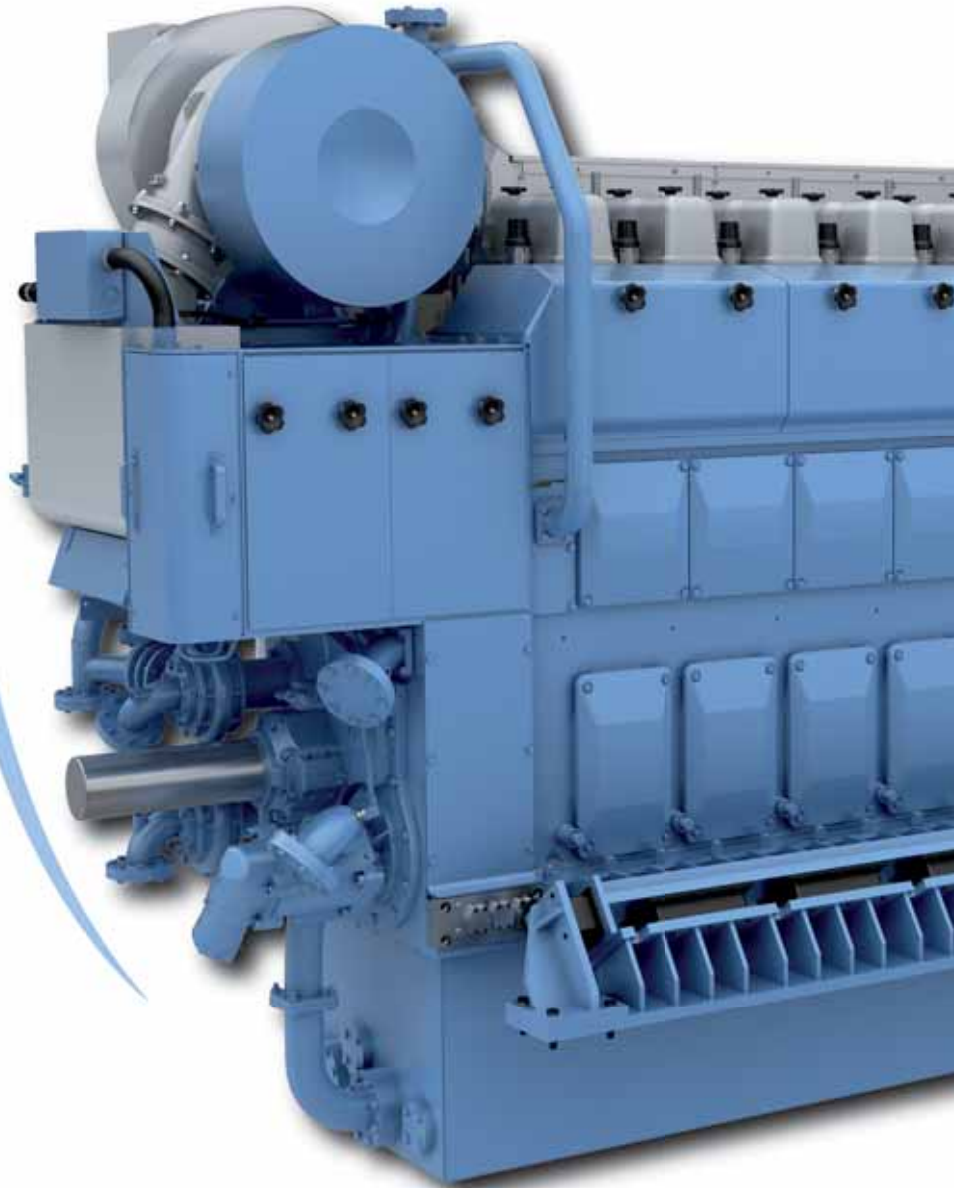
**Bergen B32:40L9P
diesel engine
(In-line configuration).**

Bergen BL- and BV-series

The Bergen B propulsion engine and generating set range (Liquid fuel)



Bergen C-series engines



Typical applications:

Suitable for:

- offshore support vessels
- offshore rigs and platforms
- tankers
- cargo vessels
- fishing vessels
- passenger ships
- yachts
- ferries
- tugs
- various types of naval vessels

The C-series engine is a simple and robust design with a reduced number of components. It is a modern engine at an early phase of its design life. Introduced at 300kW/cyl., it is now rated at 330kW/cyl. and is equally suitable for main propulsion, either with mechanical transmission or in a diesel electric system, or as a marine generating set.

With 6, 8 and 9 cylinders in-line, the Bergen C-series has a range of operating speeds from 720rpm to 1,000rpm and can be supplied for powers of 1,460 to 3,000kW.

Technical highlights

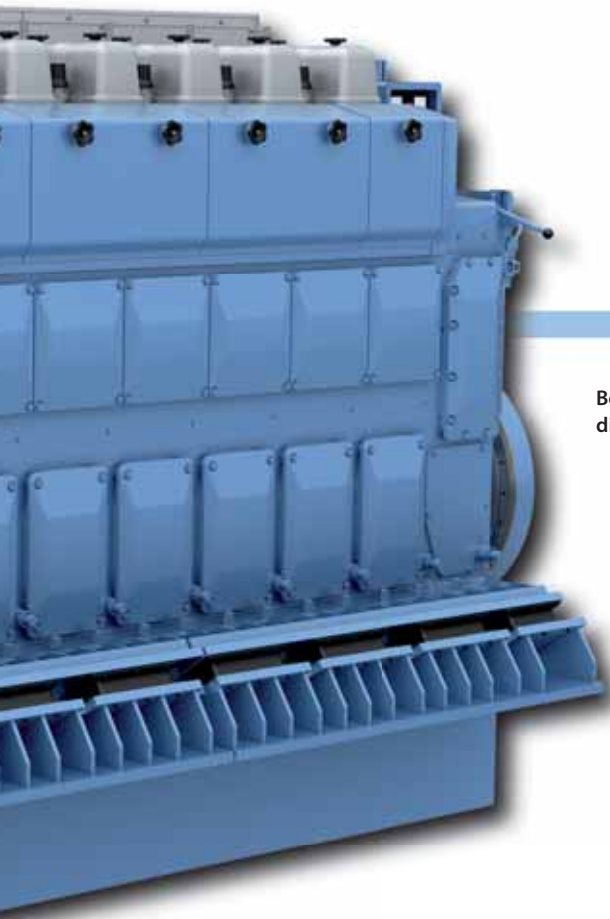
Individual cylinder units can be easily removed for repair or

exchange. Each unit, comprising the cylinder head, liner and piston (including upper con rod), can be replaced without disturbing the big end bearing. Pulse turbocharging provides good acceleration and improved performance under normal part-load operation.

Bergen C-series engine benefits:

- World-leading fast load response
- Extremely stable electrical frequency, important for frequency sensitive equipment
- Low vibration/structural noise level due to super-resilient mounting
- Certified to meet IMO Tier II requirements
- Competitive fuel and lubricating oil consumption

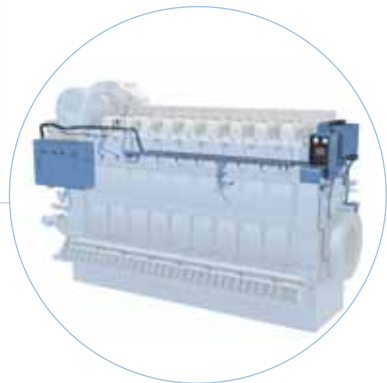
- No fuel oil leakage into the lubricating oil system due to the Bergen Cofferdam system
- Single-bearing alternator option for reduced genset length, and reduced cost, through elimination of flexible coupling between engine and alternator
- High power to weight ratio
- The liner, piston, (incl. upper con rod) and cylinder head can be replaced as a single unit without disturbing the big end bearing, saving time and money
- Proven low life-cycle cost
- Service-friendly
- 24/7 support from the Rolls-Royce global service network



Bergen C25:33L9P diesel engine.

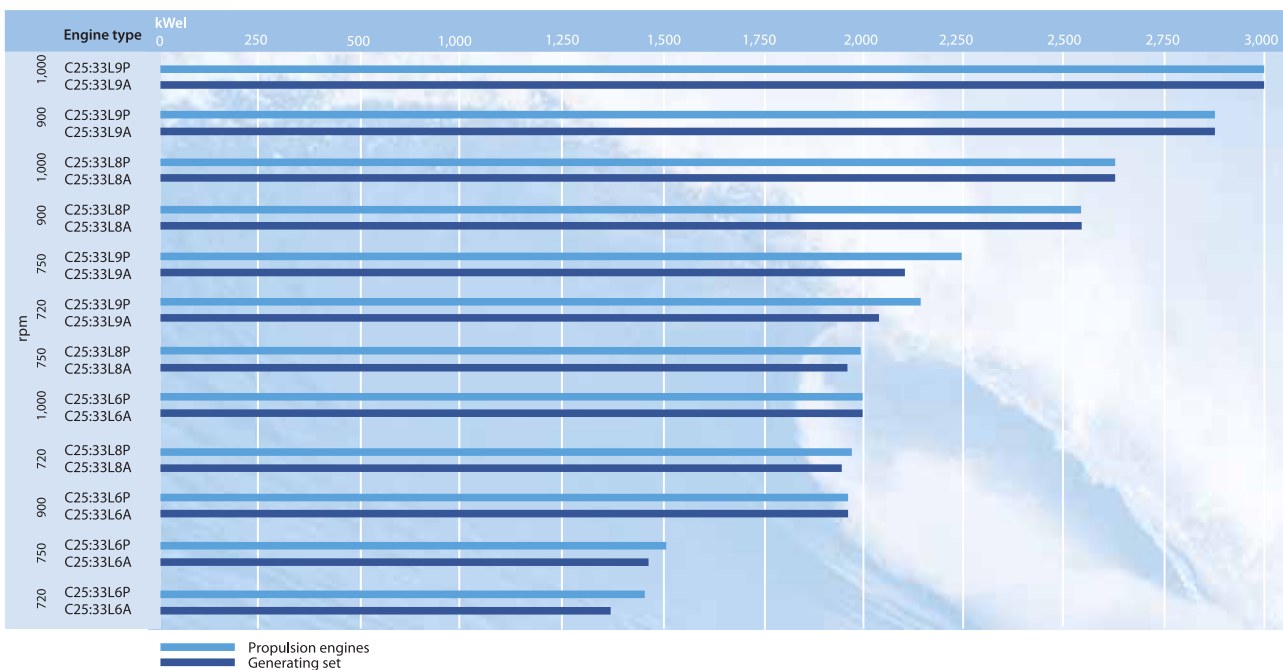


Complete cylinder units can be removed for easy servicing or exchange.



CAN bus signal system for easy overview and operation.

The Bergen C propulsion engine and generating set range (Liquid fuel)



The Bergen C-series engine fills the lower part of the Rolls-Royce diesel and gas engine power range.

Rolls-Royce gas engines

The need for vessels to meet increasingly demanding emission levels, particularly near coasts, has seen a rapid rise in the popularity of LNG (liquefied natural gas) and a corresponding increase in availability. With some countries now offering tax incentives for low emissions, LNG is set to become an important marine fuel of the future.

Bergen lean-burn gas engines are designed to burn LNG and are derived from the robust Bergen B diesel range. They share many common components, but with an increased cylinder bore of 350mm. Bergen B-series in-line and C-series gas engines are currently in development and available from 2011.

For marine gas engine installations Rolls-Royce also provides gas handling and storage systems, together with a full range of equipment to provide complete propulsion system solutions 'from the bunkering flange to the propeller blade'. The double-piped gas fuel system allows a standard engine room solution, with no need for separate engine compartments.

Lean-burn technology

Rolls-Royce was a pioneer in developing modern lean burn gas engine technology, which it has applied to several hundred engines.

A lean-burn engine operates on the Otto cycle with mixture compression and an external ignition source.

A rich gas/air mix in a precombustion chamber is ignited and forms a strong ignition source for the very lean mixture in the cylinder for knock-free combustion. This allows the cylinder power to be greatly increased with high efficiency and reduce emissions.

Key features – Bergen gas engines:

- Good fuel economy and lowest emissions over the full operating range
- Solid-state ignition
- Electronic control system constantly monitors and optimises operating parameters to maintain power and

emissions across the operating range

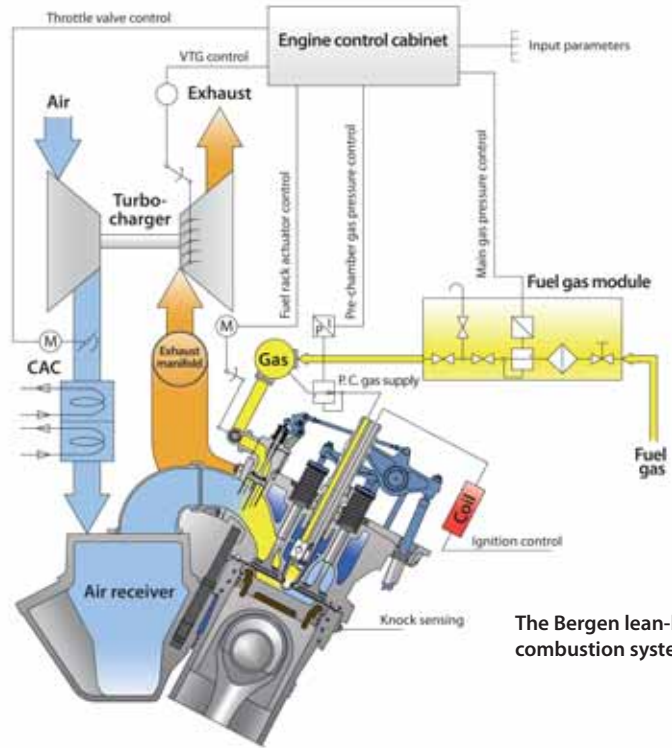
- Variable geometry turbochargers and individual timing and diagnostics for each cylinder
- Type approved for direct mechanical propulsion

Typical applications:

Suitable for:

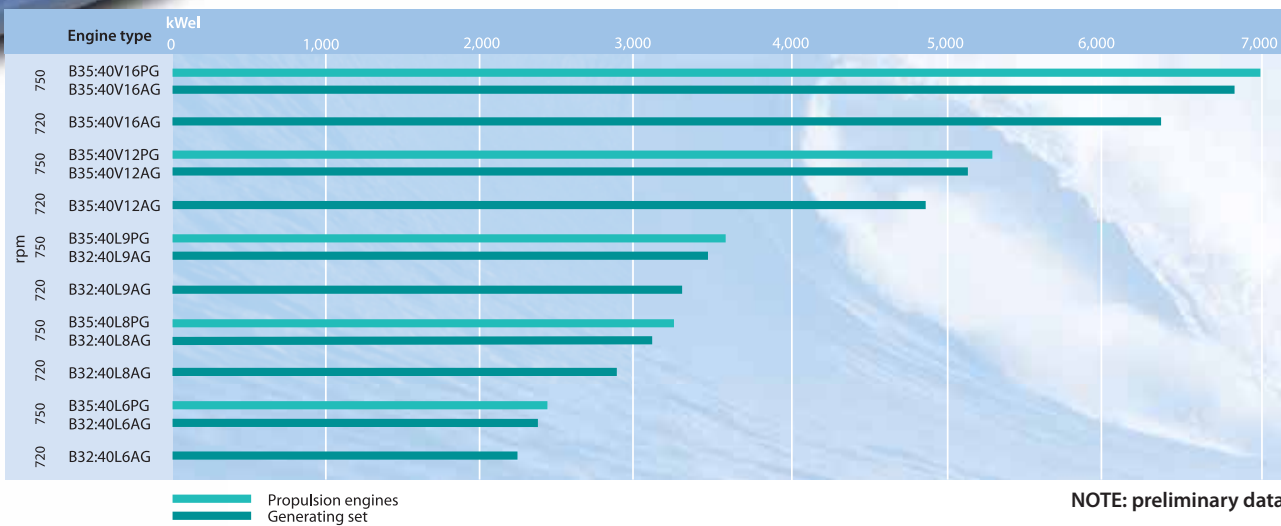
- offshore support vessels
- offshore rigs and platforms
- tankers
- cargo vessels
- fishing vessels
- passenger ships
- yachts
- ferries
- tugs



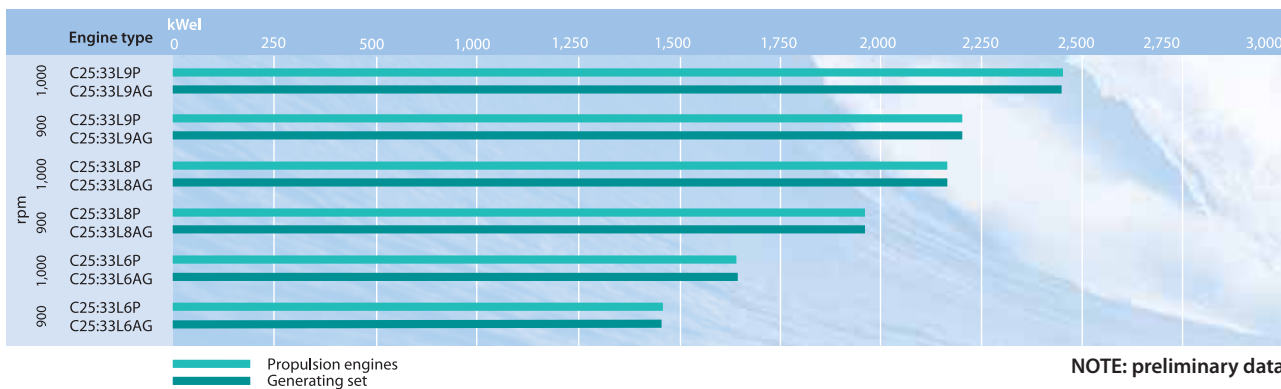


The Bergen lean-burn combustion system.

The Bergen B propulsion engine and generating set range (Gas)



The Bergen C propulsion engine and generating set range (Gas)

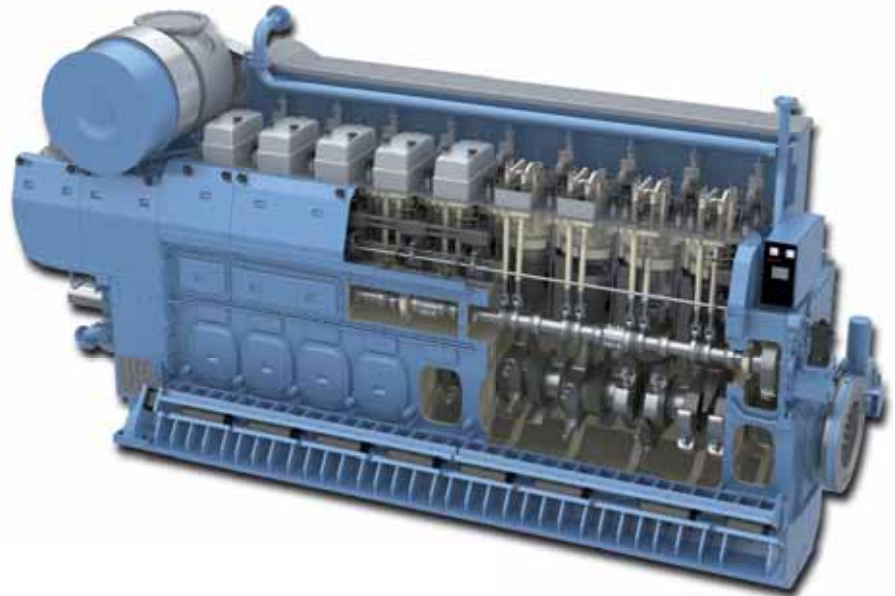


Upgrading is a good investment

Upgrading and using the correct OEM replacement parts can pay dividends in vessel performance and fuel savings.

Once a product is in service, it is expected to last 25 years or more. During that time there will be tremendous changes in product design and the technology available.

To keep your vessel operating at peak efficiency, and sometimes improve performance, we provide a variety of upgrading solutions.



Worldwide exchange pool

Rolls-Royce has created a large pool of exchange Bergen engines parts and assemblies to ensure customers' benefit from reduced maintenance costs and docking times, saving both time and money.

Exchange pool parts are available at a number of Rolls-Royce Marine centres around the world, improving availability and reducing delivery time.

Customer benefits:

- Quality overhaul
- Genuine parts
- Latest technology
- Safe operation
- Reduced off-hire time
- Reduced maintenance
- Fixed price
- Easy to budget
- OEM warranty



Training

Our purpose-built engine manufacturing facilities in Bergen, Norway, is the training centre for customers as well as Rolls-Royce service engineers.

Attending a training course led by our Bergen Engines Service dept. is the perfect compliment to newbuild or upgrading projects, ensuring

personnel have an in-depth working knowledge of the equipment before it enters service.

Training on-board or at the customers' own facilities can also be arranged using our own specialists. Complete crews can be cost-effectively trained on new or upgraded equipment.

Tailor-made courses provide more in-depth product and system training and are designed to individual customer requirements.

To discuss your own individual training needs, please contact us.



Global service and support

The Rolls-Royce service and support concept has been developed to secure complete life-cycle support for your ship and its equipment.

We enable you to choose the kind of service level you need in the most cost-efficient way. Choose between day-to-day servicing, a variety of service agreements or a full service solution.

THE PARTNER SOLUTION

A comprehensive service agreement
Lifelong support means less down-time, low life-cycle costs and proven high second-hand value. The partner solution provides you with these important advantages. This service solution allows you to optimise your daily routines, and ensures that our servicing puts your investment in the best hands. This also allows you to structure your own after-sales service to increase reliability and economy for your applications' operating conditions.

SERVICE AGREEMENTS

Save time and money

Time is crucial, so swift and correct response to enquiries or problems is of mutual benefit. Our aim is to increase your profitability by implementing long-term and cost-effective service agreements. These include delivering original replacement units, regular on-site inspections and personnel training.

BASIC SUPPORT

We get you back in business

Our service and support concept is based on reliability, determination and the expertise to carry out services and deliveries at short notice. A basic support agreement gives you access to our skilled field workers and genuine spare parts supplies, wherever and whenever you need them.

The agreement also includes access to our in-house repair and maintenance centres all over the world.

WORLDWIDE AVAILABILITY

We are always present

A Rolls-Royce service centre is never far away, no matter where you are. With a comprehensive network of service centres around the world, we are a global company and yet still local. We offer 24-hour availability worldwide, backed by a first class logistics system, which secures you rapid response to inquiries within the shortest possible time.



**Rolls-Royce gives a guarantee on all repairs carried out.
The length depends on the type of work and the specific application.**

NORTHERN EUROPE**DENMARK**

ROLLS-ROYCE
Aalborg
Tel: +45 99 30 36 00
Fax: +45 99 30 36 01

FINLAND

ROLLS-ROYCE
Helsinki
Tel: +358 9 4730 3301
Fax: +358 9 4730 3999
Kokkola (Waterjets)
Tel: +358 6 832 4500
Fax: +358 6 832 4511

Rauma
(Propulsion/Deck Machinery)
Tel: +358 2 837 91
Fax: +358 2 837 94804

FRANCE

ROLLS-ROYCE
Paris (Naval Marine)
Tel: +33 147 221 440
Fax: +33 147 457 738
Rungis
Tel: +33 1 468 62811
Fax: +33 1 468 79398

GERMANY

ROLLS-ROYCE
Hamburg
Tel: +49 40 780 91 90
Fax: +49 40 780 91 919
Norderstedt
Tel: +49 40 38 12 77
Fax: +49 40 389 21 77
Norderstedt (Stabilisation)
Tel: +49 40 528 7360
Fax: +49 40 523 1580

THE NETHERLANDS

ROLLS-ROYCE
Rotterdam, Pernis
Tel: +31 10 40 90 920
Fax: +31 10 40 90 921

NORWAY

ROLLS-ROYCE
Aalesund
(Head Office, Merchant)
Tel: +47 815 20 070
Fax: +47 70 01 40 05
Aalesund (Control Systems)
Tel: +47 815 20 070
Fax: +47 70 01 40 77
Aalesund (Ship Design,
Fish and Merchant)
Tel: +47 815 20 070
Fax: +47 70 10 37 01
Austevoll
(Power Electric Systems)
Tel: +47 56 18 19 00
Fax: +47 56 18 19 20
Bergen
(Power Electric Systems)
Tel: +47 55 50 60 70
Fax: +47 50 60 52
Bergen (Engines)
Tel: +47 815 20 070
Fax: +47 55 19 04 05
Bergen (Foundry)
Tel: +47 815 20 070
Fax: +47 55 53 65 05
Bergen (Steering Gear)
Tel: +47 815 20 070
Fax: +47 56 30 82 41
Brattvaag (Deck Machinery)
Tel: +47 815 20 070
Fax: +47 70 20 86 00
Hareid (Rudders)
Tel: +47 815 20 070
Fax: +47 70 01 40 21
Longva (Automation)
Tel: +47 815 20 070
Fax: +47 70 20 83 51
Oslo (Repr. Office)
Tel: +47 815 20 070
Fax: +47 23 31 04 99
Tennfjord (Steering Gear)
Tel: +47 815 20 070
Fax: +47 70 20 89 00
Ulsteinvik
(Head Office, Offshore)
Tel: +47 815 20 070
Fax: +47 70 01 40 05
Ulsteinvik
(Ship Design, Offshore)
Tel: +47 815 20 070
Fax: +47 70 01 40 13
Ulsteinvik (Propulsion)
Tel: +47 815 20 070
Fax: +47 70 01 40 14
Volda (Propulsion)
Tel: +47 815 20 070
Fax: +47 70 07 39 50

POLAND

ROLLS-ROYCE
Gdynia
Tel: +48 58 782 06 55
Fax: +48 58 782 06 56

Gniew (Deck Machinery)
Tel: +48 58 535 22 71
Fax: +48 58 535 22 18

SWEDEN

ROLLS-ROYCE
Kristinehamn (Propulsion)
Tel: +46 550 840 00
Fax: +46 550 181 90

UNITED KINGDOM

ROLLS-ROYCE
Bristol (Head Office, Naval)
Tel: +44 117 974 8500
Fax: +44 117 979 2607

Bristol (Marine Systems)
Tel: +44 117 979 7242
Fax: +44 0117 969 5021

Dartford
Tel: +44 1322 312 028
Fax: +44 1322 312 054

Derby
(Head Office, Submarines)
Tel: +44 1332 661 461
Fax: +44 1332 622 935

Dunfermline
(Motion Control/RAS and
Engines - Crossley Pielstick)
Tel: +44 1383 82 31 88
Fax: +44 1383 82 40 38

Newcastle (Bearings)
Tel: +44 191 273 0291
Fax: +44 191 272 2787

Newcastle (RAS Systems)
Tel: +44 191 256 2800
Fax: +44 191 256 2801

Portsmouth
(Marine Electrical Systems)
Tel: +44 2392 310 000
Fax: +44 2392 310 001

SOUTHERN EUROPE**CROATIA**

Navis Consult
Part of Rolls-Royce Marine Rijeka
Tel: +385 51 500 100
Fax: +385 51 500 101

GREECE

ROLLS-ROYCE
Piraeus
Tel: +30 210 4599 688/9
Fax: +30 210 4599 687

ITALY

ROLLS-ROYCE
Genova
Tel: +39 010 572 191
Fax: +39 010 572 1950

SPAIN

ROLLS-ROYCE
Madrid
Tel: +34 917 350 010
Fax: +34 917 350 728
Tarragona
Tel: +34 977 296 444
Fax: +34 977 296 450

MIDDLE EAST**UNITED ARAB EMIRATES**

ROLLS-ROYCE
Dubai
Tel: +971 4 883 3881
Fax: +971 4 883 3882
Dubai (Naval Marine)
Tel: +971 4 299 4343
Fax: +971 4 299 4344

ASIA PACIFIC**AUSTRALIA**

ROLLS-ROYCE
Melbourne
Tel: +61 3 9873 0988
Fax: +61 3 9873 0866
Perth
Tel: +61 8 9336 7910
Fax: +61 8 9336 7920
Sydney (Naval Marine)
Tel: +61 2 9325 1222
Fax: +61 2 9325 1300

INDIA

ROLLS-ROYCE
Mumbai
Tel: +91 22 6640 3838
Fax: +91 22 6640 3818

MALAYSIA

ROLLS-ROYCE
Kuala Lumpur (Naval Marine)
Tel: +60 3 2096 1990
Fax: +60 3 2095 7990

NEW ZEALAND

ROLLS-ROYCE
Christchurch
Tel: +64 3 962 1230
Fax: +64 3 962 1231

SINGAPORE

ROLLS-ROYCE
Singapore
(Head Office, Marine)
Tel: +65 686 21 901
Fax: +65 686 32 165

NORTH EAST ASIA**CHINA**

ROLLS-ROYCE
Dalian
Tel: +86 411 8230 5198
Fax: +86 411 8230 8448

Hong Kong
Tel: +852 2526 6937
Fax: +852 2868 5344

Shanghai
Tel: +86 21 5818 8899
Fax: +86 21 5818 9388

JAPAN

ROLLS-ROYCE
Kobe
Tel: +81 78 652 8067
Fax: +81 78 652 8068

Tokyo
Tel: +81 3 3237 6861
Fax: +81 3 3237 6846

REPUBLIC OF KOREA

ROLLS-ROYCE
Busan
Tel: +82 51 831 4100
Fax: +82 51 831 4101

RUSSIA

ROLLS-ROYCE
St. Petersburg
Tel: +7 812 332 18 55
Fax: +7 812 332 18 55

Vladivostok
Tel: +7 4232 495 484
Fax: +7 4232 495 484

AMERICAS**BRAZIL**

ROLLS-ROYCE
Rio de Janeiro
Tel: +55 21 3860 8787
Fax: +55 21 3860 4410
Rio de Janeiro (Naval Marine)
Tel: +55 21 2277 0100
Fax: +55 21 2277 0186

CANADA

ROLLS-ROYCE
Halifax
Tel: +1 902 468 2883
Fax: +1 902 468 2759

St. John's
Tel: +1 709 364 3053
Fax: +1 709 364 3054

Vancouver
Tel: +1 604 942 1100
Fax: +1 604 942 1125

CHILE

ROLLS-ROYCE
Santiago
Tel: +56 2 586 4700
Fax: +56 2 586 4705

USA

ROLLS-ROYCE
Annapolis (Naval Marine inc)
Tel: +1 410 224 2130
Fax: +1 410 266 6721

Annapolis (Shiplift Systems)
Tel: +1 410 224 2130
Fax: +1 410 266 6721

Galveston
Tel: +1 409 941 6302
Fax: +1 409 941 6319

Houston
Tel: +1 281 902 3300
Fax: +1 281 902 3301

Indianapolis (Naval Marine Inc)
Tel: +1 317 230 2000
Fax: +1 317 230 4020

Long Beach, Cal.
Tel: +1 562 983 8109
Fax: +1 562 983 8126

Miramar
Tel: +1 954 436 7100
Fax: +1 954 436 7101

New Orleans
Tel: +1 504 464 4561
Fax: +1 504 464 4565

Pascagoula
(Foundry - Naval Marine Inc)
Tel: +1 228 762 0728
Fax: +1 228 769 7048

Seattle
Tel: +1 206 782 9190
Fax: +1 206 782 0176

Walpole (Naval Marine Inc)
Tel: +1 508 668 9610
Fax: +1 508 668 2497

Washington (Naval Marine Inc)
Tel: +1 703 834 1700
Fax: +1 703 709 6086



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www.rolls-royce.com



Rolls-Royce plc

Rolls-Royce Offshore
Service Box 22
NO-6025 Aalesund
Norway
Tel: +47 815 20 070
Fax: +47 70 01 40 05

Rolls-Royce Merchant
Service Box 22
NO-6025 Aalesund
Norway
Tel: +47 815 20 070
Fax: +47 70 01 40 05

Rolls-Royce Naval
PO Box 3, Filton
Bristol BS34 7QE
England
Tel: +44 117 974 8500
Fax: +44 117 969 5021

Rolls-Royce Submarines
PO Box 2000, Raynesway
DE21 7XX Derby
England
Tel: +44 1332 661 461
Fax: +44 1332 661 630

www.rolls-royce.com