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ДЛЯ МОРСКОЙ ПРОМЫШЛЕННОСТИ И ЭЛЕКТРОЭНЕРГИИ





# Применение

## Дизельные и газовые промышленные двигатели

- Cylinder heads
- Cylinder liners
- Inlet systems
- Diesel intake systems
- Fuel injections valves
- Fuel injections pumps
- Intake and exhaust valves



## МОРСКОЕ МАШИНОСТРОЕНИЕ

### Вспомогательные системы и устройства

- Cooling systems
- Heat exchangers
- Turbochargers
- Centrifugal separators
- Exhaust gas piping
- Auxiliary devices (pumps, valves, tanks, doors, lever arms)
- Hydraulic jacks and cylinders
- Carter, access and rocker covers



## МОРСКОЕ МАШИНОСТРОЕНИЕ

- Propeller shafts
- Azimuth & tunnel thrusters
- Propeller blades
- Rudder steering gears
- Roll fin stabilisers





## Product Range

- O-rings
- Custom Rubber parts
- Metallic Gaskets
- Double-Jacketed Gaskets
- Spiral Wound Gaskets
- Metal-jacketed Gaskets
- Rotary Shaft Seals
- Tenax - Vee Packings
- Tenax Collars
- Gaskets and Jointing Sheets
- Rubber Gaskets and Jointing sheets
- Plastic Gaskets and Jointing sheets
- Hydraulic Seals - Wipers - Static Seals
- Hydraulic Seals - Piston, Rod, Rotary Seals
- Braided Packings



# Industrial engines

are constantly evolving and the world's largest producers invest enormous resources in research and development; therefore manufacturers of seals are required to provide new materials and solutions to meet the new demanding requirements.



## Industrial Engines - An Evolving industry

In recent years, research in this area has been greatly influenced by:

### Economic factors

Fuel consumption has always been considered a substantial cost in the operation of the engine. The development of new engines that are cheaper to operate thanks to the use of gas, bio diesel or fuel blends put a strain on the seals.

### Technological factors

The use of new fuels, the evolution of injection systems, the development of turbochargers and all the structural modifications made to improve the performance of the engine, demand a quick adaptation of the seals. Lubricating oils, coolants, corrosion inhibitors and other fluids used in the mechanical components to improve engine performance combined with high temperatures and increasingly arduous operating conditions, demand highly effective sealing solutions.

### Environmental factors

Emissions into the environment by gas and/or harmful products are controlled by International laws that are imposing strict limitations, such as:

- Limits for nitrogen oxides (NOx)
- Caps on sulphur content of fuels
- Heat recovery systems
- American law V.G.P. (Vessel General Permit) on the use of biodegradable oils
- On-board incinerators

All the structural changes implemented to enable the engine and components to withstand extreme conditions of heat, cold or to reduce engine room noise are also contributing factors in the evolution of this field.



#### PROTECTION OF THE MARINE ENVIRONMENT Industrial pollution

The main causes of industrial pollution of the seas are the result of discharge of toxic substances from manufacturing processes, from uncontrolled waste dumps and the negative impact of the infusion of high temperature water into the sea.



#### PROTECTION OF THE MARINE ENVIRONMENT Oil pollution

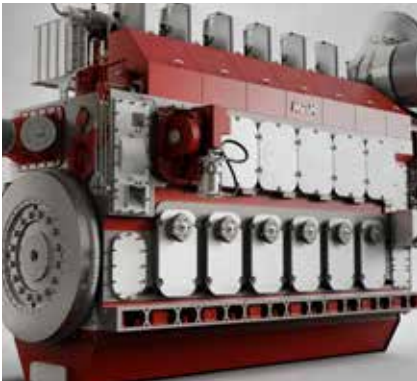
The most frequent causes of oil product spills at sea are mainly due to accidents to tankers carrying oil or to offshore platforms extracting it, but also to the water used to clean the ships' tanks.

A large, complex industrial diesel engine is the central focus of the image, situated within a marine engine room. The engine is a long, multi-cylinder unit with various components like pipes, valves, and electrical boxes. The room is filled with industrial equipment, including a control panel with a digital display on the left and a metal walkway on the right. The lighting is bright, highlighting the metallic surfaces of the engine and the surrounding infrastructure. An orange diagonal line cuts across the image, separating the text on the left from the engine on the right.

# Diesel and gas INDUSTRIAL ENGINES

for marine  
applications  
and power  
generation





Four-stroke industrial engine



Cylinder head

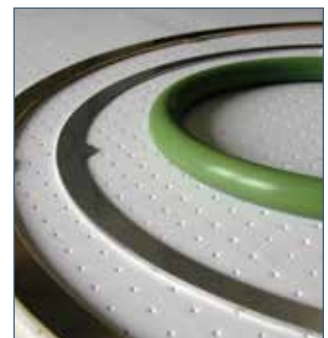


Cylinder liner

- Cylinder heads
- Cylinder liners
- Injection systems
- Diesel injectors
- Fuel injection valves
- Fuel injection pumps
- Inlet and exhaust valves

## Products

- Seal Kits for cylinder heads
- Seal Kits for injection systems
- Maintenance Seal Kits
- O-rings in a wide range of materials and dimensions
- Custom seals in compressed fibers, graphite, PTFE and other materials
- Metal and metal jacketed gaskets
- Spiral wound gaskets
- Custom moulded items in rubber and rubber+metal
- Extruded rubber items
- Seals in plastic materials





# MARINE ENGINEERING

Auxiliary systems  
and devices





Exhaust gas piping

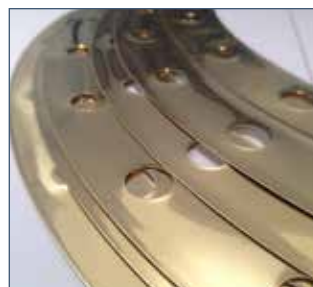


Turbocharger and Heat exchanger

- Cooling systems
- Heat exchangers
- Turbochargers
- Centrifugal separators
- Gas exhaust pipes
- Auxiliary devices (pumps, valves, tanks, doors, lever arms)
- Hydraulic jacks and cylinders
- On-board and quay cranes
- Carter, access and rocker covers

## Products

- Custom rubber seals
- Flat gaskets in CAF materials and graphite for high temperatures
- Sealing sets for plate heat exchangers (PHE)
- Metal, metal-jacketed and spiral wound gaskets
- Rotary shaft seals
- Special seals for slewing rings and bearings
- Sealing systems for hydraulic cylinders







# Marine Engineering

## PROPULSION SYSTEMS

The field of marine propulsion systems relates to a series of mechanical devices that ensure the distribution of power from the engine to the propeller, as well as the direction and movement of the vessel in port

In this context we also note:

- Propeller main shaft
- Azimuth and tunnel thrusters
- Propeller blades
- Rudders and steering gear
- Roll fin stabilisers

Each of these systems is equipped with gearboxes, bearings, locking flanges supported by their seals. The integrity of the entire propulsion system of a vessel is ensured by the use of efficient sealing systems

## Marine engineering - Seal characteristics

In order to retain lubricant within the bearing shaft and therefore prevent seawater from coming into contact with any device or with parts of the engine, causing severe damage, it is critical to carefully choose sealing systems with suitable materials and correct profiles.

### Seals should serve to

- Protect the devices from seawater ingress
- Extend the life of the bearing
- Significantly reduce maintenance costs and downtime
- Avoid waste or loss of lubricant and related costs
- Reduce power consumption and ensuring low friction running
- Prevent the corrosion of metal parts that may come into contact with each other.
- **It is important to study specific profiles that ensure an airtight seal in the presence of**
- Strong eccentricity
- Resistance to fluid lubricants contained in bearings
- Resistance to contact with the outside environment, generally seawater.





A large, dark-colored propeller is shown in a water tank, with water splashing around it. The propeller has three blades and a central hub. The background is a blue-tinted image of the tank's interior. A semi-transparent blue overlay covers the top left portion of the image, and a thin orange diagonal line runs from the bottom left towards the top right, intersecting the blue overlay.

# MARINE ENGINEERING

Propulsion systems





Propeller shaft

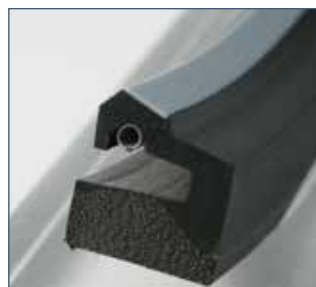


Propeller and steering gear

- Propeller shafts
- Azimuth & tunnel thrusters
- Propeller blades
- Rudder steering gear
- Roll fin stabilisers

## Products

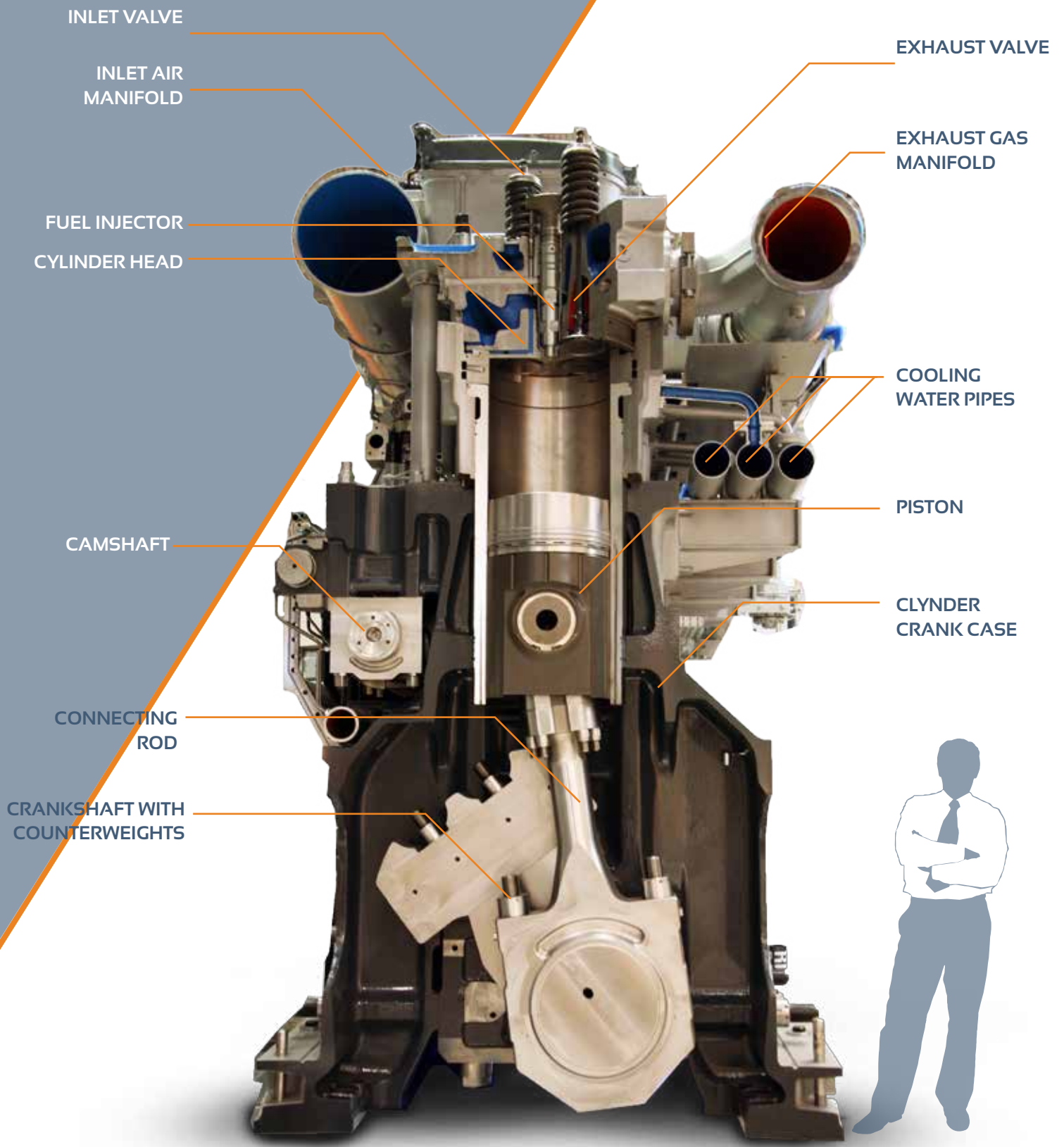
- Rotary shaft seals GTR
- Custom rotary shaft seals
- O-rings
- V-rings
- Wipers
- Guide bushings in a wide range of materials
- Sealing systems for oil hydraulic cylinders





# INDUSTRIAL ENGINES

## Main Components



# INDUSTRIAL ENGINES

## Generic Four-Stroke Engine Diagram

