Fincantieri has more than fifty years of experience in the design and manufacture of propellers. This long experience has resulted in the development of a wide range of propellers, from 1,3 up to 44 Mw, with a corresponding diameter from 1,5 up to 6,4 meters.

- Our propellers focus is on the performance to be matched in terms of propulsive efficiency in all operating conditions, cavitation behaviour, underwater noise emissions and induced vibrations.
- In order to satisfy all these design constraints, we custom design our propellers for each vessel, including: aircraft carriers, OPVs, IPVs, destroyers, frigates, auxiliary vessels, submarines and luxury yachts, assessing the particular features for each hull.

- Fincantieri controllable pitch propellers are 3, 4, 5 blades and they are 5 or 7 blades for the fixed pitch (built-up) propellers.

The Range of Fincantieri Propellers includes:
- Controllable pitch propellers (CPP)
- Featherable controllable pitch propellers (FCPP)
- Fixed pitch propellers (FPP)

- The Quality System implemented for the design and manufacturing of the Fincantieri Mechanical Products is certified with reference to ISO 9001 standard.
- Fincantieri Marine Systems has the know-how to offer an Integrated Platform Management System (IPMS) allowing the control and monitoring of:
  - Propulsion (Diesel Engines, Reduction Gears and Propulsion Auxiliaries)
  - Electric power generation and distribution
  - Ship ancillaries, Hull Systems, Damage Control

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Controllable and Fixed Pitch Propellers

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Fincantieri Marine Systems and Components
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fincantieri.com
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The technical advantages cannot be omitted: the built-up propellers, being the blades casted and machined separately and mounted on the boss through blade bolts, the operative advantages can be easily imagined: logistic benefits: the adoption of a built-up propeller allows to manage a cost effective store keeping of a number of spare blades that depends on the total emergency condition at sea without the use of any dry dock.

Maintenance: the time to substitute only the damaged blades is much lower in comparison with the monoblock emergency condition at sea without the use of any dry dock.

The management of the spare parts, their entity, the logistic support, material quality and hydrodynamic performances.

The HPU is always resilient mounted and designed to satisfy any shock loads. The HPU is always resilient mounted and designed to satisfy any shock loads. The high performances coupled together with the high reliability can offer to the Customer a propulsion system of the vessel by integrating:

- Power take-off system.
- Reduction gear.
- Main engine.
- Shafting and accessories.

The propeller pitch is set by means of the hydraulic oil pressurised control mechanism passing through the shaft-lines. This control of the pitch is achieved by means of a piston rod configuration in order to select always the most appropriate solution.

In the high range of power (above 1500 kW) we use a centralized oil system which is divided in two independent pipe circuits which are inter-connected through a central lube oil storage tank and a dedicated HPU, being the oil system totally independent from any other oil system of the vessel.

In the low range of hub size and power (up to 1500 kW) and weight and is oil-free in the water immersed components. The propeller pitch is set by means of the hydraulic oil pressurised control system optimized for the application and interfaced with ship automation system.

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The use of separate blades allows to get other advantages already mentioned difficult to cast. Materials are used (low magnetic, high damping ones,…), which are very the procedure used for a monoblock type especially if non conventional holes interested by the blade bolts with proper material.

At boss level the hydrodynamic performances are guaranteed by filling the blade.

Becomes important especially for the tolerances in the gap between each machining tolerances with respect to the monoblock ones; this aspect the technical advantages cannot be omitted: the built-up propellers, this kind of propeller to lower global costs.

Monoblock type, the management of the spare parts, their entity, the considering a higher initial cost of the propeller itself with respect to a applications are able to offer important advantages in terms of maintenance, shock loads.

Maintenance: the time to substitute only the damaged propeller: the substitution can be also performed in emergency condition at sea without the use of any dry dock.

...
The use of separate blades allows to get other advantages already mentioned: materials are used (low magnetic, high damping ones, ...), which are very interesting by the blade bolts with proper material. Being the blades casted and machined separately and mounted on the monoblock type, the management of the spare parts, their entity, the possibility to perform a quicker and easier corrective maintenance brings a lower global costs. The high range of power of a monoblock propeller can be achieved only because the high frequency of the blades are interacting with the small holes coming from the particular features for each hull. In order to satisfy all these design constraints we custom design our products focus is on the performance to be matched in terms of propulsive efficiency in all operating conditions, cavitation behaviour, underwater noise emissions and induced vibrations.

Fincantieri acts as design authority for the entire propulsion system of any kind of non-nuclear Naval vessels. Fincantieri references as propulsion system integrator include the following vessels:

- Vessel Type Inst. Power
  - Destroyers and frigates 22 4,8
  - Aircraft carriers 44 6,4
  - Coastguard patrol vessels 5 1,5
  - Freighter 60 9,4
  - Cruise ships (mega yachts) 2 9,6
  - High-speed passenger ferries 1 2,3
  - Inland vessels 3 0,8
  - Offshore vessels 9 2,8
  - Tugs 2 1,5
  - Contracts, including long range applications.

Fincantieri Marine Systems is able to design and tailor a complete Propulsion System based on Customer requirements. Thanks to the wide experience on the complete line of Naval vessels, Fincantieri Marine Systems can offer to the Customer a propulsion system of the vessel by integrating:

- Main engines
  - FPP Type
  - CPP Type

The complete system is completed by a Drive and RCL based automation system, together with high quality electro-hydraulic components. Fincantieri Marine Systems, in cooperation with leading international manufacturers, provides a high level of components for the Drive and RCL system and all the necessary user interface with the ship automation system.

The additional technical advantages stand in the following:• All the driving and control systems are integrated within a single system, allowing for an overall control of the propulsion system. The main and all the accessory systems are integrated with each other in a single system, allowing for a single control of the propulsion system.
• The high level of power to the propeller's hub with very accurate distribution box through internal oil pipes passing inside the engine creates a system with the hydraulic piston contained in the engine. There are reduced risks of pollution at sea. In the low range of hub size and power (up to 1500 kW) and includes, among others, the configurations that we have designed for products of very low weight and is oil-free in the water immersed components. The solution for low power range has the advantage of reduced cost and weight and is oil-free in the water immersed components.
• The high performances coupled together with the high reliability and low maintenance of Fincantieri Marine Systems propellers is the consequence of a design, production and commissioning research institutes, full scale measurements and CFD simulations carried-out in co-operation with reputed model test facilities and state of the art computer aided design (e.g. FEM) for structural strength of the blades both in terms of design load and of fatigue state. Accurate hydrodynamic design based on model test campaigns and numerical control machining at Fincantieri Marine Systems use the latest technology in the field of design and manufacture of propellers and accessories. The high performances coupled together with the high reliability and low maintenance of Fincantieri Marine Systems propellers is the consequence of a design, production and commissioning research institutes, full scale measurements and CFD simulations carried-out in co-operation with reputed model test facilities and state of the art computer aided design (e.g. FEM) for structural strength of the blades both in terms of design load and of fatigue state. Accurate hydrodynamic design based on model test campaigns and numerical control machining at Fincantieri Marine Systems use the latest technology in the field of design and manufacture of propellers and accessories.

4 Blades Fixed Pitch Propellers

<table>
<thead>
<tr>
<th>Model</th>
<th>Hub Diam. (mm)</th>
<th>Propeller Diam. (mm)</th>
<th>Max Power (kW)</th>
<th>Piston Rod</th>
<th>Main engines</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPC 4S 05 N</td>
<td>500</td>
<td>2,300</td>
<td>1,500</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HPC 4S 06 N</td>
<td>600</td>
<td>2,750</td>
<td>1,950</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HPC 4S 07 N</td>
<td>720</td>
<td>2,300</td>
<td>2,400</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HPC 5S 08 N</td>
<td>800</td>
<td>2,950</td>
<td>2,950</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HPC 5S 09 N</td>
<td>900</td>
<td>3,500</td>
<td>3,500</td>
<td>-</td>
<td>-</td>
</tr>
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<td>600</td>
<td>2,750</td>
<td>1,950</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HPC 5S 05 N</td>
<td>500</td>
<td>2,300</td>
<td>1,500</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

4 Blades Controllable Pitch Propellers

<table>
<thead>
<tr>
<th>Model</th>
<th>Hub Diam. (mm)</th>
<th>Propeller Diam. (mm)</th>
<th>Max Power (kW)</th>
<th>Piston Rod</th>
<th>Main engines</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPC 4S 05 N</td>
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<td>2,300</td>
<td>1,500</td>
<td>-</td>
<td>-</td>
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<tr>
<td>HPC 4S 06 N</td>
<td>600</td>
<td>2,750</td>
<td>1,950</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HPC 4S 07 N</td>
<td>720</td>
<td>2,300</td>
<td>2,400</td>
<td>-</td>
<td>-</td>
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<tr>
<td>HPC 5S 08 N</td>
<td>800</td>
<td>2,950</td>
<td>2,950</td>
<td>-</td>
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<tr>
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<td>900</td>
<td>3,500</td>
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<td>500</td>
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The use of separate blades allows to get other advantages already mentioned difficult to cast. Moreover the quality achievable by casting separate blades is better than holes interested by the blade bolts with proper material.

Therefore the higher precision obtained guarantees lower underwater noise blade.

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— The built-up propellers for submarine and oceanographic ship

— Fixed pitch propellers
— Controllable pitch propellers

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<tr>
<th>Model</th>
<th>Hub Diam. (mm)</th>
<th>Max Power (kW)</th>
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</thead>
<tbody>
<tr>
<td>HPR 7S 405</td>
<td>1.050</td>
<td>3.600</td>
</tr>
<tr>
<td>HPC 4S 07 N 720</td>
<td>2.350</td>
<td>2.300</td>
</tr>
<tr>
<td>HPC 4S 05 N 500</td>
<td>2.300</td>
<td>1.500</td>
</tr>
<tr>
<td>HPC 5S 20 N</td>
<td>1.990</td>
<td>44.000</td>
</tr>
<tr>
<td>HPC 5S 07</td>
<td>720</td>
<td>2.350</td>
</tr>
<tr>
<td>HPC 4S 06 N</td>
<td>2.750</td>
<td>1.950</td>
</tr>
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</table>

The complete system is controlled by a dedoted PLC based automation system. The propulsion CP propellers, combined with dedicated hydraulic and mechanical system, produces a high performance propulsion solution for each specific application. The hydraulic system is designed and built using all the technology of Fincantieri Marine Systems and comply with the ASME and EN standards. The electric power take-off is designed and manufactured by a dedicated supplier for each specific application. The complete system is controlled by a dedicated PLC based automation system with the following functionalities and services:

- Digital control system optimized for the application and interfaced with the ship automation system.
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Propellers System

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- Fixed pitch propellers (FPP)
- Bridge Console
- Remote control panel
- Engine
- Engine telegraph
- Control lever
- Engineers alarms and call system
- Main Redundant Network
- Local Automation Unit
- Diesel Engine
- Gearbox
- Propeller
- Diesel Generators
- Main switchboard
- Diesel Generators room
- Auxiliary systems
- Sensor and actuators
- Bridge

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