



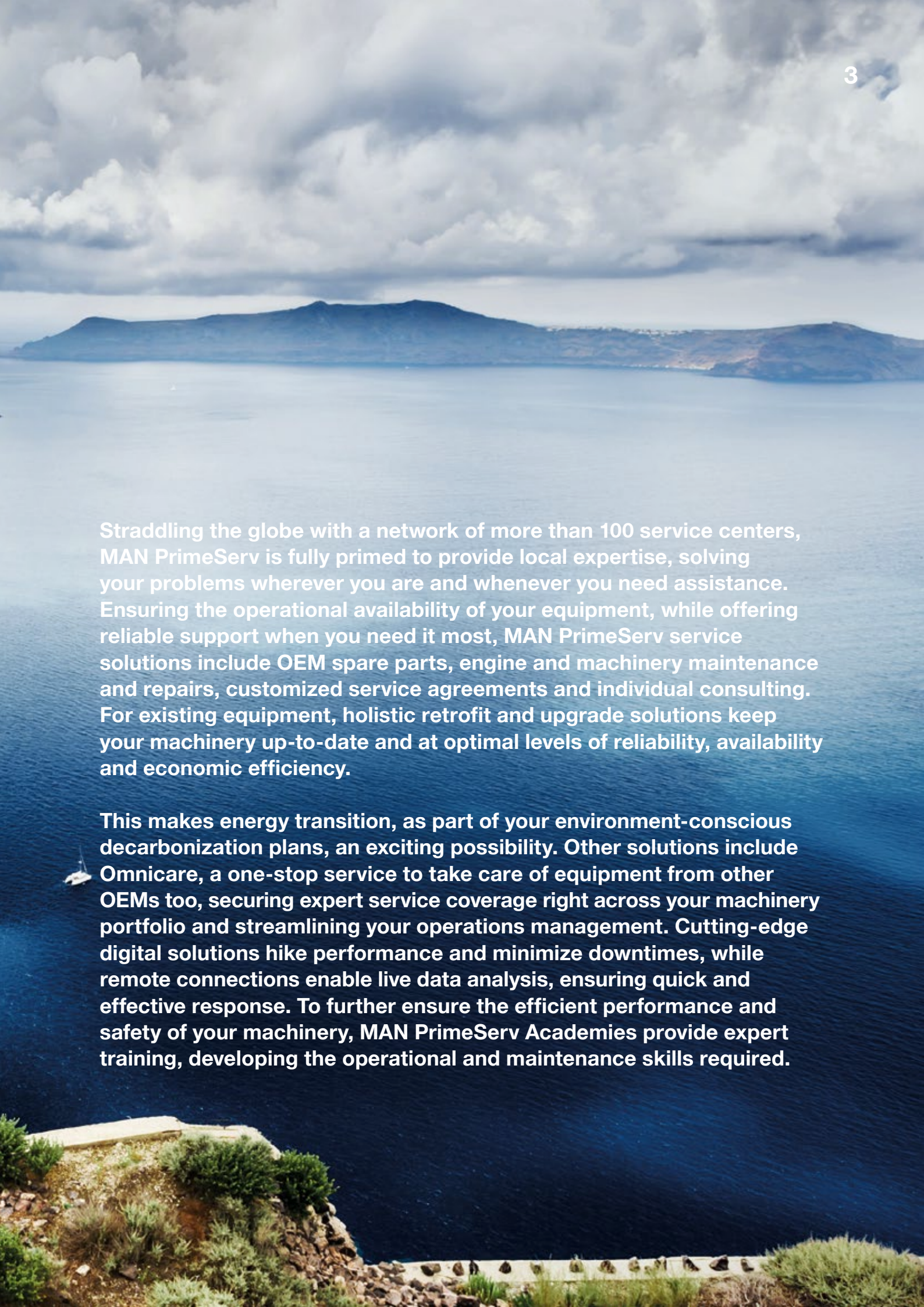
Essential spare parts

MAN PrimeServ

A complete portfolio of
high-quality components
for maximum engine
performance

Service with passion





Straddling the globe with a network of more than 100 service centers, MAN PrimeServ is fully primed to provide local expertise, solving your problems wherever you are and whenever you need assistance. Ensuring the operational availability of your equipment, while offering reliable support when you need it most, MAN PrimeServ service solutions include OEM spare parts, engine and machinery maintenance and repairs, customized service agreements and individual consulting. For existing equipment, holistic retrofit and upgrade solutions keep your machinery up-to-date and at optimal levels of reliability, availability and economic efficiency.

This makes energy transition, as part of your environment-conscious decarbonization plans, an exciting possibility. Other solutions include Omnicare, a one-stop service to take care of equipment from other OEMs too, securing expert service coverage right across your machinery portfolio and streamlining your operations management. Cutting-edge digital solutions hike performance and minimize downtimes, while remote connections enable live data analysis, ensuring quick and effective response. To further ensure the efficient performance and safety of your machinery, MAN PrimeServ Academies provide expert training, developing the operational and maintenance skills required.

Keep downtime to a minimum

To maximize the value of your engine investment, it is vital that all parts and components are well maintained and replaced when necessary. With MAN PrimeServ, you have access to the industry's largest portfolio of genuine-quality spare parts, each designed to optimize your engine's performance over its entire lifetime.

OEM quality

OEM spare parts from MAN PrimeServ are the best way to prevent engine damage and costly interruptions to your operation schedule. All OEM spare parts incorporate the latest technology solutions to provide maximum quality and reliability, while ensuring downtime is kept to a minimum.

Continuous development

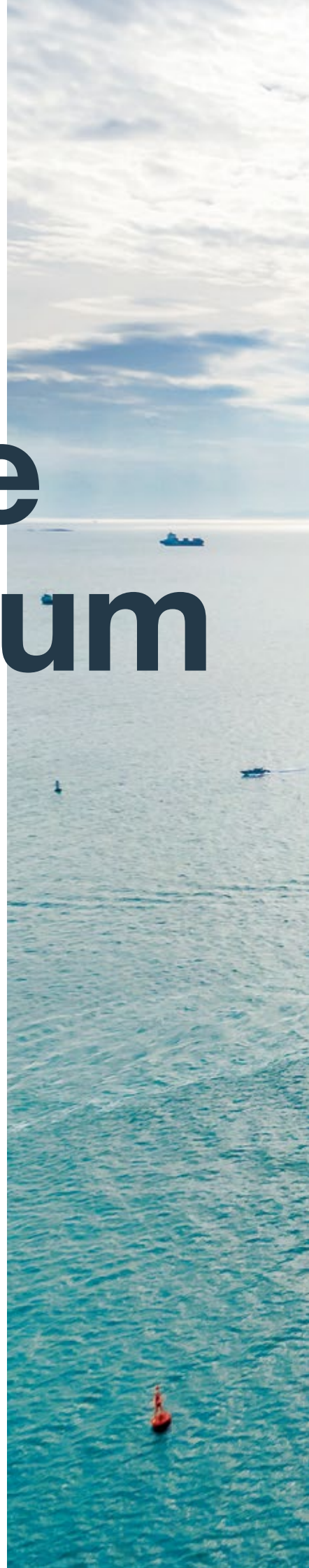
Our R&D teams are constantly developing new ways to improve the quality of your engine's components, covering everything from O-rings to crankshafts, and for new or old engine models. Every part we produce is precision-engineered for its specific purpose, using the latest design updates and the highest-grade materials, which for you translates directly into cost-, reliability- and efficiency gains.

Dependable support

We understand the challenges you face in maintaining profitable fleet operations, which is why we focus on providing high quality solutions as well as high quality parts. This gives you the best and most flexible options to protect your investments and minimize your repair costs. We have also optimized our global network of sales offices, including a more streamlined online portal, to make it easier for you to find the part or quotation you need, and to ensure reliable delivery and installation.

With MAN PrimeServ you can be sure of:

- One-stop shop for all your needs
- Comprehensive portfolio of spare parts with warranties
- Class-approved spare parts for all MAN two-stroke engines
- Round-the-clock stock availability in Denmark and Singapore
- Emergency assistance availability to minimize downtime
- Fully updated designs for the highest quality and efficiency
- Global network of more than 100 sales and service offices
- IMO parts for any engine
- One contact point regardless of engine builder
- Technical support 24/7





OEM spare parts for reliable engine performance



Fuel and exhaust equipment



**Multi-way
FIVA valves**



Spindle guides

Essential wear parts



Cylinder liners



Piston crowns



**Plunger-and-
Barrels**



DuraSpindle



**Piston rings
(Alu and Cermet)**



Bearing shells



Stuffing box




Maintenance kits

Fuel and exhaust equipment

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Spare parts for fuel and exhaust equipment



MAN PrimeServ fuel and exhaust equipment is designed to optimize the performance of your engine. Inevitable wear and tear on key components can result in lower fuel efficiency, inconsistent emissions, and further engine damage, which is why it is important you replace any parts that are not in optimal working condition.

Full availability

We offer a complete range of genuine spare parts for fuel and exhaust systems. As with all our equipment, each component is built using the latest modifications and the correct material composition. We also use state-of-the-art 'lapping' technology to ensure corresponding or 'paired' parts are fully compatible and operate together with maximum efficiency.

Genuine quality

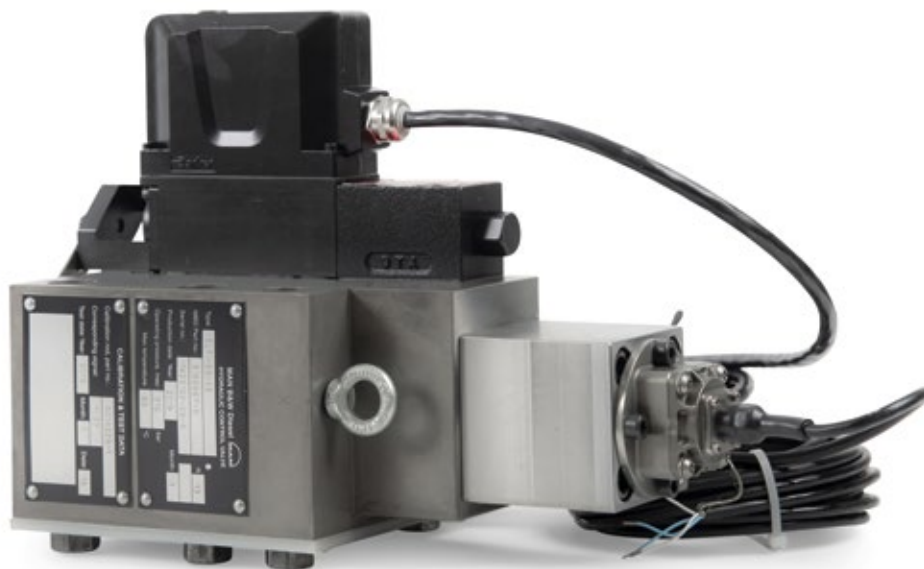
It is essential you only use genuine MAN spare parts. We conduct rigorous in-house testing and validation to ensure each part meets our uncompromising standards for durability and performance, and to ensure thousands of hours of flawless operation.

Multi-way FIVA valves

The FIVA (Fuel Injection, Valve Actuation) valve is a high-precision unit that controls the fuel injection and exhaust valve opening of the main engine, thereby serving the same function as the camshaft on conventional engines. It is an important part of your engine and essential to its operation and efficiency.

A highly durable coating on the inside of the valve ensures thousands of hours of maintenance-free operation. All FIVA designs are constantly upgraded to enhance performance and reliability, and each component is manufactured to the highest possible quality.

Depending on your engine design, the Multi-way valve can be provided as two separate units (ELFI and ELVA).



Key features

- Optimal engine performance
- Long lifetime
- Incorporates the latest design updates
- Built to the highest quality standards

Services for Multi-way FIVA valves

- MAN FIVA valve retrofitting
 - FIVA overhauling
 - Cost-effective factory overhaul options at certified MAN ES workshops in Copenhagen, Istanbul, Shanghai, Qatar and Houston
 - Service kit for Multi-way valves
-

Spindle guides

The spindle guide and nozzle are important fuel valve components and play a crucial role regarding fuel injection accuracy. OEM spindle guides and OEM nozzles are designed to withstand extreme temperatures to maintain precise operation with no fuel leakage. This eliminates risks of contamination of other key components and helps to ensure efficient fuel combustion.

The spindle guide and nozzle are the main wear parts of the fuel valve, and as such they need to be replaced at certain intervals. As they are designed to work as a pair, they should both be changed at the same time.

Combining the spindle guide with a HIP (Hot Isostatic Pressing) compound nozzle helps to minimize maintenance costs by providing an average Time Between Overhaul of 16,000 running hours (8,000 hours on gas).

Spindle guides, as with other fuel system components that can affect emissions, are manufactured in-house in Denmark using precision machinery to maintain strict quality standards. To help reduce your fuel consumption and emissions, a high priority is placed on the development of our spindle guides and nozzles for optimal performance.



Key features

- Manufactured using the latest design specification updates
- No dripping from the nozzle eliminates contamination of other key components and helps to minimize exhaust gas emissions
- Cleaner exhaust gas ways for more efficient combustion
- Manufactured to the highest quality standards
- Precision-engineered by MAN Energy Solutions in Denmark

Services for spindle guides

- Fuel valve nozzle - cleaning tools



Plunger and Barrel

The Plunger-and-Barrel is key components of your engine's fuel pump, ensuring the optimal amount of fuel oil reaches the combustion chamber. Plunger-and-Barrels are included in the IMO technical file because they are essential to the running of the engine and are a part of the fuel system that can affect emissions.

To optimize the combustion process and regulate emissions correctly, it is important to monitor the engine performance during different engine loads.

If the index has increased more than 10% prior to testbed performance, the Plunger-and-Barrel should be replaced.

Plunger-and-Barrels are continuously developed to improve reliability and manufactured in-house in Copenhagen to ensure the highest possible quality. Even if your engine is an older design, you will receive exactly the right parts for your engine's specifications in order to comply with the technical file.



Key features

- Incorporates the latest design updates
- Built to highest quality standards
- Tracking codes ensure you receive the right part for your engine type
- Precision-engineered by MAN Energy Solutions in Denmark
- Amendments to the IMO technical file free of charge (if required)

Services for Plunger-and-Barrels

- Maintenance kits for fuel pumps
-

DuraSpindle

The DuraSpindle is an important part of the exhaust valve that leads gas from the combustion chamber to the exhaust gas receiver, enabling gas fluctuations to be equalized and led to the turbo-charger. The DuraSpindle is subjected to extreme operating conditions and is therefore manufactured using the latest engineering designs in MAN ES approved factories for the best possible product quality.

The vane wheel is designed to rotate the exhaust spindle during operation. This ensures the valve spindle is heated symmetrically and distributes heat from minor blow-throughs on a wider area of the bottom piece, thereby eliminating burn-away occurrences on the valve seat.

For many years, optimizing the durability of DuraSpindles by using sophisticated welding techniques has been in great focus. As a result, we use a special rolling process to weld Inconel 625 onto the disc bottom and Inconel 718 onto the seat to improve hardness. This high-temperature resilient Ni-Cr alloy gives a more reliable, longer-lasting result and significant cost savings compared to previous designs.



Key features

- Longer Time Between Overhaul
- Incorporates the latest design updates
- Improved reliability
- Reduced maintenance

Services for DuraSpindle

- Maintenance kit for exhaust valves
-



Essential wear parts



Certain spare parts for the two-stroke engine are considered to be essential wear parts, as they are key components that have a critical effect on the performance of your engine. When worn, they must be replaced with parts engineered to precise design specifications to avoid further damage to your engine and downtime for your vessel.

Engineered for quality

Essential wear parts are subject to harsh operating conditions and other factors such as inconsistent fuel quality, which can affect their operational lifetime. It is critical that these parts are manufactured to the highest possible quality standards to ensure continuous and dependable performance over many thousands of hours in use.

Tested to the extreme

Every product we launch undergoes a stringent testing and validation process at our research centers. We verify key factors such as efficiency, longevity and reliability against a broad scope of variables, including different engine models, running speeds and fuel types, to ensure you always get the best solution for your specific engine requirements.

Cylinder liners

Cylinder liners are a key component of your main engine and should be kept in optimal condition to ensure efficient and reliable operation.

OEM cylinder liners have a wave-cut and honed profile on the surface for optimal oil retention and to provide a hydro-dynamic oil film. The cast iron running surface of our cylinder liners helps to optimize tribology configuration. For specific engines, a tailored cooling layout of the liners contributes to improved lifetime and performance.

OEM cylinder liners are engineered in Denmark to the highest standards and produced under strict quality control. Rigorous in-house performance testing of the interaction between the running surface and the piston ring ensures minimal maintenance and a long Time Between Overhaul.



Key features

- Incorporates the latest design updates
- High strength, cast iron build with optimized tribology configuration
- Cooling layout tailored to specific engine types
- In-house performance testing between running surface and piston ring
- Limited maintenance
- Long Time Between Overhaul

Services for cylinder liners

- Maintenance kit for cylinder liners
 - Maintenance kit for cylinder covers
-

Piston crown

The OEM piston crown is located at the top of the piston rod and is a crucial component to transform combustion energy to the crankshaft as mechanical energy. During this process, the piston crown is subjected to very high pressures, temperatures, and corrosive substances.

To ensure they can withstand these harsh conditions and give you many thousands of hours of maintenance-free operation, OEM piston crowns are manufactured using high grade steel and tested at certified workshops under strict quality control agreements.

By incorporating the latest designs updates, the warranty on OEM piston crowns has been extended to 36 months.



Key features

- Incorporates the latest design updates
- Manufactured to the highest quality for maximum performance
- Extended warranty to 36 months for complete reliability assurance

Services for piston crown

- Maintenance kit for piston
-

Piston rings

Alu-coated and Cermet-coated

OEM piston rings form a seal between the piston crown and the cylinder liner to retain combustion pressure and improve fuel efficiency, while also influencing the friction and retention of lube oil. As such, piston rings are a critical part of your engine and play an important role in maintaining the performance of surrounding components, including emissions and consumptions. It is important to keep your piston rings in optimal condition, which is why the design is constantly under development in order to deliver maximum reliability.

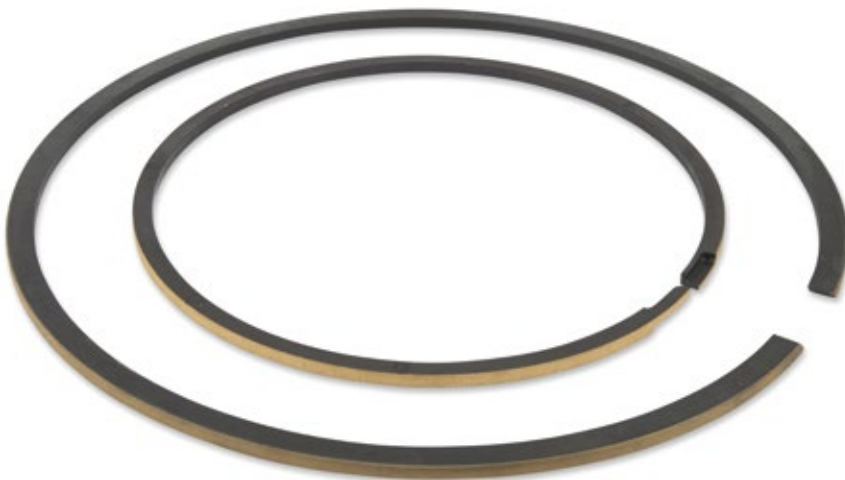
Depending on your needs, you can choose from two types of piston rings: Cermet-coated and Alu-coated.

Cermet-coated piston rings reduce the risk of scuffing and seizures, which can occur when operating on 2020-compliant fuel oils (VLSFO & ULSFO). As cermet

is a composite, part-ceramic, part-metal material, it combines the best properties from each, including wear resistance and toughness. This helps to reduce wear when using low sulphur fuel oils and minimizes potential cylinder lubrication issues. For certain engine types, the addition of chrome layers on the underside of the rings also helps to protect the piston crown.

Alu-coated piston rings have a light aluminum-based coating on the base ring to give a faster “running in” time. The aluminum coating is also applied to Cermet-coated piston rings.

By combining specific layers of coating and complying with new environmental regulations, OEM piston rings are designed to maximize your cylinder liners’ and pistons’ operational lifetime and increase Time Between Overhaul.



Key features

- Low friction
- Low lube oil consumption
- Resistant to 2020 compliant fuel oils
- Incorporates the latest design updates
- Increases cylinder liner operational lifetime
- Safe and reliable running-in time
- Maximizes piston operational time
- Improved Time Between Overhaul

Services for piston rings

- Cermet-coated piston rings are part for the MAN PrimeServ product portfolio for compliance with IMO 2020 regulations
 - Maintenance kit for pistons
-

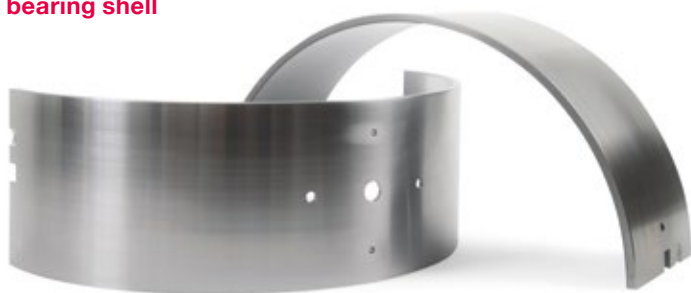
Bearing shells

OEM bearing shells are essential to keep your engine's crankshaft and crosshead pin in place during operation. These components are subjected to high forces and pressures and, if maintained correctly, should last for your engine's entire lifetime.

OEM bearing shells are engineered for different engine types and feature unique coatings for maximum protection. An optimized design ensures better oil film thickness and pressure on the bearing shells.

As with all our spare parts, our constant focus on improvement ensures you always get the best product quality and performance.

Blended edge main bearing shell



Blended edge main bearing shells – key features

- Reduced oil film pressures
- Increased oil film thickness
- Relieves edge loading

Crosshead bearing shell



Crosshead bearing shells – key features

- Undivided loaded area
 - Ensures higher oil film thickness
 - Maintains lower oil film pressure
-

Stuffing box

The stuffing box is a mechanical seal between the cylinder and the cross-head that protects both sides from contamination. It features a lamella-type top ring that scrapes off unwanted substances (soot, coke, etc.) from the piston rod and leads them into a scavenge sludge drain.

The stuffing boxes feature a new lap joint and lamellas, which optimizes the overall performance and is standard on all two-stroke MAN ES diesel engines. An optimized design also helps to reduce oil consumption, which lowers your operational costs, as well

as improved draining and sealing to help the system oil remain clean.

You can also get special Maintenance Kits to maintain your stuffing box, which include all the spare parts you need for optimal performance and a longer operational lifetime.

All stuffing boxes are designed in Denmark and produced in approved facilities to ensure they adhere to our uncompromising quality control standards.



Key features

- Reduced cost in system oil consumption
- Reduced stuffing box maintenance costs
- Improved cleanliness of system oil
- Innovative design optimizes stuffing box performance

Services for stuffing box

- Maintenance kit for stuffing box
 - Retrofit kit for stuffing box
-

Maintenance kits

We provide the solution for you

MAN PrimeServ Maintenance Kits provide an all-in-one solution for the easy and effective overhaul of components in your engine.

Each MAN PrimeServ Maintenance Kit contains all necessary genuine MAN PrimeServ replacement parts along with an installation guide for the specific component, based on easy-to-follow visual diagrams that highlight their purpose and fitting instructions. This enables your engineers to carry out any service or repair operations quickly and correctly, whenever and wherever

needed, helping you to minimize risks of unscheduled downtime.

Using such a kit extends the Time Between Overhaul and enables you to keep your fleet operating with even greater reliability and lower operating costs.

- **Greater efficiency**
Saves you time, money and hassle by eliminating the need for urgent unscheduled spare part deliveries
- **All-in-one parts packages**
All you need for effective maintenance is the kit containing genuine MAN spare parts
- **Effective servicing**
All the wear parts for each component are replaced at the same time, reducing risk and boosting reliability
- **Simple installation**
Easy-to-follow instructions help prevent mistakes and ensure faster return to service
- **Access to know-how**
Direct access to the results of MAN PrimeServ experience and know-how about effective preventive maintenance



Worldwide service

We offer retrofitting and upgrade services to bring engines and turbochargers already in service up to the very latest standards of performance and efficiency.

Using the latest digital technology, we enable you to maximize the performance and availability of your MAN equipment by accessing real-time data analysis, remote support and rapid solutions. We also offer an extensive range of training courses at MAN PrimeServ Academies around the world.

Our service does not vary according to location. We know that a vessel may be built in Asia, operated in Europe for ten years and then move to Africa for the next ten years. That does not alter our focus on dedicated training, fast delivery of strategic spare parts, a comprehensive approach, or our tailored maintenance contracts.

For more information please visit
www.man-es.com/primeserv



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