



The waterjet drive is currently considered the most important innovation, ever, in marine propulsion systems.

The waterjet drive has gained acceptance as the leading means of propulsion for all types of high-speed crafts, ferries, workboats, patrol boats, landing crafts and the like. It is also reputed to be essential on many small vessels such as crew boats, tenders, S.A.R. boats, personal water craft and so on.

Ride on a modern waterjet powered boat and feel the notable difference with propellers: higher speed, faster acceleration, shallow water capability, great manoeuvrability and absence of vibration. In addition, the lower maintenance, longer engine life and advantages over propellers, (with their engine overloading, exposure to damage and danger for people in the water), are all indisputable.



Castoldi pioneered the development of its revolutionary system in the early 1960s using facilities which were sophisticated and extraordinary for those times and which are still rare today such as the laboratory boat, equipped with special instruments for checking the net dynamic thrusts of the waterjet drive and the water impeller tunnel to test and determine the best impeller geometry in terms of efficiency and cavitation margin.

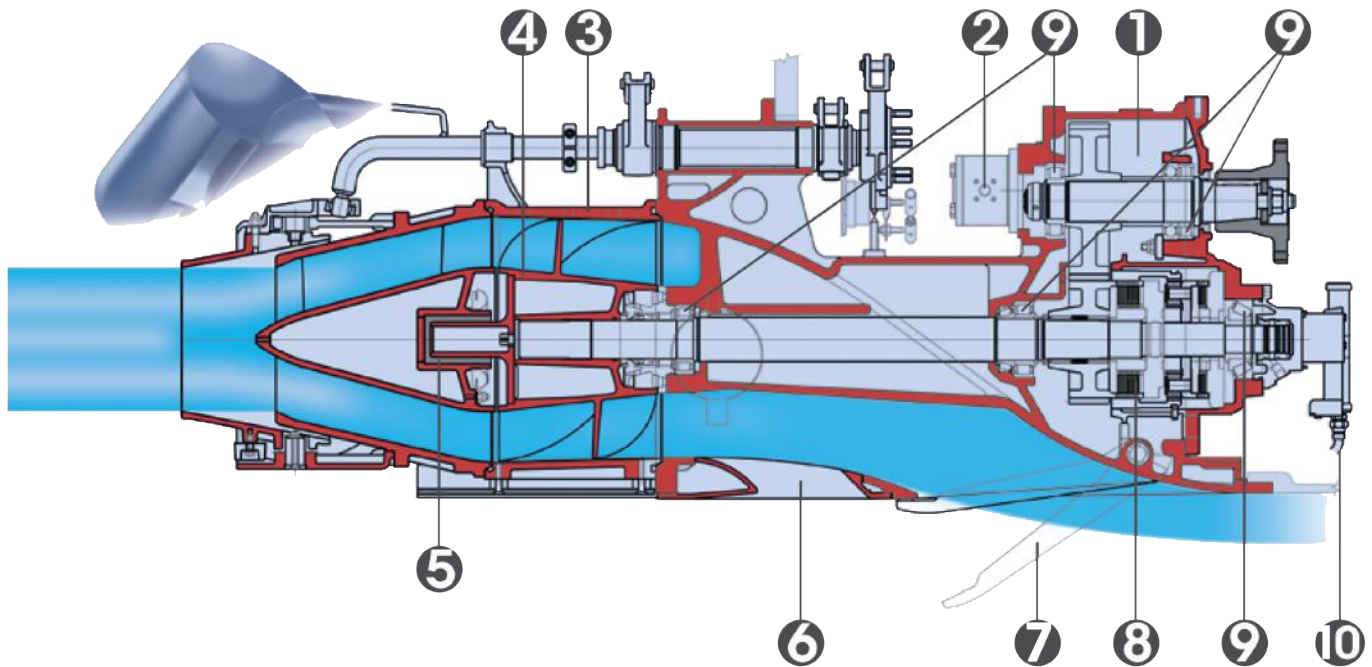
Presently the Company owns several laboratory boats which are used for testing each new waterjet model.

Since beginning this activity in 1962, more than 40,000 units have been delivered worldwide, and installed on various types of military, commercial and pleasure vessels.

The Castoldi Company has ISO 9001 certification, and all waterjet models comply with the requirements of the major Classification Registers such as ABS, BV, DNV, RINA, RMRS and RRR. However, the challenge is never-ending; the waterjet design, range of models and control types are continuously being improved. This is possible through the work of the in-house R&D department, conducted by experienced engineers, using the latest software, working closely with a University, with the most sophisticated calculation tools.

## CASTOLDI UNIQUE WATERJET DRIVE

So different from all the competitors on the market, due to its many advanced exclusive features. Much more than a simple pump, it is a complete, integrated marine propulsion system.



**1 INTEGRATED GEARBOX WITH HYDRAULIC MULTI-DISC CLUTCH**

The integrated gearbox with its wide range of transmission ratio options (No. 17 to N. 25 depending on the waterjet drive model) is the ultimate solution for engine coupling system with multiple advantages at one stroke:

- A very fine r.p.m. matching for every selected engine. This means full power absorption without over or under-loading the engine regardless of boat speed, resulting in extended engine life.
- Less weight. The integrated Castoldi gearbox is very light and simple as it is contained in the waterjet casing. It does not require an oil heat exchanger because its lubrication oil is cooled through the waterjet's surface contact with the surrounding water. Therefore, the propulsion system weight is lower, compared to that of competitors, where marine transmissions must be added to the engine.
- The use of a single unique stainless steel cast impeller, designed with the best geometry ever tested, without the constraints of having to modify it for adaptation to the engine. The impeller has optimized efficiency and cavitation resistance under any operating conditions and meets high standards of quality production processes.
- The lifting of the jet input flange allows for a shorter and better-aligned cardan shaft without the need to trim the unit, allowing a drastic reduction in the engine room length. This is a clear advantage, given that long transmissions and forward engine installations may reduce the top speed due to moving the boat's centre of gravity forward.

- The lowering of the impeller shaft and, consequently the centre of thrust, results in better manoeuvrability and boat running stability; moreover this allows the design of a flat, straight duct enabling the water stream to flow smoothly with minimum hydrodynamic losses at high speed.

**2 HYDRAULIC PUMP**

Directly splined to the input shaft, thus avoiding any vulnerable belts.

**3 TITANIUM IMPELLER HOUSING LINER (STANDARD ON LARGE MODELS).**

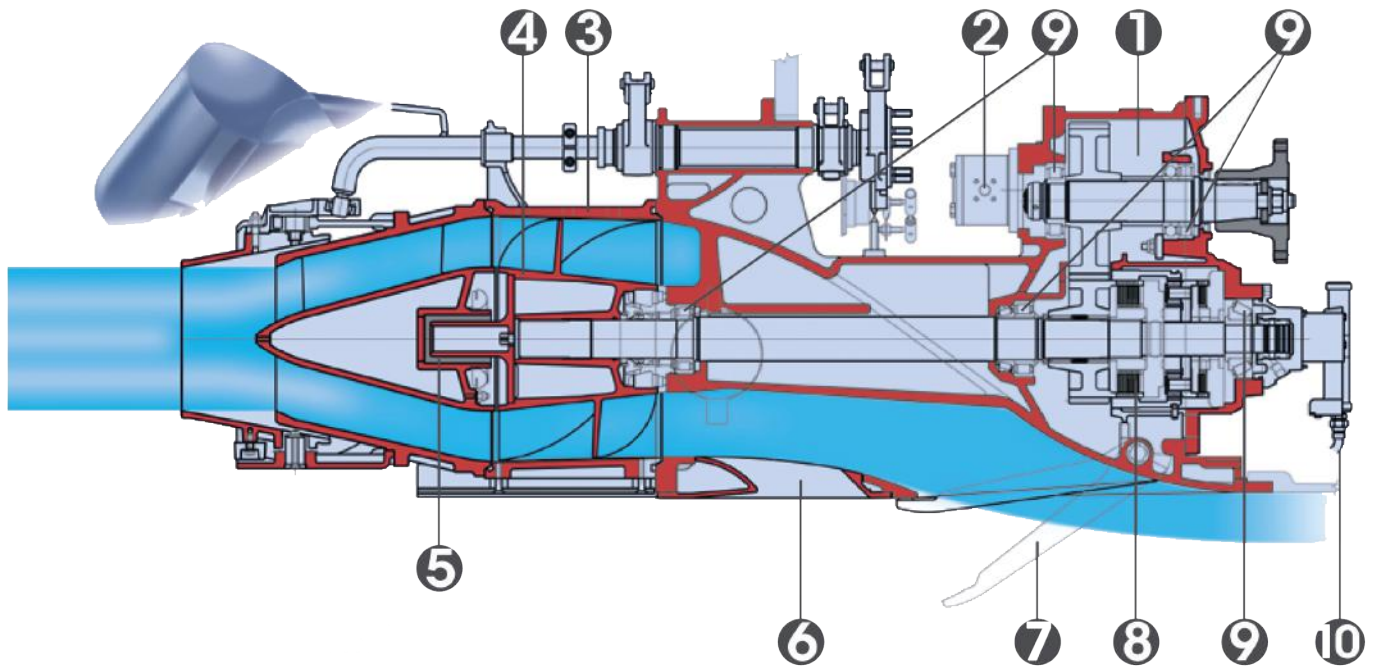
Best resistance to marine corrosion and wear, for the longest operational life.

**4 IMPELLER**

The Castoldi impeller is a true axial inducer type design and is recognized as having the best efficiency, cavitation resistance and lowest weight compared to any other type of pump.

It operates on a volume system with high flow rate and low pressure.

Because of its volume design, increased blade tip clearance due to wear, does not significantly compromise its efficiency. This can be contrasted to what happens to mixed flow impellers, operating with low flow rate and high pressure, which are much more vulnerable to this type of clearance issue, leading to fast and dramatic speed loss.



**5 IMPELLER VIBRATION RUBBER DAMPER**

This item damps vibrations if any transitory cavitation occurs at the impeller. Because this device has no shaft bearing function, it can withstand a large degree of wear without affecting the waterjet's integrity.

**6 B.P.R (OPTIONAL)**

This unique patented device provides an auxiliary water flow by-pass to the main water intake allowing an increase in the power operational range and thrust on low speed heavy boats, as well as a take-off improvement for middle speed heavy boats. It never affects full speed efficiency and can easily be retrofitted.

**7 MOVABLE PROTECTION GRID ON WATER INTAKE**

The inlet grid protects the water intake from the suction of floating debris. It performs self-cleaning operations by rejecting the same through the shift opening of the flush mounted hydrodynamically profiled set of bars. The helmsman can activate the system, when the pressure gauge indicates a pressure drop in the waterjet duct.

**8 CLEAR-DUCT SUPERIOR ANTI-CLOGGING SYSTEM (OPTIONAL)**

The waterjet duct and intake cleaning system are as-

sured through the synchronized simultaneous electrically controlled operations of impeller rotation reversing and the intake grid opening. This generates a back flushing, which is ejected through the water intake without any obstruction caused by the grid bars. The whole operation is feasible using special parts, all included in the Castoldi integrated gearbox.

**9 ALL BEARINGS OIL LUBRICATED**

All the bearings are lubricated by the same gearbox oil. They never come into contact with seawater and are sized for several thousand hours of life.

**10 OIL LEVEL TRANSDUCER (STANDARD AND AVAILABLE ONLY ON LARGE MODELS)**

The oil level transducer allows for remote level control.

**FULL PROTECTION AGAINST MARINE CORROSION**

The whole unit is protected by a hard anodizing treatment, plating all light-alloy components with 60 microns thickness of aluminum oxide (ceramic), three layers of special paint and cathodic protection by zinc anodes.

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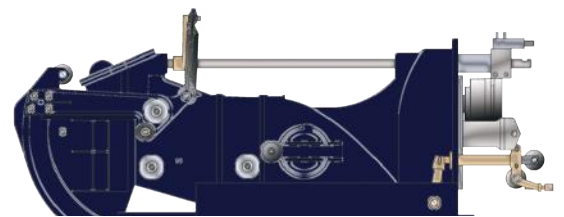


**APPLICATIONS**



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**TURBODRIVE 238**



| Impeller<br>Ø (mm) /<br>Material        | Weight<br>kg | Impeller<br>Housing<br>Material | Clutch     | Movable<br>Debris<br>Screen<br>Grid | Integrated<br>Gearbox<br>Ratios<br>Number | Available Controls                                       | FAST BOATS                   |                         |  |              | SLOW<br>BOATS                      |
|---|--------------|---------------------------------|------------|-------------------------------------|---|--|------------------------------|-------------------------|--|--------------|------------------------------------|
|   |              |                                 |            |                                     |   |  | Max Power Input<br>HP - (KW) |                         | Max. Recom-<br>mended Displace-<br>ment (Tons) |              | Max<br>Power<br>Input<br>HP - (KW) |
|   |              |                                 |            |                                     |   |  | Intermit-<br>tent Duty       | Conti-<br>nuous<br>Duty | Single<br>Jet                                  | Twin<br>Jets |                                    |
| 238 /<br>AISI 316<br>STAINLESS<br>STEEL | 123          | AISI 316<br>STAINLESS<br>STEEL  | Mechanical | Mechani-<br>cal                     | 25  | Mechanical<br>Mechanical/Hydraulic<br>Electric/Hydraulic | 238 - (175)                  | 170 - (125)             | 1.5  | 3.7          | 75 - (55)                          |