Industrial engines
Marine industry

Colombo&C.
GASKETS AND SEAL SOLUTIONS

GASKETS AND SEAL SOLUTIONS®
MADE IN ITALY - SINCE 1911

Colombo&C.

GASKETS AND SEAL SOLUTIONS

PRESTIGIOUS MANUFACTURING WITH THE STRENGTH OF "MADE IN ITALY"

Manifattura Guarnizioni COLOMBO & C. spa manufactures a wide variety of gaskets and sealing systems for machines and industrial plants.

Known as "COLOMBO" by industry insiders the company has always been regarded as a highly qualified reference point for technicians, engineers, and skilled maintenance workers.
A reliable partner capable of providing customers with a specific and superior know-how for all applications, the company is currently one of the major Italian manufacturers of gaskets and sealing systems.

Customers who rely on solutions offered by COLOMBO are able to experience concrete benefits such as cost reduction, guaranteed continuity of supplies and, most critically, the support of competent advice and proven expertise.

Diesel and gas industrial engines

FOR MARINE INDUSTRY AND POWER GENERATION

Manifattura Guarnizioni Colombo has been involved for many years in the production of industrial engines and marine engineering. In particular we produce gaskets and sealing systems primarily for industrial diesel / gas engines and propulsion systems.
The issues that affect seals in this area are very complex and the skills, professionalism and expertise of a company like 'COLOMBO' are of critical importance in the analysis and solution of these challenging demands.
Our company has especially distinguished itself over the years as a reliable supplier to the world industry leading companies. Our products are used in a wide range of applications; in fact, industrial engines are usually installed on:

- Military, cruise line and commercial ships
- Stations generating power for residential, commercial and industrial consumption
- Power generators for large industrial plants
- Trains
- Offshore platforms

Applications

Diesel and gas **INDUSTRIAL ENGINES**
for marine applications and power generation

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

MARINE ENGINEERING
Auxiliary systems and devices

- 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

MARINE ENGINEERING
Propulsion systems

- 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

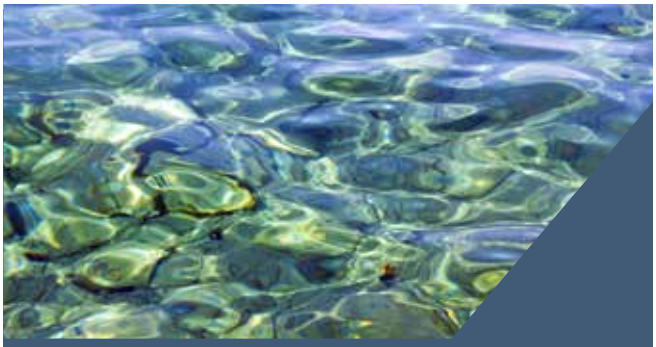
The use of new fuels, the evolution of injection systems, the development of turbochargers and all the structural modifications made to improve the performance of the engine, demand a quick adaptation of the seals. Lubricating oils, coolants, corrosion inhibitors and other fluids used in the mechanical 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

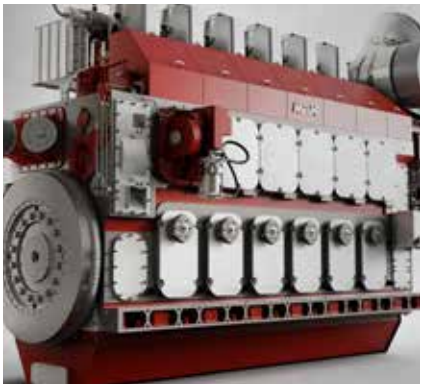
The main causes of industrial pollution of the seas are the result of discharge of toxic substances from manufacturing processes, from uncontrolled waste dumps and the negative impact of the infusion of high temperature water into the sea.

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.

Diesel and gas INDUSTRIAL ENGINES

for marine applications and power generation


Four-stroke industrial engine


Cylinder head

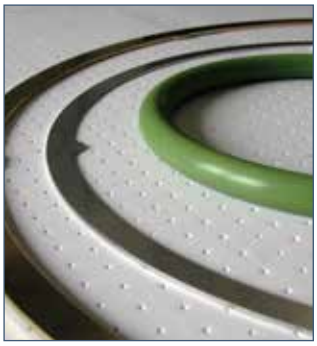

Cylinder liner

- 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

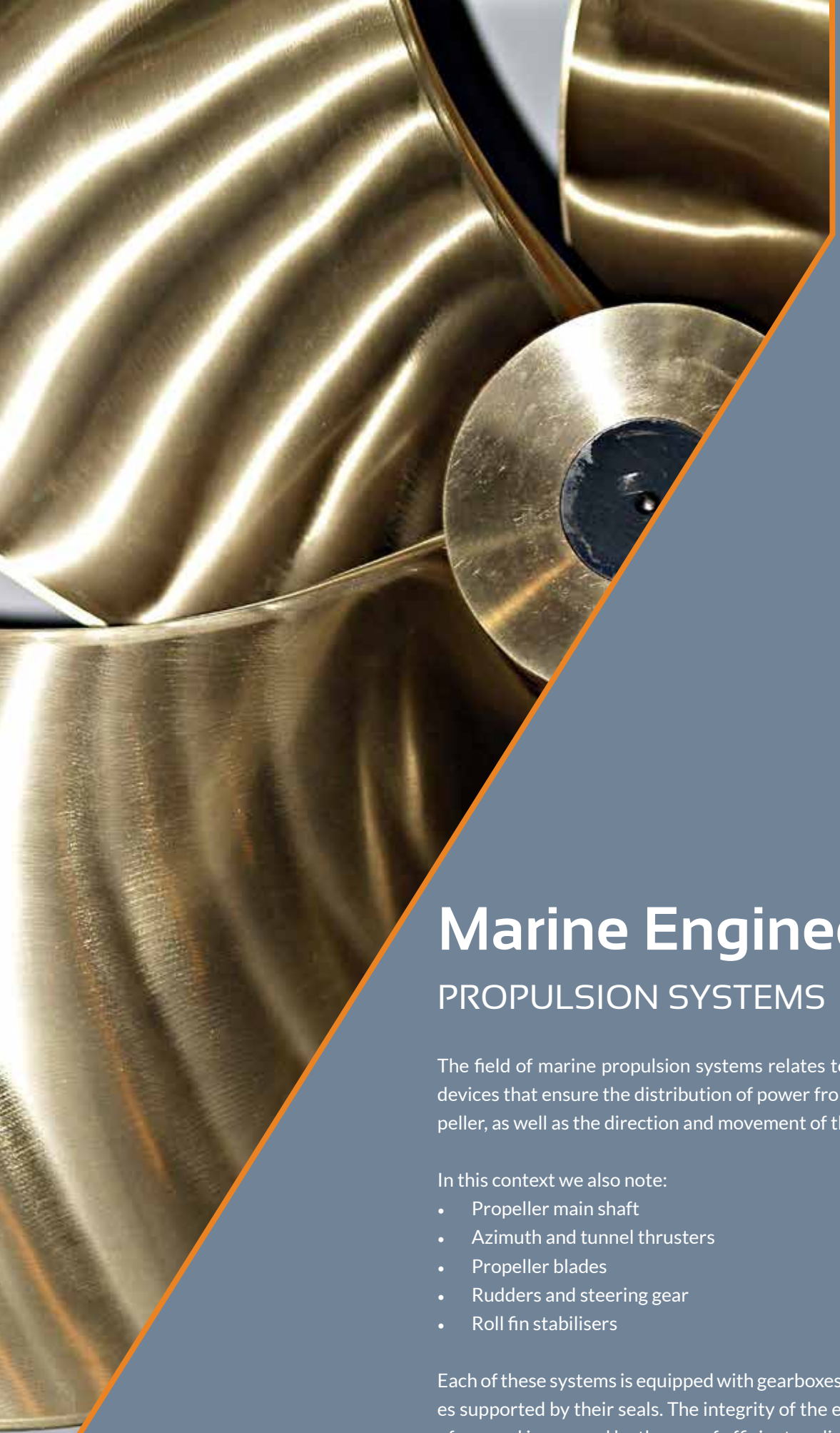
Exhaust gas piping

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.

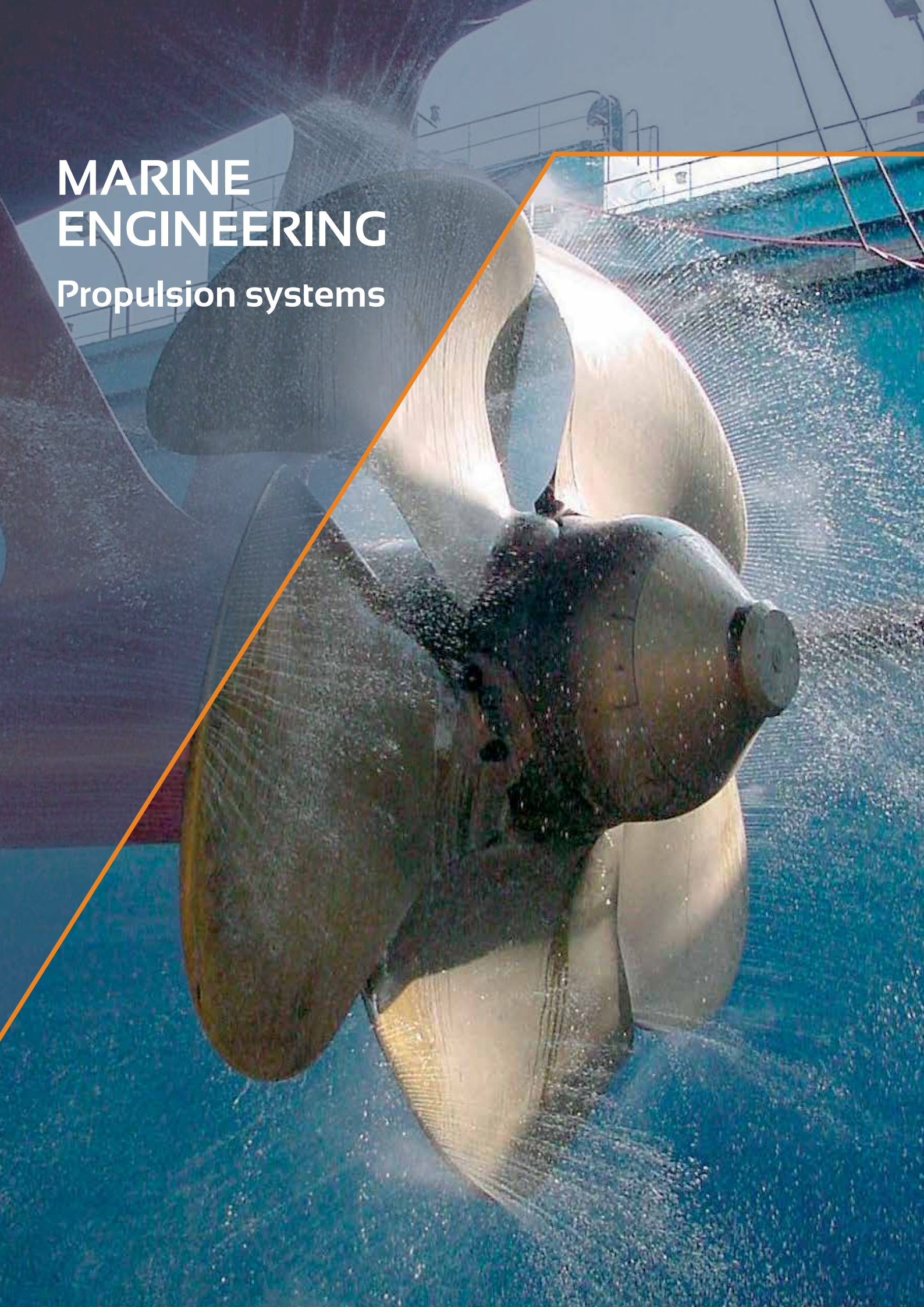
- **It is important to study specific profiles that ensure an airtight seal in the presence of**
- Strong eccentricity
- Resistance to fluid lubricants contained in bearings
- Resistance to contact with the outside environment, generally seawater.

NEW ENVIRONMENTAL REGULATIONS FOR PROPULSION SYSTEMS

On 19 December 2013 the law "Vessel General Permit (VGP)" came into effect. This provision stipulates that only biodegradable lubricants classified as having an environmental "low-impact", Environmental Acceptable Lubricants (EALs), must be used for the oil-seawater applications. Today the law covers all waters under US jurisdiction and all vessels with length greater than 79 feet.
All devices in contact with seawater, such as transmission shafts, propellers, roll fin stabilizers, rudders and rudder blades, Azimuth thrusters and related control devices, are affected by the new law.
These regulations have forced original equipment manufacturers to develop new special seals, with higher performance but also more expensive, providing high resistance to chemicals contained in biodegradable oils.
Colombo has developed in-house a range of materials that can successfully provide resistance to both organic oils and conventional lubricants.
For further information you should contact our technical department.

MARINE ENGINEERING

Propulsion systems



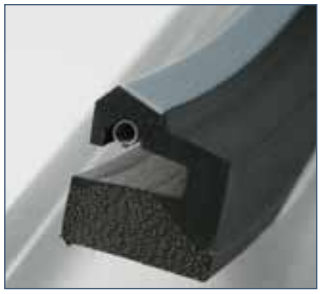
Propeller shaft

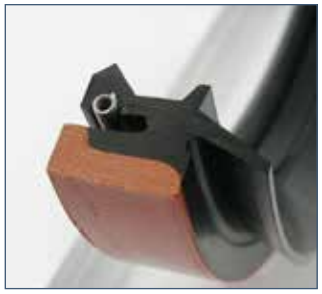
Propeller and steering gear

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

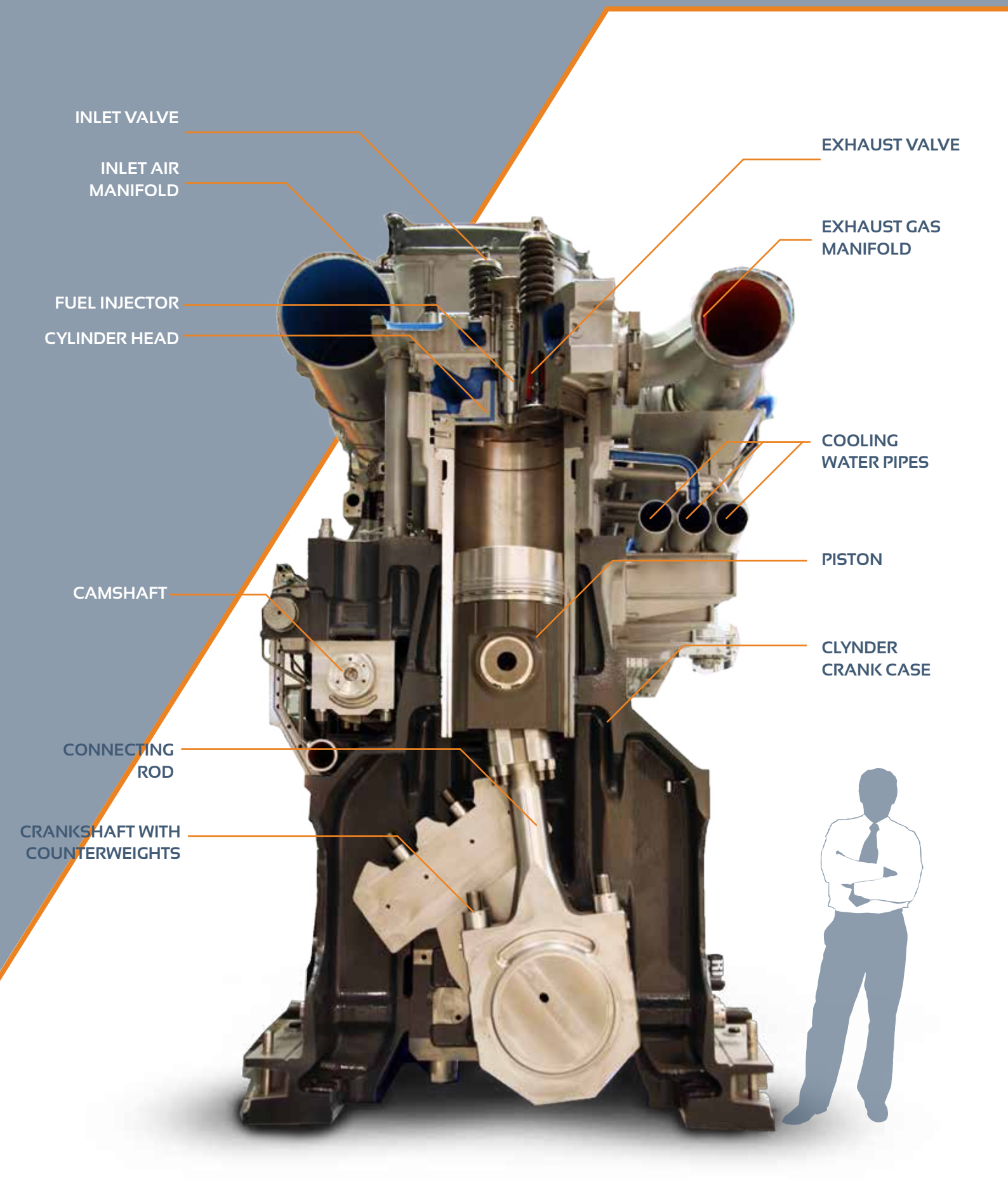
Products

- **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**

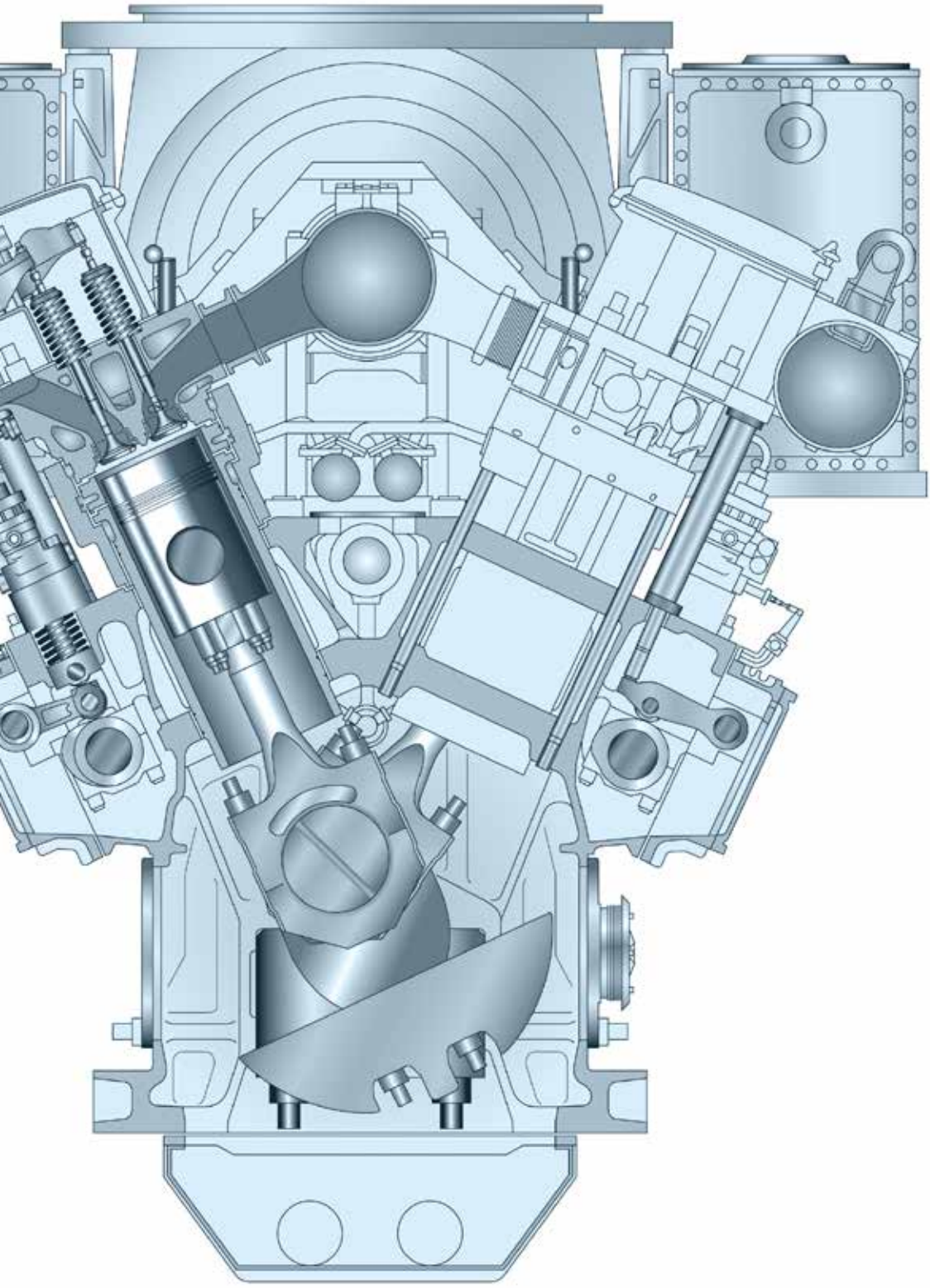


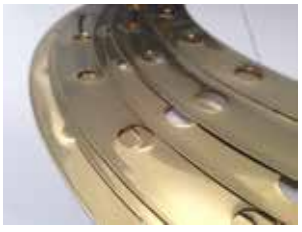


INDUSTRIAL ENGINES
Main Components



INDUSTRIAL ENGINES
Generic Four-Stroke Engine Diagram





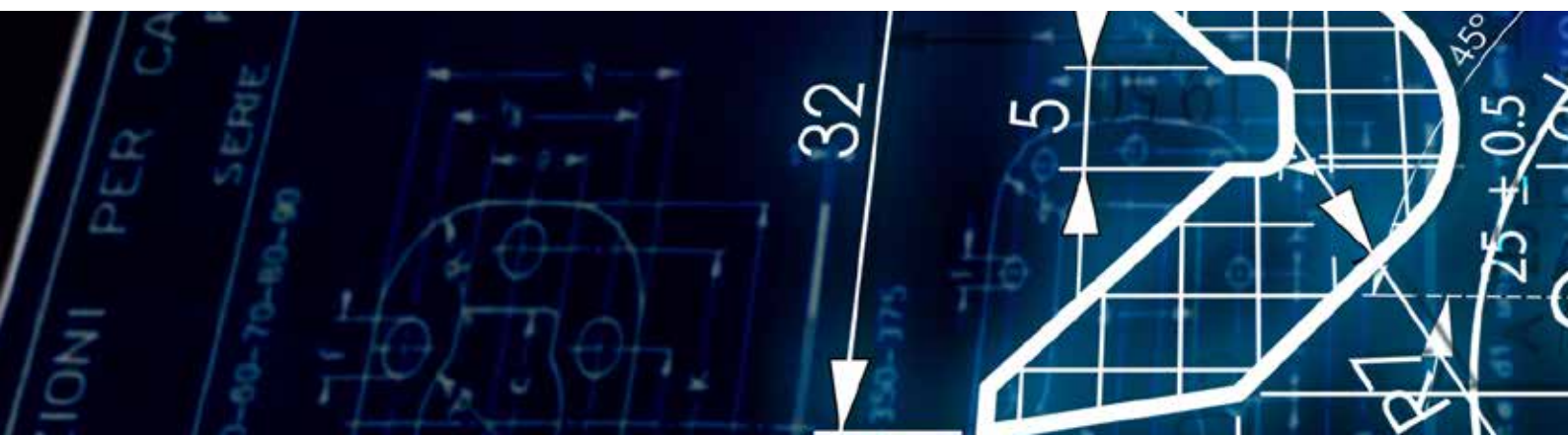
Quality

COLOMBO is an OEM supplier and is able to respond in a competent and professional manner through its own technical department to the various requests from engine manufacturers. Our staff is highly qualified and our manufacturing facility is able to satisfy the customer from samples to production.

The study phases of a seal, static or dynamic, are conducted through a partnership with the customer's technical department; it is important to agree on guidelines to build a project that involves analysis of a specific design, operating conditions, materials, required certifications, laboratory testing, validation testing, etc.

In special cases, and in agreement with the customer, COLOMBO relies on the collaboration of external accredited laboratories, engineering firms or university departments in the area.

Colombo is ISO 9001 2008 certified for the design of gaskets and seals for rotating shafts.



Production

The production department of the company includes:

- Technical offices whose task is to prepare drawings for items, moulds and equipment
- Manual and automatic trimming machines, automatic water-jet cutting machines and cutting machines with rotating blades
- Department for production of metal gaskets with automatic presses, machines for cutting metal plates and shaping profiles to obtain metal rings, spiral wound and metal jacketed gaskets
- In-house production of moulds with screw cutting lathes for diameters till Ø 1400 mm, CNC lathes and milling machines
- Production of rubber moulded items with injection and compression presses
- Production of cotton fabric NBR seals with compression presses
- Production of packings and braided packings
- Quality control department with sophisticated and certified analysis instruments.

The following raw and semi-finished materials are available in stock:

- Nbr, Hnbr, Fkm, Vmq, Epdm compounds
- Nbr, Fkm, Vmq, Epdm, Sbr sheets and rolls
- CAF sheets and rolls in a wide range of materials and dimensions
- Plates and sheets in PTFE, nylon and pvc
- Tubes, cords and sleeves in PTFE, PTFE+bronze, PTFE+carbon, PTFE+glass and PTFE+Glass Mos2
- Metal sheets in different dimensions in carbon steel, stainless steel, copper, brass and aluminum.

This wide range of raw materials and semi-finished products together with the large inventory of processing machines allows us to ensure a more timely delivery.

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GASKETS AND SEAL SOLUTIONS

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