Exactly on course
Marine products and services
The right propulsion system for every situation

Be it out at sea or in port, on rivers or lakes: Voith’s custom-tailored propulsion systems ensure precise, prompt and safe maneuvering. Our propulsion solutions are specifically designed for all maritime tasks and requirements.

propulsion system technology is key to operate vessels efficiently and with a high degree of safety. Matching the propulsion system to the vessel design is equally important. With more than 90 years of experience, Voith provides both: Propulsion systems tailored to the application in question and vessel concepts.

In addition to the proven Voith Schneider Propeller (VSP) with its stepless, precise and prompt generation of thrust in all directions, the Voith Inline Thrusters (VIT) and Voith Inline Propulsors (VIP) are used as propulsion systems or thrusters. The Voith Linear Jet (VLJ) combines the best properties of propellers with the best properties of waterjets. Voith offers a customized service package accompanying the customer throughout the entire product lifecycle.
Our target applications: Offshore, Tugs, Ferries, Navy, Yachts, Cruise

<table>
<thead>
<tr>
<th></th>
<th>Voith Schneider Propeller</th>
<th>Voith Inline Thruster / Propulsor</th>
<th>Voith Linear Jet</th>
<th>Voith Electronic Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Tugs</td>
<td>•</td>
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<td>•</td>
<td>•</td>
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<tr>
<td>Ferries</td>
<td>•</td>
<td>•</td>
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<td>Navy</td>
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<td>Yachts</td>
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<tr>
<td>Cruise</td>
<td></td>
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</tbody>
</table>
Voith Schneider Propeller

Propulsion and steering – ahead, astern and sideways: The Voith Schneider Propeller (VSP) developed more than 90 years ago generates thrust in all directions. Propulsion and steering are combined in one unit, thus allowing prompt, safe and precise maneuvering, even under adverse conditions. An additional feature: Voith roll stabilization (VRS).
Successful worldwide
The VSP is suitable for a wide range of applications – from harbor tugs to offshore supply vessels. And it has been operating successfully in all these applications for decades. The VSP is distinguished by its high reliability and low maintenance requirements. Its minimum power demand translates into low fuel consumption while at the same time maximizing safety for the vessel.

The VSP principle is strikingly simple and fascinating at the same time: A rotor casing fitted with four, five or six propeller blades rotates about a vertical axis. As is the case with the tail fin of a dolphin, a superimposed oscillating motion of the blades around their own axis generates thrust. The magnitude of thrust is determined either by the rotational speed of the rotor casing or the amplitude of the blade angle oscillation. The direction of thrust is controlled by the phase of this oscillation.

Longitudinal section of a VSP

1 Rotor casing
2 Blade
3 Kinematics
4 Thrust plate
5 Roller bearing
6 Propeller housing
7 Reduction gear
8 Bevel gear
9 Driving sleeve
10 Control rod
11 Servo motor
12 Gear pump
13 Control shaft
14 Indicator plate

Rotating parts
Steering parts
# VSP sizes

<table>
<thead>
<tr>
<th>Propeller type / size</th>
<th>Control system ME / ECA *</th>
<th>Control system EC **</th>
<th>VRS *** option</th>
<th>Blade orbit diameter A [mm]</th>
<th>Blade length B **** [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>x</td>
<td></td>
<td></td>
<td>1 200</td>
<td>912</td>
</tr>
<tr>
<td>16</td>
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<td></td>
<td></td>
<td>1 600</td>
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<tr>
<td>18</td>
<td>x</td>
<td></td>
<td></td>
<td>1 800</td>
<td>1 512</td>
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<tr>
<td>21</td>
<td>x</td>
<td></td>
<td></td>
<td>2 100</td>
<td>1 766</td>
</tr>
<tr>
<td>26</td>
<td>x</td>
<td></td>
<td></td>
<td>2 600</td>
<td>1 965</td>
</tr>
<tr>
<td>28</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>2 800</td>
<td>2 355</td>
</tr>
<tr>
<td>30</td>
<td>x</td>
<td></td>
<td></td>
<td>3 000</td>
<td>2 666</td>
</tr>
<tr>
<td>31</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>3 100</td>
<td>2 666</td>
</tr>
<tr>
<td>32</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>3 200</td>
<td>2 666</td>
</tr>
<tr>
<td>36</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>3 600</td>
<td>2 872</td>
</tr>
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</table>

![Diagram of VSP sizes](image-url)
<table>
<thead>
<tr>
<th>VSP sizes</th>
<th>Control system</th>
<th>ME / ECA *</th>
<th>Control system</th>
<th>EC **</th>
<th>VRS ***</th>
<th>option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propeller type</td>
<td>number of gear steps</td>
<td>Weight without oil [kg]</td>
<td>Oil filling [l]</td>
<td>Max. propeller input power [kW]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 x 1200</td>
<td>1</td>
<td>3800</td>
<td>380</td>
<td>260</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 x 1600</td>
<td>1</td>
<td>6700</td>
<td>680</td>
<td>540</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 x 1800</td>
<td>1 or 2</td>
<td>9500</td>
<td>1000</td>
<td>780</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 x 2100</td>
<td>2</td>
<td>16000</td>
<td>1600</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 x 2600</td>
<td>2</td>
<td>27500</td>
<td>2700</td>
<td>1500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 x 2800</td>
<td>2</td>
<td>38500</td>
<td>4300</td>
<td>2000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 x 3000</td>
<td>2</td>
<td>47000</td>
<td>4000</td>
<td>2450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 x 3100</td>
<td>2</td>
<td>48000</td>
<td>4000</td>
<td>2500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 x 3200</td>
<td>2</td>
<td>50000</td>
<td>5200</td>
<td>2600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 x 3600</td>
<td>2</td>
<td>75000</td>
<td>7700</td>
<td>3900</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Input speeds can be adapted to all common diesel and electric motor rpm either by internal gearbox (2-gear-step VSP) and/or by intermediate gearbox (single-gear-step VSP).

* Either mechanical or add-on electronic control system possible
** Electronic control system
*** Voith roll stabilization
**** Maximum blade length (can be shortened)
Voith Inline Thruster and Voith Inline Propulsor

Minimum vibration and noise emission, prompt steering response and efficient thrust generation – these were the targets set by Voith for the development of a new propulsion system. The results are the Voith Inline Truster (VIT) and Voith Inline Propulsor (VIP) rim drive systems. The VIT is the ideal transverse thruster for use in the bow or stern. It significantly improves the vessel’s maneuvering. Together with a rotatable nozzle, the VIP SO AZI is designed for swing-out and azimuthing capability through 360°.

Prompt, efficient, silent
VIT and VIP require neither axes nor shafts or gearing. The propeller blades made of carbon-fiber-reinforced polymer (CFRP) are attached to the inner side of the motor. The motor transfers a large torque without transmission losses. The unit is cooled by seawater, therefore an additional cooling system is not required. Thanks to the sea-water-lubricated radial and axial bearings, the motor is completely maintenance-free.

With an optional swing-out unit, the VIT-SO can be extended from the vessel hull when needed. In addition the VIT-SO AZI can azimuthing through 360° in its end position.
VIPs and VITs can either be used as auxiliary propulsion systems or transverse thrusters. Voith can offer the entire system: tunnel, grids, flowparts and the power and control electronics incl. frequency converter.

### Product range Voith Inline Thruster (VIT)

<table>
<thead>
<tr>
<th>Type</th>
<th>Power [kW]</th>
<th>Propeller diameter A [mm]</th>
<th>Propeller diameter B [mm]</th>
<th>Width C [mm]</th>
<th>Weight* [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIT 380-50</td>
<td>50</td>
<td>380</td>
<td>560</td>
<td>280</td>
<td>165</td>
</tr>
<tr>
<td>VIT 550-110</td>
<td>110</td>
<td>550</td>
<td>790</td>
<td>355</td>
<td>400</td>
</tr>
<tr>
<td>VIT 550-110 SO</td>
<td>110</td>
<td>550</td>
<td>790</td>
<td>355</td>
<td>400</td>
</tr>
<tr>
<td>VIT 850-200</td>
<td>200</td>
<td>850</td>
<td>1 120</td>
<td>420</td>
<td>910</td>
</tr>
<tr>
<td>VIT 1000-300</td>
<td>300</td>
<td>1 000</td>
<td>1 380</td>
<td>530</td>
<td>1 970</td>
</tr>
<tr>
<td>VIT 1350-500</td>
<td>500</td>
<td>1 350</td>
<td>1 750</td>
<td>650</td>
<td>4 300</td>
</tr>
</tbody>
</table>

### Product range Voith Inline Propulsor (VIP)

<table>
<thead>
<tr>
<th>Type</th>
<th>Power [kW]</th>
<th>Propeller diameter A [mm]</th>
<th>Propeller diameter B [mm]</th>
<th>Width inc. nozzle C [mm]</th>
<th>Weight* [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIP 850-200 SO AZI</td>
<td>200</td>
<td>850</td>
<td>1 170</td>
<td>760</td>
<td>1 100</td>
</tr>
<tr>
<td>VIP 1000-300 SO AZI</td>
<td>300</td>
<td>1 000</td>
<td>1 440</td>
<td>940</td>
<td>2 200</td>
</tr>
<tr>
<td>VIP 1350-500 SO AZI</td>
<td>500</td>
<td>1 350</td>
<td>1 810</td>
<td>1 200</td>
<td>3 500</td>
</tr>
</tbody>
</table>

* Thruster only.
VIT and VIP for offshore applications

The VIT significantly improves vessel comfort and provides increased thruster performance. Be it dynamic positioning (DP) or harbor maneuver – the VIT is the right choice. The swing-out fully azimuthing Voith Inline Propulsor (VIP) combined with a nozzle, is designed as a main propulsor or assist system for DP or tracking modes, while providing the highest comfort class criteria.

Efficient, silent and compact
The VIT, as well as the VIP, for offshore applications, operates with a central roller bearing system. The system features a well-proven design and material combination. The bearings are equipped with a leakage-free and redundant sealing system.

The fixed-pitch thruster blades of the propeller are made from bronze, are highly resistant to cavitation and suitable for ice-class. The propeller is directly connected to the rotor housings. The unique design of the VIT/VIP results in significantly reduced noise and vibration emissions.

A positioning of accommodation areas near the thruster area is possible without any major provisions concerning insulation. The VIT/VIP is not significantly stressed when the propeller ventilates.
The Voith scope of supply includes the entire system: tunnel, grids, flow parts and power- and control electronics. Voith is the system supplier – your single point of contact.

### Product range Voith Inline Thruster (VIT) Offshore

<table>
<thead>
<tr>
<th>Type</th>
<th>Power [kW]</th>
<th>Propeller diameter A [mm]</th>
<th>Outer diameter B [mm]</th>
<th>Width C [mm]</th>
<th>Weight* [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIT 1350-500 H</td>
<td>500</td>
<td>1 350</td>
<td>1 800</td>
<td>1 150</td>
<td>5 100</td>
</tr>
<tr>
<td>VIT 1650-750 H</td>
<td>750</td>
<td>1 650</td>
<td>2 230</td>
<td>1 350</td>
<td>8 200</td>
</tr>
<tr>
<td>VIT 2000-1000 H</td>
<td>1 000</td>
<td>2 000</td>
<td>2 520</td>
<td>1 490</td>
<td>10 700</td>
</tr>
<tr>
<td>VIT 2300-1500 H</td>
<td>1 500</td>
<td>2 300</td>
<td>2 850</td>
<td>1 670</td>
<td>12 300</td>
</tr>
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</table>

### Product range Voith Inline Propulsor (VIP) Offshore

<table>
<thead>
<tr>
<th>Type</th>
<th>Power [kW]</th>
<th>Propeller diameter A [mm]</th>
<th>Outer diameter B [mm]</th>
<th>Width inc. nozzle C [mm]</th>
<th>Weight* [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIP 1350-500 H SO AZI</td>
<td>500</td>
<td>1 350</td>
<td>1 800</td>
<td>1 250</td>
<td>5 500</td>
</tr>
<tr>
<td>VIP 1650-750 H SO AZI</td>
<td>750</td>
<td>1 650</td>
<td>2 360</td>
<td>1 550</td>
<td>8 600</td>
</tr>
<tr>
<td>VIP 2000-1000 H SO AZI</td>
<td>1 000</td>
<td>2 000</td>
<td>2 580</td>
<td>1 800</td>
<td>11 200</td>
</tr>
<tr>
<td>VIP 2300-1500 H SO AZI</td>
<td>1 500</td>
<td>2 300</td>
<td>2 880</td>
<td>2 000</td>
<td>13 000</td>
</tr>
</tbody>
</table>

* Thruster only
Voith Linear Jet

The Voith Linear Jet (VLJ) combines the best properties of propellers with the best properties of waterjets. Low installation complexity, low sensitivity to marine growth, sustained high efficiency across the vessel’s speed range and high bollard pull are taken from the propeller side. Reduced vessel draft, the ability to reach high speeds with high efficiency and low noise and vibration levels are taken from the waterjet side.

Applications
• Crew transfer vessels
• Yachts
• (Semi)-fast ferries
• Defense applications

Product features
• Good high-speed and low-speed efficiency
• Low noise & vibration
• Low maintenance device
• Low marine growth sensitivity
• Reduced draft

A new propulsion standard
The Voith Linear Jet is suited for almost all ships with a top speed of up to 40 knots. Especially ships that combine a high top speed requirement with frequent low speed cruising will benefit from substantial fuel savings and an increased operation range at sea. Typical examples of ships with such an operation profile between low and high speed are coastal patrol vessels, ferries with seasonal operation profiles or yachts combining low-speed cruising with high-speed transit.
The above graphs indicate the VLJ size required based on the relation between the engine power and the design speed of the vessel. For instance a ship with two 7 000 kW engines and a corresponding design speed of approx. 32 knots will need two VLJ2180’s. The correct VLJ size is thus indicated by the line above the intersection of the engine power and the design speed (see example in above graph).

Please contact us for an accurate selection custom for your project. Special operational conditions like bollard pull, towing conditions or extreme low noise profiles for defense applications are not considered in above graphs and may give size selection deviations.

Driveline of the Voith Linear Jet
Voith control system

Years of excellence: Voith propulsion systems are in use all over the world and in all kinds of vessels. And for each individual propulsion system, Voith offers a perfectly matched control system – electronic or mechanical.

Electronic control system
Voith offers an electronic control system consisting of a modular hardware and software architecture with a wide variety of control functions and standardized interfaces.

Fast actuation and exact propulsion system control, remote diagnostics via the internet and human-engineered control elements are but some of the advantages of this system.
Mechanical control system
Absolutely reliable, straight forward to use and easy to maintain – attributes that have made the Voith mechanical control system stand out for many decades. It is primarily used in applications with a very short distance between the wheelhouse and the propulsion unit, as is the case on Voith Water Tractors.

Additional electronic features, such as an autopilot, can be integrated via actuators. In addition, various optional components such as auxiliary servo motors are available for increased ease of handling.
In addition to providing innovative service solutions and product support, Voith offers personalized training courses to ensure optimum professional training of the operating personnel. The focus is always on customer satisfaction, efficient operation of the Voith product, and short repair and maintenance times. Vessels equipped with Voith technology are in use all over the world.

To ensure optimum service and minimize response time, Voith has set up a global service network. Experienced service technicians provide support during installation, commissioning, and maintenance and upgrade work. Spare parts availability is a matter of course to Voith and is ensured long-term for all products.

Global service

Partnership throughout the entire life of the product. Voith offers a customized service accompanying the customer throughout the entire product lifecycle. Benefitting from more than 90 years of marine experience, Voith customers are in good hands – both before and after the purchase. Short repair and maintenance times along with efficient operation – thanks to the customized Voith Service.
Service packages – Voith provides innovative service solutions and product support:

**Field service**
Short repair and maintenance times along with efficient operation – thanks to the customized Voith Service network.

**Spare parts – High availability and reliability**
Efficient operation of the Voith components throughout their entire lifetime is paramount. The Voith spare parts management is characterized by high availability and reliability.

**Remote data access**
For the electronic control system Voith can offer a remote data access which allows an access on the electronic control system from any place without sending a service technician instantaneously.

**Condition Monitoring System (CMS)**
Optionally Voith can offer a Condition Monitoring System for all products, which should avoid failures of components and will provide input to Voith’s condition based maintenance services.

**Retrofit of electronic control systems and general modernization**
Improved efficiency by upgrading your systems to current Voith standards.

**Health checks**
Increasing the availability of Voith products by comprehensive inspections.
Emergency hotlines

North and South America
Voith Turbo Inc.
25 Winship Road
17406-8419 York (PA)
USA

Emergency hotline
+1 888 244 2882

Europe, Middle East, Africa
J. M. Voith SE & Co. KG
Alexanderstr. 2
89522 Heidenheim, Germany

Emergency hotline
+49 173 3091 918

Asia, Pacific
Voith Turbo Pte. Ltd.
10 Jalan Lam Huat,
Voith Building
737923 Singapore

Emergency hotline
+65 6863 0073
Customized support

Voith offers comprehensive support in developing new vessel concepts and solving technically complex issues. Being able to safely forecast vessel behavior through comprehensive CFD calculations, simulator studies and FE structural analyses ensures further investment security for our customers. Model measurements in our own test tank or at renowned international research institutes and large-scale measurements are carried out regularly and to a high quality level by Voith.

The Voith customer support stands apart due to its comprehensive approach: With its tools, highly motivated and skilled development engineers, powerful hardware and software and many decades of experience, Voith examines not only the vessel propulsion systems but the entire vessel and is capable of carrying out all calculations, simulations and measurements required.

- Simulator studies / simulator training
- Nautical training
- Technical training
- Model tests at own test tank
- Assistance at model tests
- CFD studies
- Basic layouts of vessel concepts, as generated arrangements, lines plans, installation proposals
- Bollard pull and speed prognosis
- Escort force calculations
- DP calculations
Seaway Moxie (former Siem Moxie)

- Windpark Infield Support Vessel for Subsea7, United Kingdom
- L x B x D: 74.00 x 17.00 x 6.40 m
- Engine power: 2 x 1 850 kW
- Propeller type: VSP 28R5 ECS / 234-2

Lochinvar

- Double-ended Ferry for Caledonian MacBrayne, Great Britain
- L x B x D: 42.80 x 12.20 x 1.73 m
- Engine power: 2 x 375 kW
- Propeller type: VSP 16R5 EC / 90-1
Shinano Maru

- Escort Voith Water Tractor for Fukushima Kisen, Co., Japan
- L x B x D: 39.00 x 13.60 x 6.15 m
- Engine power: 2 x 2 650 kW
- Propeller type: VSP 32R5 ECS / 265-2

Trearddur Bay

- Crew Transfer Vessel for Turbine Transfers, UK
- L x B x D: 20.00 x 7.00 x 1.30 m
- Engine power: 2 x 900 kW
- Propeller type: VLJ 900
Sea Installer

- Self-propelled Jack-Up Vessel for A2SEA A/S, Denmark (now DEME Offshore)
- L x B x D: 132.00 x 39.00 x 5.30 m
- Engine power: 3 x 3 800 kW for VSP
  + 1 x 1 500 kW for VIT
- Propeller type: VSP 36R6 ECR / 285-2
  + VIT 1 x 2 300 – 1 500

Lady Kathryn

- Yacht Lady Kathryn V
- Top speed: 15.5 knots
- Length: 61 m
- Propeller type: Voith Inline Thruster type 850-160
Kroonborg

- Maintenance Support Vessel (MSV), Walk to Work (W2W)
- L x B x D: 79.20 x 16.00 x 5.00 / 5.40 m
- Engine power: 2 x 1 850 kW @ 1 200 rpm for VSP
  + 2 x 1 000 kW for VIT
- Propeller type: VSP 28R5 ECS / v234-2
  + VIT 2 000 – 1 000 H

Amrumbank

- Buoy Layer for Wasser- und Schifffahrtsamt Tönning, Germany
- L x B x D: 44.50 x 10.50 x 1.76 m
- Engine power: 2 x 375 kW
- Propeller type: Voith Schneider Propeller 16R5 EC / 120-1