

PROFJORD

Innovative Technology for Speed at Sea



Advanced Appendage Design

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When designing high performance marine crafts such as high speed workboats, motor yachts or large offshore patrol vessels, the details are essential. Problems related to sea chest inlets, exhaust outlets or other appendages often lead to a significant increase in project cost and lead time. PROFJORD offers their customers advanced design solutions to ensure performance and secure quality.

Sea Chest Inlet Design

- **High speed capacity**
- **Cavitation free**
- **Low noise**
- **Minimum drag**
- **Minimum wake**
- **No protruding parts**

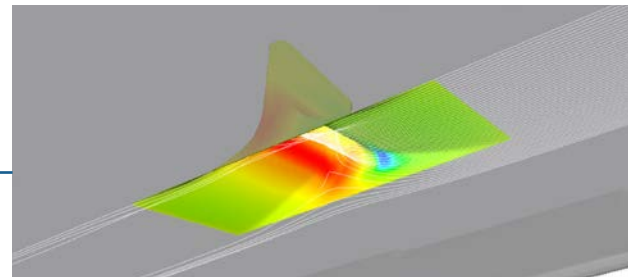
In 2003 PROFJORD performed an extensive investigation in a project that required a sea chest that could operate at 70 knots with minimum wake and no cavitation. Optimization was done using unique adopted CFD-code (Computational Fluid Dynamics) and the final design was verified through model tests. The final product was proved to operate outstanding in speeds even exceeding 70 knots. Furthermore it was found that the design could be applied for all high performance water crafts with excellent results. PROFJORD's sea chests also works well if even when positioned just forward of the waterjet inlets due to the minimum wake generated.

Since 2003 PROFJORD have close to 100 sea chest inlet designs in operation and references ranges from high performance sail yachts to ultra-high speed vessels.

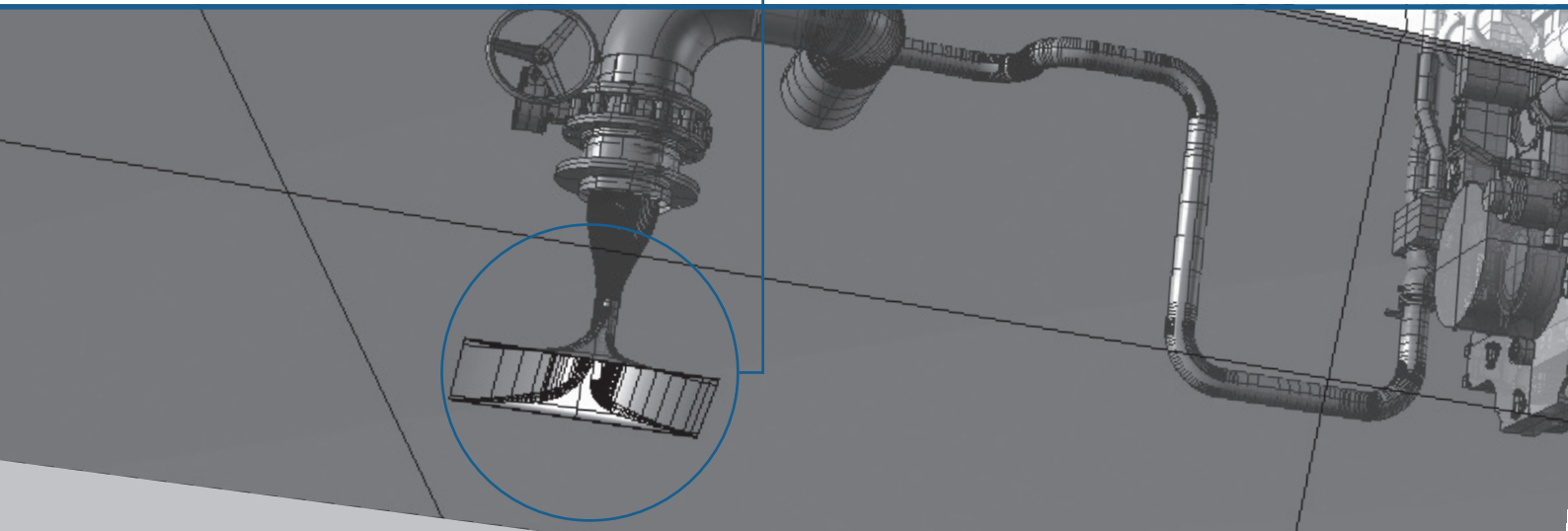
Workflow

For the design, input data such as cooling water flow rate at zero speed and full vessel speed as well as preferred position of the sea chest inlet are required.

With these inputs, simulations can be performed in order to determine optimal size and geometry of the sea chest inlet design. As a second step the PROFJORD in-house CFD software is applied to verify the high speed performance.



3D CFD image which illustrates how the PROFJORD sea chest works. In the picture shown, direction of the water flow and pressure distribution can be seen from right to left.



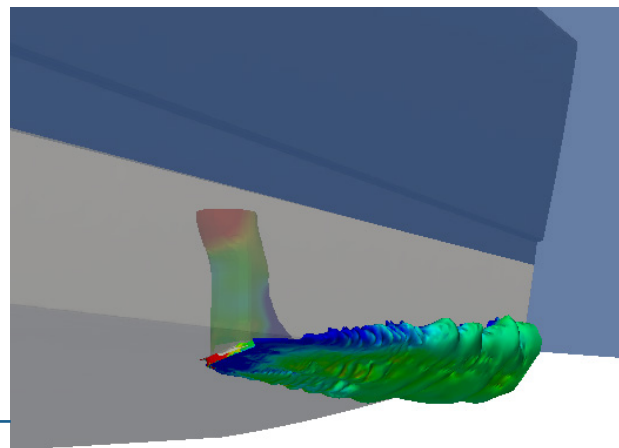
Underwater Exhausts Outlet Design

- **Controlled exhaust back pressure**
- **Reduced noise**
- **Low drag**
- **No protruding parts**
- **Small dimensions**

PROFJORD has worked many years with underwater exhaust outlets together with shipyards and boat builders to find best possible design for specific projects. With help of advanced two phase flow CFD-calculations (Computational Fluid Dynamics) PROFJORD has developed a method to design an underwater exhaust outlet based on a variety of customer requirements. Focus can be on achieving the right back pressure or having an outlet design with smallest possible dimensions or lowest noise.

The design of the exhaust scoop is of high importance. It is not uncommon that the scoop is oversized in relation to overall design and engine requirements which will not only create excessive drag but also potential problems like pulsation and too low engine exhaust back pressure. Therefore, PROFJORD puts extra effort in the design of the scoop so that correct back pressure and minimum drag is attained.

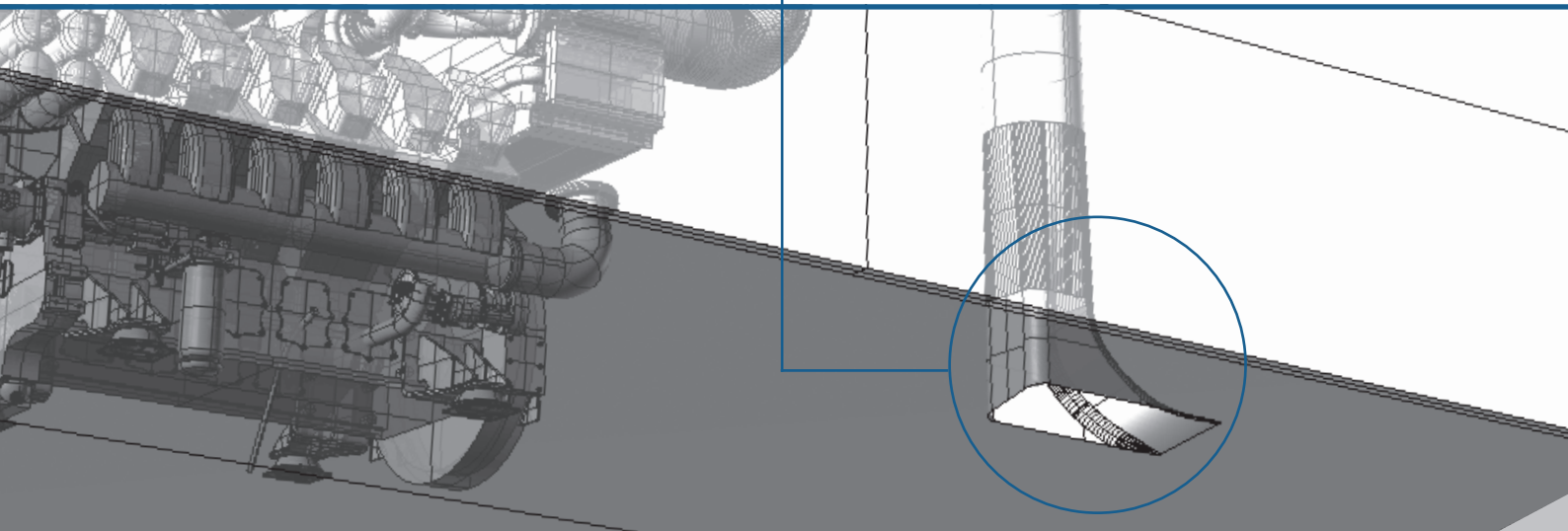
Since the design is customized for each specific vessel, PROFJORD's underwater exhaust outlet can be suitable for a wide range of vessels and the design has been proven on large military OPV's as well as on several high performance motor yachts.



3D CFD image which illustrates the principle of the PROFJORD exhaust outlet. In the picture it can be seen how the exhaust gases mixes with the water towards the transom.

Workflow

Information needed for the exhaust outlet design are engine exhaust volume, exhaust temperature, preferred position of outlet and the typical operating speed of the vessel. With these inputs the exhaust outlet geometry is customized for the specific vessel. Analyses with in-house CFD software will be made to ensure the high speed performance.





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Grimboåsen 16, SE-417 49 Gothenburg, Sweden

Tel: +46 31 779 08 18 Fax: +46 31 744 35 73

info@profjord.se www.profjord.se