

voith.com

VOITH

**Marine products
and services
Drive New Ways**





DR

**Exactly
on course
for your
drive
solutions**



As a technology partner and pioneer, Voith makes energy-efficient and resource-conserving mobility possible. Both for people and for goods. And with our sustainable drive solutions as the new electric Voith Schneider Propeller (eVSP), we are already fit for the global trend of green shipping. Especially in the field of marine technology, a large number of our systems and applications are already designed for alternative drives, state-of-the-art digitalization and maximum efficiency. We always combine innovative technologies with maximum safety. Experience it for yourself.

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 almost 100 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/eVSP) 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.



	VSP/eVSP	VIT/VIP	VLJ
Ferries and Passenger Ships	•	•	•
Offshore Oil and Gas	•	•	•
Offshore Wind	•	•	•
Special Ships	•	•	•
Tug Boats	•	•	
Yachts	•	•	•
Navy	•	•	•



Ferries and
Passenger Ships



Offshore
Oil and Gas



Offshore Wind



Special Ships



Tug Boats



Yachts



Navy



VOITH

Voith Schneider Propeller

Propulsion and steering – ahead, astern and sideways: The Voith Schneider Propeller (VSP) developed almost 100 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), see page 22.

Successful worldwide

The VSP is suitable for a wide range of applications – from (harbor) tugs and ferries to various types of offshore 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 vessels, passengers and the environment.

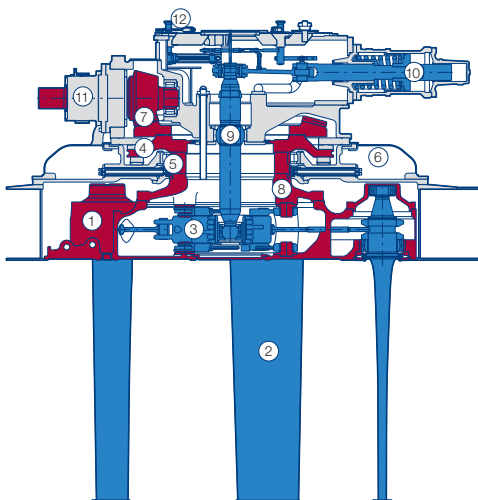
The intelligent propulsion system for safe shipping

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 blade angle determines the direction of thrust.

Product range Voith Schneider Propeller (VSP)*

Propeller type/size	Option for mechanical control system	Number of blades	Blade orbit diameter A [abt. mm]	Blade length B [abt. mm]	Housing height C [abt. mm]
VSP 12		4	1 200	900	1 200
VSP 16		5	1 600	1 200	1 400
VSP 18		5	1 800	1 500	1 500
VSP 21	x	5	2 100	1 750	1 800
VSP 26	x	5	2 650	2 300	2 100
VSP 28	x	5	2 800	2 340	2 200
VSP 32	x	5/ 6	3 200	2 650	2 400
VSP 36		6	3 600	2 850	3 000

Longitudinal section of a VSP



- | | | |
|------------------|---------------------|------------------|
| 1 Rotor casing | 6 Propeller housing | 11 Gear pump |
| 2 Blade | 7 Bevel gear | 12 Control shaft |
| 3 Kinematics | 8 Driving sleeve | ■ Rotating parts |
| 4 Thrust plate | 9 Control rod | ■ Steering parts |
| 5 Roller bearing | 10 Servomotor | |

Housing diameter D [mm]	Number of gear steps	Weight without oil [abt. kg]	Oil filling [abt. l]	Max. propeller input power [kW]
1 700	1	3 900	430	260
2 200	1	6 700	680	540
2 500	1	9 500	1 000	780
2 900	1 or 2	17 000	1 600	1 100
3 500	1	29 000	3 000	1 900
3 800	2	38 500	4 300	2 000
4 300	1 or 2	48 000–52 000	4 600	2 650 / 3 000
4 800	2	75 000	7 700	3 900

***Note:**

1. Input speeds can be adapted to all common diesel and electric motor rpms either by internal gearbox (2-gear-step VSP) and/or by intermediate gearbox (single-gear-step VSP).
2. Indicated blade length is maximum value, can be shortened on request.
3. Propellers are by standard controlled by electronic control, mechanical control optionally (see indication).
4. All electronically controlled propellers offer option for active Voith Roll Stabilization.
5. Oil fillings apply for total amount consisting of lube and control oil.



Electric Voith Schneider Propeller

With the electric Voith Schneider Propeller (eVSP), we are taking an important step towards the electrification of the drivetrain in marine applications and thus to a shipping industry that is even more eco-friendly.

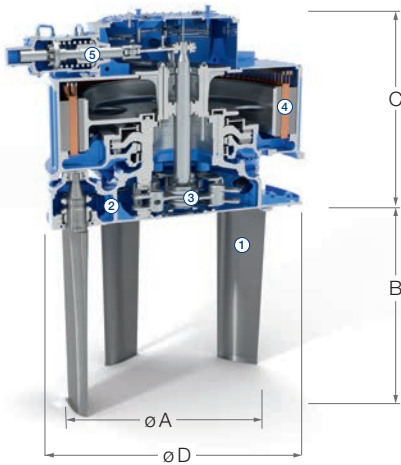
The eVSP combines all the advantages of the VSP with the electric motor of the Voith Inline Thruster. The result is a reliable, energy-efficient, environmentally friendly and compact drive unit that is ideal for use in yachts, ferries, tugs, tenders and passenger vessels, and in offshore applications. Like the conventional VSP, the eVSP achieves maximum thrust in all directions, continuously variable and with maximum precision.

The powerful, directly integrated electric motor (permanent magnet motor) delivers high torque and a fast response without any gears whatsoever. This means that it ensures a more direct and almost loss-free conversion of the electrical drive power into thrust, while keeping noise emissions to a minimum. Due to the low maintenance requirement for the robust electric propeller, the subsequent costs for servicing are drastically reduced.

Product range electric Voith Schneider Propeller (eVSP)*

Propeller type/size	Number of blades	Blade orbit diameter A [mm]	Blade length B [mm]	Housing height C [mm]
eVSP 9	5	900	900	*
eVSP 12	5	1 250	1 200	*
eVSP 16	5/6	1 660	1 500	*
eVSP 21	6	2 100	1 750	2 000
eVSP 26	5	2 650	2 300	2 500
eVSP 32	5/6	3 200	2 650	*

The electric Voith Schneider Propeller at a glance



1 Blades
2 Wheel body

3 Kinematics
4 Electric motor

5 Hydraulic cylinder

Customer benefits and advantages

- + Proven technologies for reliable performance
- + Efficient electric drive system for maximum effectiveness
- + Compact design to suit individual requirements
- + Improved sustainability

Housing diameter D [mm]	Weight without oil [abt. kg]	Oil filling [abt. l]	Electrical input power [kW]
*	*	*	200
*	*	*	375
*	*	*	700/800
3 100	26 000	1 750	1 050
3 300	39 000	3 200	1 850
*	*	*	2 500/2 900

* Under development: Please get in touch for details

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 Thruster (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°.

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 including frequency converter.



Product range Voith Inline Thruster (VIT) Yachts

Type	Power [kW]	Propeller diameter A [mm]	Outer diameter B [mm]	Width C [mm]	Weight* [kg]
VIT 380-60	60	380	560	280	165
VIT 550-125	125	550	790	355	400
VIT 550-125 SO	125	550	790	355	400
VIT 700-200	200	700	924	378	700
VIT 850-300	300	850	1 120	420	910
VIT 1000-400	400	1 000	1 380	530	1 970
VIT 1350-650	650	1 350	1 750	650	4 300

* Thruster only

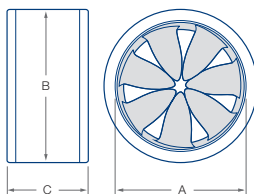
Product range Voith Inline Propulsor (VIP) Yachts

Type	Power [kW]	Propeller diameter A [mm]	Outer diameter B [mm]	Width incl. nozzle* C [mm]	Weight** incl. swing-out Azi unit [kg]
VIP 550-125 SO AZI	125	550	840	700	2 800
VIP 850-300 SO AZI	300	850	1 120	840	4 100
VIP 1000-400 SO AZI	400	1 000	1 440	940	5 100
VIP 1350-650 SO AZI	650	1 350	1 810	1 200	8 000

* Nozzle according to customer requirements

**Thruster only

Voith Inline Thruster (VIT)



VIT and VIP for offshore applications

The Voith Inline Thruster (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

Type	Power [kW]	Propeller diameter A [mm]	Outer diameter B [mm]	Width C [mm]	Weight* [kg]
VIT 1350-650 H	650	1 350	1 800	1 150	5 100
VIT 1650-1100 H	1 100	1 650	2 230	1 350	8 200
VIT 2000-1650 H	1 650	2 000	2 520	1 490	10 700
VIT 2300-2100 H	2 100	2 300	2 850	1 670	12 300

* Thruster only

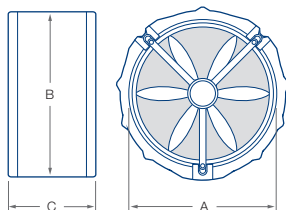
Product range Voith Inline Propulsor (VIP) Offshore

Type	Power [kW]	Propeller diameter A [mm]	Outer diameter B [mm]	Width incl. nozzle* C [mm]	Weight** [kg]
VIP 1350-650 H SO AZI	650	1 350	1 800	1 250	5 500

Further sizes on request, please get in touch for details.

* Nozzle according to customer requirements ** Thruster only

Voith Inline Thruster (VIT)



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.

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 and yachts combining low-speed cruising with high-speed transit.

Driveline of the Voith Linear Jet



Product features

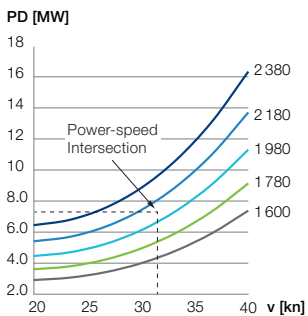
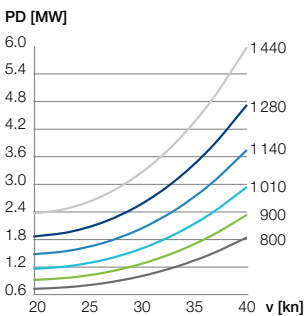
- + Good high-speed and low-speed efficiency
 - + Low noise and vibration
 - + Low maintenance device
 - + Low marine growth sensitivity
 - + Reduced draft
-



The graphs below 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 7,000kW engines and a corresponding design speed of approx. 32 knots will need two VLJ2180s. The correct VLJ size is thus indicated by the line above the intersection of the engine power and the design speed (see example in graph below).

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

Rotor relations VLJ





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.

Digital future: OnCare.Health Marine

OnCare.Health Marine is a condition monitoring system with a remote support connection. It provides valuable, intuitive diagnostic information in real time for multiple systems.

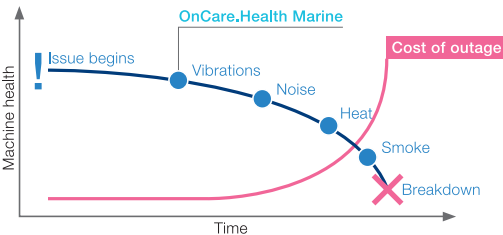
Customers can use OnCare.Health Marine to:

- Increase the availability and reliability on board their Voith-propelled marine vessels
- Increase ship safety and reduce maintenance costs
- Change their maintenance strategy from reactive to preventive and beyond

Features of OnCare.Health Marine

- + On-premise installation
- + Intuitive on-board interface
- + OnBoard Interface Inclusion (DP, winch control, NMEA, alarm system)
- + Customized alarm settings
- + OnCumulus cloud storage
- + Customized reporting and optimization advice
- + Remote expert support
- Reduction of unplanned maintenance times

A common run into failure – knowing issues early is our core value contribution

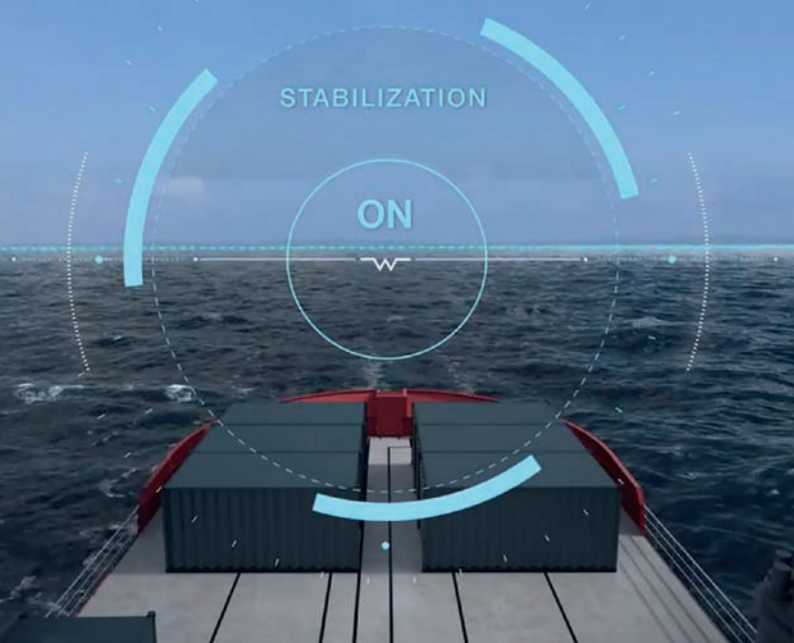




Sensor overview



- Vibration sensor
- Oil condition unit (humidity & temperature + water saturation + optional oil particle counter)
- Air humidity/air temperature sensor
- Propeller pitch sensors
- Propeller RPM sensor



Digital future: Voith Roll Stabilization

Both under dynamic positioning and when traveling full speed ahead, Voith Roll Stabilization (VRS) counteracts up to 90 per cent of all the rolling motion of a ship. This not only improves the on-board comfort of working ships, ferries and yachts, but also increases the safety of passengers and crew. In addition, offshore support vessels, for example, can continue working even in heavy seas thanks to the VRS. Due to these extended operating times, the ships can be operated more cost-effectively.

The Voith Schneider Propeller (VSP) forms the basis for using the VRS module. As it is necessary to specify the thrust magnitude and thrust direction quickly for the system to work, the ship must also be equipped with an electronic control system. The combination of these two systems with the Voith Roll Stabilization forms a system that automatically allows response time to counter the wave motion, almost completely eliminating the potential for rolling.

Remote-controlled tugs: FernSAMS

FernSAMS improves crew safety as crews are not exposed dangerous maneuvers while operating closely to the assisted vessel, also tow line hand over and operation can be conducted from a safe distance.

Besides FernSAMS also significantly reduces costs for shipping companies as remote controlled tugboats can be designed less complex and crews do not need to spend standby time on board while only operational hours are providing revenue.

Autonomous ferries: AKOON

Autonomous systems are an important topic of the future in the field of global mobility. The AKOON research project (German acronym of “Automatisierte und koordinierte Navigation von Binnenfähren”) is a collaborative project undertaken by Voith, the Institute of Control Engineering at RWTH Aachen University and other partners.

AKOON is intended to lay the foundations for full automation in inland navigation and act as a technology driver. Upcoming developments in the field of ship assistance systems, especially in inland navigation, are to be derived from the project in the future.

Please scan
QR-Code to get
further information:



About FernSAMS



About AKOON

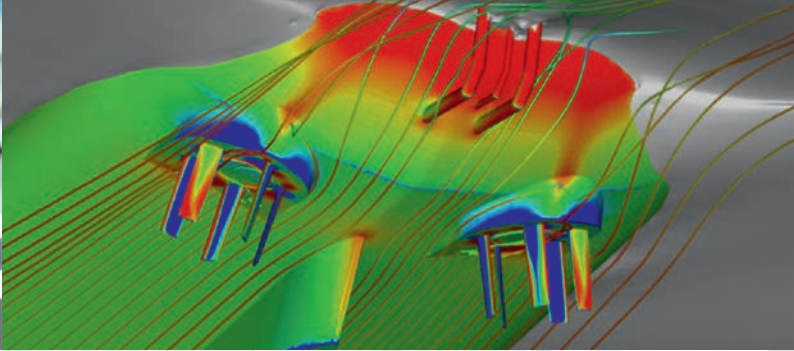


Voith project support / Research & Development

As well as building propulsion systems, Voith provides comprehensive support when it comes to developing new vessel designs and solving complex technical issues.

Using a wide range of computational fluid dynamic (CFD) calculations, simulator studies and finite element analysis, we can forecast vessel behavior reliably and give you peace of mind when committing to a major investment. We also conduct model evaluations in our own test tank and at well-known international research institutes, and regularly perform large-scale measurements to exacting levels of quality.

What makes Voith customer support unique is our comprehensive mix of great tools, skilled engineers, a can-do



attitude, and powerful hardware and software coupled with decades of experience. We don't just focus on vessel propulsion systems, we have the entire vessel in mind and are experts in performing all the calculations, simulations and measurements required.

Exemplary services at a glance

- + 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
-



Our Service –
Part of your
Business.

Voith Service: Your partner for maximum availability

Our mission is to keep your fleet running. Through our customized services and smart service solutions, we give our all every single day to achieve this goal. Being part of your company and helping you run your operations efficiently are what drives us.

As a full-line supplier, Voith supports you with comprehensive services for our own or third-party products, leaving you free to concentrate on your core business. To make this happen, our service experts are available on site 24/7 and dedicated to ensuring the availability of your fleet.

This focus on customer needs and our experience as an established system and component supplier make Voith your ideal partner for efficient operation. More than 150 years of reliability and quality mean that you can always count on us.



Spare parts & units

From the smallest exchangeable components to assemblies and functional units we combine certified Voith quality with cutting-edge technology.



MRO & field service

Whether in our own workshops or on your premises, our teams provide you with their expertise around the world.



Retrofit & modernization

We offer you various optimization options to ensure your fleet meets the highest standards.



Digital services

With Voith's digital services you can optimize maintenance processes and fleet availability while minimizing running costs.



Service packages

From "Basic" to "Standard" and "Advanced" up to "Full Service": With our service packages you can access exactly the Voith services you need to ensure maximum availability of your fleet.



Technical support

With Voith's engineering services you reap the benefits of our extensive system and technical expertise and needs-based solutions.



Consulting & training

From consulting to training, we share with you our many years of experience across a range of products and you benefit from individualized expert support.

Contact us:

Service and emergency hotline
+49 7321 37-3000
marineservice@voith.com



Best Practice



Edda Breeze

Commissioning Service Operation Vessel (CSOV)

- L x B x D: 88.3 x 19.7 x 5.0 m
- Engine/motor power: 2 x 1 850 kW
- Propeller type: 2 x eVSP 26X5/230



Condor

Multi-purpose harbor tractor tug

- L x B x D: 24.31 x 11.0 x 3.8 m
- Engine/motor power: 2 x 970 kW
- Propeller type: 2 x VSP 21RV5/175-2



MV Michael H. Ollis

New York Staten Island ferry

- L x B x D: 97.54 x 21.34 x 3.96 m
- Engine/motor power: 4 x 1 862 kW
- Propeller type: 2 x VSP 36RV6 ECS/285-2



Arlau

Kiel canal hybrid ferry

- L x B x D: 30.0 x 9.5 x 1.48 m
- Engine/motor power: 2 x 100 kW
- Propeller type: 2 x VSP 12RV4 EC/75-1



Viking Mississippi

River cruise vessel

- L x B x D: 136.3 x 23.16 x 2.59 m
- Engine/motor power: 3 x 1 100 kW
- Propeller type: 3 x eVSP 21X6/175



Elandess

Mega yacht

- L x B x D: 74.5 x 12.8 x 3.45 m
- Engine/motor power: 2 x 1 492 kW main,
200 kW maneuvering (VIP)
- Propeller type (maneuvering): 1 x VIP 850-200 SO AZI



Kroonborg

Maintenance Support Vessel (MSV), Walk to Work (W2W)

- L x B x D: 79.2 x 16.0 x 5.4 m
- Engine/motor power: 2 x 1 850 kW (VSP), 2 x 1 000 kW (VIT)
- Propeller type: 2 x VSP 28R5 ECS/234-2,
2 x VIT 2000-1000 H



Multratug 32

Carousel Rave Tug (CRT)

- L x B x D: 31.9 x 13.2 x 6.2 m
- Engine/motor power: 2 x 2 650 kW
- Propeller type: 2 x VSP 32RV5 EC/250-2



Sea Installer

Self-propelled jack-up vessel

- L x B x D: 130.8 x 39.0 x 5.8 m
- Engine/motor power: 3 x 3800 kW (VSP), 1 x 1500 kW (VIT)
- Propeller type: 3 x VSP 36R6 ECR/285-2,
1 x VIT 2300-1500



Victoria of Wight

Hybrid ferry

- L x B x D: 89.7 x 19.4 x 2.6 m
- Engine/motor power: 4 x 950 kW
- Propeller type: 4 x VSP 21R5/150-2



Naviexpress

Hybrid ferry for Lake Geneva

- L x B x D: 61.3 x 10.0 x 1.6 m
- Engine/motor power: 2 x 920 kW (diesel),
2 x 225 kW (electric)
- Propeller type: 2 x VLJ 1140, 2 x VIT 550-110,
2 x VIT 380-60TC



Rawabi Liberty

Harbor towing tug

- L x B x D: 31.15 x 11.2 x 5.71 m
- Engine/motor power: 2 x 1765 kW
- Propeller type: 2 x VSP 26X5/230



Seaway Moxie

Windpark infield support vessel

- L x B x D: 74.0 x 17.0 x 6.3 m
- Engine/motor power: 2 x 1 850 kW
- Propeller type: 2 x VSP 28R5 ECS/234-2



Eitan

Harbor towing tug

- L x B x D: 30.25 x 13.0 x 6.7 m
- Engine/motor power: 2 x 2 525 kW CAT 3516C-TA-HD
- Propeller type: 2 x VSP 32RV5 EC/265-2



Kuestenwache

LNG-powered multipurpose vessel

- L x B x D: 93.7 x 19.5 x 7.0 m
- Engine/motor power: 4 x 3600 kW main,
900 kW maneuvering (VIT)
- Propeller type (maneuvering): 1 x VIT 1650-1100H



Leven

Shallow draft yacht

- L x B x D: 27.0 x 6.52 x 1.38 m
- Engine/motor power: 2 x 1432 kW
- Propeller type: 2 x VLJ1010

Contact us

Service and emergency hotline:

+49 7321 37-3000

marineservice@voith.com



Please scan QR-Code
to get further information:



Voith Group
St. Poeltener Strasse 43
89522 Heidenheim
Germany

www.voith.com/marine



Please scan QR-Code
to contact our experts:



Contact:
Phone + 49 7321 37-2055
marine@voith.com

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