VETH RUDDER PROPELLERS

MAXIMUM MANEUVERABILITY

The basic principle of a rudder propeller is simple and effective. The propeller rotates 360° around its own vertical axis to guarantee maximum maneuverability in all directions.

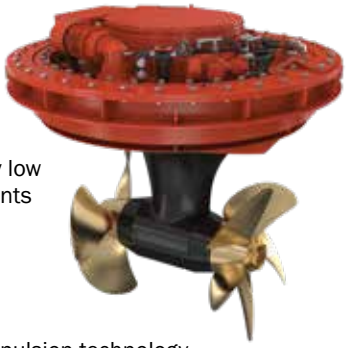
Our azimuth thrusters are available in either Z- or L-drive configurations and can be powered by any power source; the control for its azimuth steering system can be either electric or hydraulic. The thruster units are available with open propeller, contra-rotating propellers or with a nozzle. The Veth Control Systems are developed in-house by our R&D department. Veth Propulsion has developed the Veth Integrated L-drive with a permanent magnet (PM) motor, which has extremely low mounting space requirements.

By stocking the standard parts for every one of our thrusters, we can provide fast service when needed.

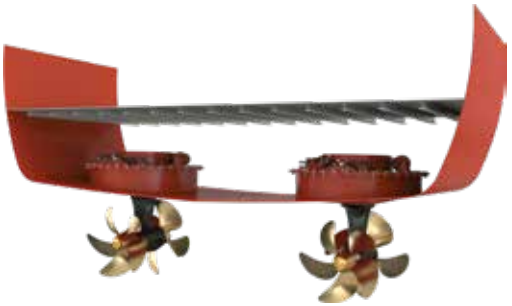
Z-DRIVE

- 360° full thrust for optimal maneuverability
- 2% more efficiency than with a conventional propeller
- Possibility for flexible suspension (better insulation from noise and vibration)
- Ability to change propeller without docking
- Simple to install
- More room for passengers/cargo due to compact construction
- No separate gearbox needed
- Ideally suited for Dynamic Positioning (DP)
- Safer, through shorter emergency stopping distance and improved maneuverability

INTEGRATED L-DRIVE



- Compact design; extremely low mounting space requirements
- High efficiency
- Quiet
- Low weight
- Built using proven Veth Propulsion technology
- Outstanding maneuverability due to the 360° thrust
- Electric motor inside the ship; fewer vulnerable components underwater
- Simple to install
- Slip ring cabinet unnecessary
- Optimal flow of water thanks to ‘Shark Tail’ on contra-rotating propeller



VETH PROPULSION BY TWIN DISC

VETH CONTROL SYSTEMS

PROVEN TECHNOLOGY

Like all of our products, our control systems are also developed and produced in-house. The Veth Control Systems (VCS) offer you the opportunity to read out, monitor and analyze data and alarms. The choices Veth Propulsion makes are based on dynamic and proven technologies from the automotive industry.

CONTROL PANEL

KEY PANEL

FRONT DISPLAY THRUSTER

DRIVEN BY SIMPLICITY

Veth Propulsion has its own R&D department for electronics, which is engaged with in-house development, innovation and improvement of our control systems on a daily basis. This is in line with the everything-under-one-roof principle and offers several advantages. Simplicity for you as a key user and for service purposes is most important in the continuous development of our control systems.

FEATURES & BENEFITS

- Fast service
- Single contact point
- Sufficient stock
- In-house knowledge and skills
- Not dependent on others
- Interfacing with third-party systems is developed and maintained internally, such as DP, Pilot and VDR interfaces
- The Veth Autopilot interface provides the ability to control the thruster asynchronously
- The DP interface provides safety around the DP control

LOCAL PANEL

WING PANEL

VETH BOW THRUSTERS

Many Veth bow thrusters are part of the shallow draft family. A major advantage of a horizontal propeller (shallow draft) is that optimum thrust is achieved at minimum draft, without vulnerable parts sticking out beneath the vessel. The shallow draft thrusters provide high thrust even at cruising speed, because the propeller draws up the water over a short length.

VETH JET

The Veth Jet channel bow thruster, an invention of Jan Veth, was launched in 1970 in response to market demand for a thruster that could function optimally at 360° with a shallow draft.

VETH COMPACT JET

The Veth Compact Jet can be found only at Veth Propulsion. A special feature of the Veth Compact Jet is that the propeller is placed at an angle of 17°. In practice, this means more efficiency and higher thrust on a sailing vessel.

VETH STEERING GRID

With a Veth Steering Grid, you achieve optimal thrust at minimum draft, even at speed and with no parts extending from beneath the vessel. The Veth Steering Grid makes use of existing technology found in the successful Veth Jet, such as the worm wheel and gear transmission.

VETH COMPACT GRID

The Veth Compact Grid offers the advantages of two existing Veth solutions: the simplicity of the Veth Steering Grid and the angled propeller of the Veth Compact Jet.

Each vessel is unique and it may be that a regular tunnel thruster does not meet your needs. Veth Propulsion also offers aluminum, flexible mounted (combined with air injection), elbow or retractable tunnel thrusters.

VETH PROPULSION BY TWIN DISC

VETH Z-DRIVE SPECIFICATIONS

TYPE OF NOZZLE
Veth Propulsion uses two types of nozzles: VG40 and VOB50 (optimized nozzle 19A).

VOB 50 is often used with tug- and push boats. The Bollard Pull efficiency is 2–3% higher than a VG40 nozzle. VG40 is recommended when high thrust at higher speeds and sailing perfomances are relevant.

TYPE OF PROPELLER
For speeds of 12–14 knots, an open propeller is a better choice than a nozzled propeller. Contra-rotating (CR) propellers are an excellent option with regard to efficiency (at different speeds) for vessels with a top speed between 10–20 knots which require a low noise level. The propellers can be used for various applications such as megayachts, ferries and passenger vessels. The CR propellers are a combination of high-efficiency, small propeller diameters and low-noise propulsion.

THRUSTER FOUNDATION

RIGID WELDED SUSPENSION
The thruster can be welded into the hull of the vessel; all foundation elements will be welded as an integrated part of the vessel.

RIGID BOLTED SUSPENSION
The thrusters can be built into the vessel on a rigid suspension foundation, where the thruster is bolted directly onto the bottom well.

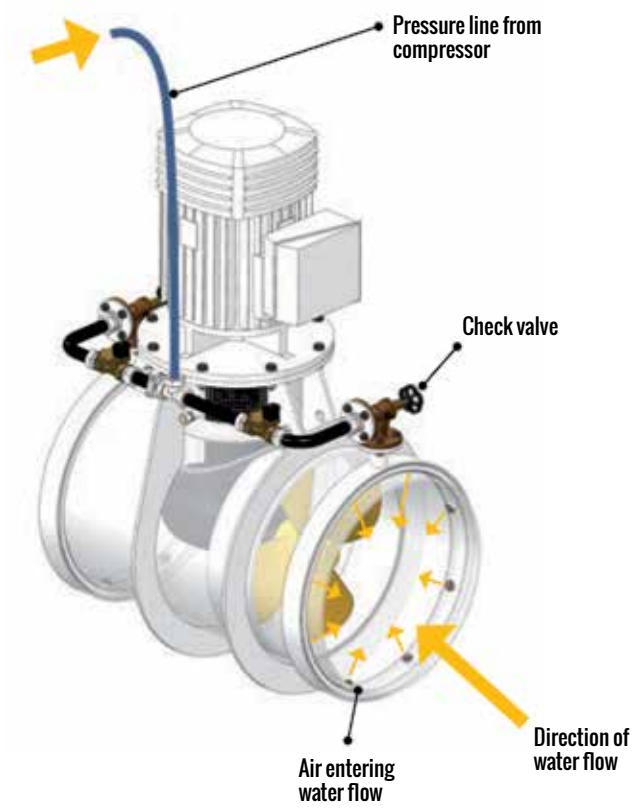
FLEXIBLE SUSPENSION
The thrusters can be mounted in a flexible suspension bottom well to suppress noise and vibration when operating. To create a flexible suspension, rubber isolation rings are inserted between the thruster foundation and the bottom well.

ACTIVE NOISE SUPPRESSION (ANS)

One of Veth Propulsion's solutions to keeping tunnel thruster noise levels to a minimum, besides flexible mounting of the thrusters, is by employing Active Noise Suppression by means of compressed air injection. Compressed air is injected into the thruster's tunnel in front of the propeller's direction of flow, thus minimizing the effects of cavitation.

ANS is a cost-effective way to decrease noise levels and cavitation damage in practically all new and existing tunnel thruster designs. Extensive testing has resulted in noise reductions up to 10 dB.

System activation - compressed air injected into tunnel's water flow



Unit	Nominal Speed (rpm)	Propeller Type	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)	LRS (kW) Inland	LRS (kW) Seagoing	BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
VZ-200	1800	Open	Ø900	27	245	245	210	233	207	216	138
		Open	Ø1000	30	245	245	210	233	207	216	138
		Ducted	Ø900	27	245	245	210	233	207	216	138
VZ-320	1800	Open	Ø1100	31	330	330	320	319/330*	284/313*	319/330*	155
		Ducted	Ø1050	29	330	330	330	319/330*	284/313*	319/330*	155
VZ-320A	2100	Open	Ø1100	31	335	335	324	319/335*	283/317*	319/335*	157
		Ducted	Ø1050	29	335	335	324	319/335*	283/317*	319/335*	157
VZ-400A	1800	Open	Ø1100	32	380	380	361	380	380	380	280
		Ducted	Ø1030	30	417	417	361	417	392/416*	410/417*	280
VZ-400	1800	Open	Ø1250	31	470	417	417	468	416/432*	435/469*	286
		Ducted	Ø1130	28	470	417	417	468	416/432*	435/469*	286
VZ-550	1800	Open	Ø1350	31	555	484	484	555	555	484	381
		Ducted	Ø1250	29	555	484	484	555	555	484	381
VZ-700	1800	Open	Ø1500	31	707	707	624	688	616/634*	643/688*	419
		Ducted	Ø1400	29	716	716	624	688	616/634*	643/688*	419
VZ-900	1800	Open	Ø1600	29	804	804	804	804	804	804	763
		Open	Ø1700	31	908	908	908	908	908	908	763
		Ducted	Ø1600	29	968	945	945	968	968	958	763
		Ducted	Ø1700	31	968	945	945	968	968	958	763
VZ-900A	1600	Open	Ø1600	29	804	804	804	804	804	804	753
		Open	Ø1700	31	908	908	908	876	869	869	753
		Ducted	Ø1600	29	945	958	958	876	869	869	753
		Ducted	Ø1700	31	945	958	958	876	869	869	753
VZ-1100	1800	Open	Ø1900	32	1134	1134	1134	1134	1118/1143*	1134	877
		Ducted	Ø1800	30	1272	1272	1272	1258/1272*	1118/1243*	1168/1272*	877
		Ducted	Ø1900	32	1305	1305	1305	1258/1305*	1118/1243*	1168/1305*	877
VZ-1100A	1600	Open	Ø1900	32	1134	1134	1134	1134	1134	1134	1006
		Ducted	Ø1800	30	1272	1272	1272	1272	1272	1272	1006
		Ducted	Ø1900	32	1305	1305	1305	1305	1291/1305*	1305	1006
VZ-1250	1800	Open	Ø2100	33	1385	1385	1385	1385	1289/1385*	1346/1385*	1009
		Ducted	Ø1900	30	1418	1418	1418	1418	1289/1418*	1346/1418*	1009
		Ducted	Ø2000	31	1425	1425	1425	1425	1289/1425*	1346/1425*	1009
		Ducted	Ø2100	33	1425	1425	1425	1425	1289/1425*	1346/1425*	1009
VZ-1250A	1600	Open	Ø2100	31	1385	1385	1385	1385	1291/1385*	1348/1385*	1006
		Ducted	Ø1900	28	1418	1418	1418	1418	1291/1418*	1348/1418*	1006
		Ducted	Ø2000	30	1425	1425	1425	1425	1291/1425*	1348/1425*	1006
		Ducted	Ø2100	31	1425	1425	1425	1385	1291/1425*	1348/1425*	1006
VZ-1250B[1]	1200	Open	Ø2100	29	1385	1320	1320	1385	1307/1320*	1320	900
		Ducted	Ø1900	26	1418	1320	1320	1418	1307/1321*	1320	900
		Ducted	Ø2000	28	1425	1320	1320	1418	1307/1322*	1320	900
		Ducted	Ø2100	29	1425	1320	1320	1420	1307/1323*	1320	900
VZ-1250C[1]	1000	Open	Ø2100	31	1385	1385	1385	1385	1325/1385*	1384/1385*	976
		Ducted	Ø1900	28	1418	1418	1418	1418	1325/1418*	1384/1418*	976
		Ducted	Ø2000	30	1425	1425	1425	1425	1325/1425*	1384/1425*	976
		Ducted	Ø2100	31	1425	1425	1425	1425	1325/1425*	1384/1425*	976
VZ-1250D[1]	900	Open	Ø2100	31	1385	1385	1385	1385	1329/1385*	1385	976
		Ducted	Ø1900	28	1418	1418	1418	1418	1329/1418*	1388/1418*	976
		Ducted	Ø2000	29	1425	1425	1425	1425	1329/1425*	1388/1425*	976
		Ducted	Ø2100	31	1425	1425	1425	1425	1329/1425*	1388/1425*	976
VZ-1250F[1]	750	Open	Ø2100	31	1385	1385	1385	1385	1310/1385*	1368/1385*	989
		Ducted	Ø1900	28	1418	1418	1418	1418	1310/1418*	1368/1418*	989
		Ducted	Ø2000	29	1425	1425	1425	1425	1310/1425*	1368/1425*	989
		Ducted	Ø2100	31	1425	1425	1425	1425	1310/1425*	1368/1425*	989

Unit	Nominal Speed (rpm)	Propeller Type	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)	LRS (kW) Inland	LRS (kW) Seagoing	BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
VZ-1550	1800	Open	Ø2400	33	1810	1810	1810	1810	1753/1810*	1830/1810*	1395
		Ducted	Ø2200	31	1901	1901	1901	1901	1753/1901*	1830/1901*	1395
		Ducted	Ø2300	32	1920	1920	1920	1920	1753/1920*	1830/1920*	1395
		Ducted	Ø2400	33	1920	1920	1920	1920	1753/1920*	1830/1920*	1395
VZ-1550A	1600	Open	Ø2400	33	1810	1810	1810	1810	1746/1810*	1822/1810*	1389
		Ducted	Ø2200	30	1901	1901	1901	1901	1746/1901*	1822/1901*	1389
		Ducted	Ø2300	32	1920	1920	1920	1920	1746/1920*	1822/1920*	1389
		Ducted	Ø2400	33	1920	1920	1920	1920	1746/1920*	1822/1920*	1389
VZ-1550C[1]	1000	Open	Ø2400	33	1810	1810	1810	1810	1737/1810	1814/1810	1315
		Ducted	Ø2200	31	1901	1901	1901	1901	1737/1901	1814/1901	1315
		Ducted	Ø2300	32	1920	1920	1920	1920	1737/1915	1814/1920	1315
		Ducted	Ø2400	33	1920	1920	1920	1920	1737/1915	1814/1920	1315
VZ-1550D[1]	900	Open	Ø2400	33	1810	1810	1810	1810	1755/1810	1810	1315
		Ducted	Ø2200	31	1901	1901	1901	1901	1755/1901	1832/1901	1315
		Ducted	Ø2300	32	1920	1920	1920	1920	1755/1920	1832/1920	1315
		Ducted	Ø2400	33	1920	1920	1920	1920	1755/1920	1832/1920	1315
VZ-1550F[1]	750	Open	Ø2400	33	1810	1810	1810	1810	1755/1810	1793/1810	1285
		Ducted	Ø2200	30	1901	1901	1901	1901	1718/1891	1793/1901	1285
		Ducted	Ø2300	31	1920	1920	1920	1920	1718/1891	1793/1920	1285
		Ducted	Ø2400	33	1920	1920	1920	1920	1718/1891	1793/1920	1285
VZ-1800	1800	Open	Ø2600	34	2124	2124	2124	2124	2124	2124	1759
		Ducted	Ø2400	31	2262	2262	2262	2262	2256/2262*	2262	1759
		Ducted	Ø2500	32	2350	2350	2350	2350	2256/2350*	2350	1759
		Ducted	Ø2600	34	2350	2350	2350	2350	2256/2350*	2350	1759
VZ-1800A	1600	Open	Ø2600	33	2124	2124	2124	2124	2124	2124	1768
		Ducted	Ø2400	31	2262	2262	2262	2262	2249/2262*	2262	1768
		Ducted	Ø2500	32	2350	2350	2350	2350	2249/2350*	2347/2350*	1768
		Ducted	Ø2600	33	2350	2350	2350	2350	2249/2350*	2347/2350*	1768
VZ-1800B	1500	Open	Ø2600	33	2124	2124	2124	2124	2124	2124	1815
		Ducted	Ø2400	31	2262	2262	2262	2262	2240/2262*	2262	1815
		Ducted	Ø2500	32	2350	2350	2350	2350	2240/2350*	2338/2350*	1815
		Ducted	Ø2600	33	2350	2350	2350	2350	2240/2350*	2338/2350*	1815
VZ-1800D[1]	1200	Open	Ø2600	34	2124	2124	2124	2124	2112/2124*	2124	1621
		Ducted	Ø2400	31	2262	2262	2262	2262	2112/2262*	2206/2262*	1621
		Ducted	Ø2500	33	2350	2350	2350	2350	2112/2350*	2206/2350*	1621
		Ducted	Ø2600	34	2350	2350	2350	2350	2112/2350*	2206/2350*	1621
VZ-1800F[1]	1000	Open	Ø2600	33	2124	2124	2124	2124	2124	2124	1785
		Ducted	Ø2400	31	2262	2262	2262	2262	2244/2262*	2262	1785
		Ducted	Ø2500	32	2350	2350	2350	2350	2244/2350*	2343/2350*	1785
		Ducted	Ø2600	33	2350	2350	2350	2350	2244/2350*	2343/2350*	1785
VZ-1800G[1]	900	Open	Ø2600	33	2124	2124	2124	2124	2124	2124	1774
		Ducted	Ø2400	31	2262	2262	2262	2262	2223/2262*	2262	1774
		Ducted	Ø2500	32	2350	2350	2350	2350	2223/2350*	2320/2350*	1774
		Ducted	Ø2600	33	2350	2350	2350	2350	2223/2350*	2320/2350*	1774
VZ-1800H[1]	750	Open	Ø2600	33	2124	2124	2124	2124	2124	2124	1783
		Ducted	Ø2400	31	2262	2262	2262	2262	2244/2262*	2262	1783
		Ducted	Ø2500	32	2350	2350	2350	2350	2244/2350*	2343/2350*	1783
		Ducted	Ø2600	33	2350	2350	2350	2350	2244/2350*	2343/2350*	1783

1 Concept design only; delivery time on request.
* Number applies when the upper and/or lower gears are shotpeened.

Ratings are in kilowatts (kW) and are based on both maximum blade load (400 kW/m² for open propeller and 500 kW/m² for ducted propellers) and maximum machinery power.

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)		V_{tip} (m/s)	Veth (kW)
		Front	Aft		
VZ-160-CR	1800	Ø650	Ø585	28	155
VZ-250-CR	1800	Ø850	Ø765	27	325
VZ-250A-CR	2100	Ø850	Ø765	28	329
VZ-450-CR	1800	Ø1100	Ø990	25	475
		Ø1200	Ø1080	27	475
VZ-700-CR	1800	Ø1350	Ø1210	25	737
VZ-900-CR	1800	Ø1400	Ø1260	25	975
		Ø1450	Ø1305	26	995
		Ø1500	Ø1350	27	995
VZ-900A-CR	1600	Ø1400	Ø1260	25	938
		Ø1450	Ø1305	25	938
		Ø1500	Ø1350	26	938
VZ-1250-CR	1800	Ø1650	Ø1485	28	1355
		Ø1700	Ø1530	29	1425
VZ-1250A-CR	1600	Ø1650	Ø1485	30	1355
		Ø1700	Ø1530	31	1425
VZ-1550-CR	1800	Ø1900	Ø1710	28	1800
		Ø2000	Ø1800	30	1920

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
on request	on request	on request	on request	on request	on request
341	285	312	279/288*	292/312*	137
350	289	317	383/292*	383/317*	139
435	435	441/475*	392/432*	410/435*	280
435	435	441/475*	392/432*	410/435*	280
694	694	677	611	637	477
958	958	975	933	958	656
958	958	985	933	958	656
958	958	985	933	958	656
869	869	876	869	869	647
869	869	876	869	869	647
869	869	876	869	869	647
1355	1355	1355	1256/1355*	1311/1355*	945
1395	1395	1390	1256/1383*	1311/1390*	945
1355	1355	1355	1355	1355	1039
1425	1425	1425	1377/1425*	1425	1039
1800	1800	1800	1735/1800*	1800	1382
1920	1920	1920	1735/1910*	1811/1920*	1382

* Number applies when the upper and/or lower gears are shotpeened.
Ratings are in kilowatts (kW) and are based on both maximum blade load (350 kW/m^2 for contra-rotating propellers, 400 kW/m^2 for open propellers and 500 kW/m^2 for ducted propellers) and maximum machinery power.

Unit	Nominal Speed (rpm)	Propeller Type	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)	LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
						Inland	Seagoing				
VZ-200	1800	Open	Ø900	27	254	254	248	254	245	254	164
		Open	Ø1000	30	265	265	248	260	245	260	164
		Ducted	Ø900	27	265	265	28	260	245	260	164
VZ-320	1800	Open	Ø1100	31	330	330	330	330	330	330	185
		Ducted	Ø1050	29	330	330	330	330	330	330	185
VZ-400A	1800	Open	Ø1100	32	470	470	470	470	470	470	340
		Ducted	Ø1030	30	470	470	470	470	470	470	340
VZ-400	1800	Open	Ø1250	31	380	380	380	380	380	380	334
		Ducted	Ø1130	28	417	417	417	417	417	417	286
VZ-550	1800	Open	Ø1350	31	555	555	555	555	555	555	420
		Ducted	Ø1250	29	555	555	555	555	555	555	420
VZ-700	1800	Open	Ø1500	31	707	707	707	707	707	707	480
		Ducted	Ø1400	29	770	770	738	770	735	770	480
VZ-900	1800	Open	Ø1600	29	804	804	804	804	804	804	800
		Open	Ø1700	31	908	908	908	908	908	908	800
		Ducted	Ø1600	29	968	968	968	968	968	968	800
		Ducted	Ø1700	31	968	968	968	968	968	968	800
VZ-900A	1600	Open	Ø1600	29	804	804	804	804	804	804	790
		Open	Ø1700	31	908	908	908	908	869	908	790
		Ducted	Ø1600	29	945	945	945	945	869	945	790
		Ducted	Ø1700	31	945	945	945	945	869	945	790
VZ-1100	1800	Open	Ø1900	32	1134	1134	1134	1134	1118/1143*	1134	1044
		Ducted	Ø1800	30	1272	1272	1272	1272	1272	1272	1044
		Ducted	Ø1900	32	1305	1305	1305	1305	1305	1305	1044
VZ-1100A	1600	Open	Ø1900	32	1134	1134	1134	1134	1134	1134	1044
		Ducted	Ø1800	30	1272	1272	1272	1272	1272	1272	1100
		Ducted	Ø1900	32	1305	1305	1305	1305	1305	1305	1100
VZ-1250	1800	Open	Ø2100	33	1385	1385	1385	1385	1385	1385	1100
		Ducted	Ø1900	30	1418	1418	1418	1418	1418	1418	1201
		Ducted	Ø2000	31	1425	1425	1425	1425	1425	1425	1201
		Ducted	Ø2100	33	1425	1425	1425	1425	1425	1425	1201
VZ-1250A	1600	Open	Ø2100	31	1385	1385	1385	1385	1385	1385	1198
		Ducted	Ø1900	28	1418	1418	1418	1418	1418	1418	1198
		Ducted	Ø2000	30	1425	1425	1425	1425	1425	1425	1198
		Ducted	Ø2100	31	1425	1425	1425	1425	1425	1425	1198
VZ-1550	1800	Open	Ø2400	33	1810	1810	1810	1810	1810	1810	1661
		Ducted	Ø2200	31	1901	1901	1901	1901	1901	1901	1661
		Ducted	Ø2300	32	1920	1920	1920	1920	1920	1920	1661
		Ducted	Ø2400	33	1920	1920	1920	1920	1920	1920	1661
VZ-1550A	1600	Open	Ø2400	33	1810	1810	1810	1810	1810	1810	1500
		Ducted	Ø2200	30	1901	1901	1901	1901	1901	1901	1500
		Ducted	Ø2300	32	1920	1920	1920	1920	1920	1920	1500
		Ducted	Ø2400	33	1920	1920	1920	1920	1920	1920	1500

* Number applies when the upper and/or lower gears are shotpeened.
Ratings are in kilowatts (kW) and are based on both maximum blade load (400 kW/m² for open propeller and 500 kW/m² for ducted propellers) and maximum machinery power.

Unit	Nominal Speed (rpm)	Propeller Type	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)	LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
						Inland	Seagoing				
VZ-1800	1800	Open	Ø2600	34	2124	2124	2124	2124	2124	2124	2093
		Ducted	Ø2400	31	2262	2262	2262	2262	2262	2262	2093
		Ducted	Ø2500	32	2350	2350	2350	2350	2350	2350	2093
		Ducted	Ø2600	34	2350	2350	2350	2350	2350	2350	2093
VZ-1800A	1600	Open	Ø2600	33	2124	2124	2124	2124	2124	2124	1815
		Ducted	Ø2400	31	2262	2262	2262	2262	2262	2262	1815
		Ducted	Ø2500	32	2350	2350	2350	2350	2350	2350	1815
		Ducted	Ø2600	33	2350	2350	2350	2350	2350	2350	1815
VZ-1800B	1500	Open	Ø2600	33	2124	2124	2124	2124	2124	2124	1815
		Ducted	Ø2400	31	2262	2262	2262	2262	2262	2262	1815
		Ducted	Ø2500	32	2350	2350	2350	2350	2350	2350	1815
		Ducted	Ø2600	33	2350	2350	2350	2350	2350	2350	1815

Ratings are in kilowatts (kW) and are based on both maximum blade load (400 kW/m^2 for open propeller and 500 kW/m^2 for ducted propellers) and maximum machinery power.

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)		V_{tip} (m/s)	Veth (kW)	LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
		Front	Aft			Inland	Seagoing				
VZ-160-CR	1800	Ø650	Ø585	28	155	On request	On request	On request	On request	On request	On request
VZ-250-CR	1800	Ø850	Ø765	27	345	345	336	345	345	345	163
VZ-450-CR	1800	Ø1100	Ø990	25	480	475	475	475	475	475	325
		Ø1200	Ø1080	27	480	475	475	475	475	475	325
VZ-700-CR	1800	Ø1350	Ø1210	25	834	802	802	783	783	783	568
VZ-900-CR	1800	Ø1400	Ø1260	25	975	975	975	975	975	975	782
		Ø1450	Ø1305	26	995	995	995	995	978	995	782
		Ø1500	Ø1350	27	995	995	995	995	978	995	782
VZ-900A-CR	1600	Ø1400	Ø1260	25	938	938	938	938	869	938	765
		Ø1450	Ø1305	25	938	938	938	938	869	938	765
		Ø1500	Ø1350	26	938	938	938	938	869	938	765
VZ-1250-CR	1800	Ø1650	Ø1485	28	1355	1355	1355	1355	1355	1355	1125
		Ø1700	Ø1530	29	1425	1425	1425	1425	1425	1425	1125
VZ-1250A-CR	1600	Ø1650	Ø1485	30	1355	1355	1355	1355	1355	1355	1237
		Ø1700	Ø1530	31	1425	1425	1425	1425	1425	1425	1237
VZ-1550-CR	1800	Ø1900	Ø1710	28	1800	1800	1800	1800	1800	1800	1646
		Ø2000	Ø1800	30	1920	1920	1920	1920	1920	1920	1646

Ratings are in kilowatts (kW) and are based on both maximum blade load (350 kW/m^2 for contra-rotating propellers) and maximum machinery power.

Unit	Nominal Speed (rpm)	Propeller Type	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)	LRS (kW) Inland	LRS (kW) Seagoing	BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
VL-50	1800	Open	Ø450	29	61	61	61	57	57	57	36
		Ducted	Ø450	29	61	61	61	57	57	57	36
VL-90	1800	Open	Ø600	30	115	115	115	115	115	115	79
		Open	Ø650	33	135	135	135	135	133	139	79
		Ducted	Ø600	30	140	140	140	140	133/140*	139	79
VL-180	1500	Open	Ø800		168	168	152	168	168	168	98
	1800	Open	Ø700	29	154	154	154	154	154	154	117
		Ducted	Ø700	29	192	192	183	192	192	192	117
VL-200	1500	Open	Ø900	38	254	254	250	254	254	254	165
		Open	Ø1000	43	265	265	250	265	265	265	165
		Ducted	Ø900	27	265	265	250	265	265	265	165
VL-320	1500	Open	Ø1100	31	370	370	370	370	370	370	186
		Ducted	Ø1050	30	370	370	370	370	370	370	186
VL-400A	1200	Open	Ø1100	33	380	380	380	380	380	380	380
		Ducted	Ø1030	31	417	417	417	417	417	417	387
VL-400	1500	Open	Ø1250	34	491	491	491	491	491	491	367
		Ducted	Ø1130	30	500	500	500	500	500	500	367
VL-550	900	Open	Ø1350	29	533	533	533	533	533	533	398
		Ducted	Ø1250	27	533	533	533	533	533	533	398
VL-550	1000	Open	Ø1350	32	555	555	555	555	555	555	442
		Ducted	Ø1250	30	555	555	555	555	555	555	442
VL-550	1500	Open	Ø1350	30	517	540	429	517	517	496	369
		Ducted	Ø1250	28	517	540	429	517	517	496	369
VL-700	1000	Open	Ø1500	32	707	707	707	707	707	707	490
		Ducted	Ø1400	30	760	770	762	760	760	760	490
VL-700	1500	Open	Ø1500	33	650	681	542	650	628	682	409
		Ducted	Ø1400	31	650	681	542	650	628	682	409
VL-900	900	Open	Ø1600	32	804	804	804	804	804	804	804
		Open	Ø1700	34	908	908	908	908	908	908	865
		Ducted	Ø1600	32	968	968	968	968	968	968	865
		Ducted	Ø1700	34	968	968	968	968	968	968	865
VL–1100	900	Open	Ø1900	33	1134	1134	1134	1134	1134	1134	1134
		Ducted	Ø1800	31	1272	1272	1272	1272	1272	1272	1140
		Ducted	Ø1900	33	1305	1305	1305	1305	1305	1305	1140
VL-1250	900	Open	Ø2100	32	1385	1385	1385	1385	1385	1385	1355
		Ducted	Ø1900	29	1418	1418	1418	1418	1418	1418	1355
		Ducted	Ø2000	31	1425	1425	1425	1425	1425	1425	1355
		Ducted	Ø2100	32	1425	1425	1425	1425	1425	1425	1355
VL-1550	750	Open	Ø2400	34	1810	1810	1810	1810	1810	1810	1687
		Ducted	Ø2200	31	1901	1901	1901	1901	1901	1901	1687
		Ducted	Ø2300	32	1920	1920	1920	1920	1920	1920	1687
		Ducted	Ø2400	34	1920	1920	1920	1920	1920	1920	1687
VL-1800	750	Open	Ø2600	32	2124	2124	2124	2124	2124	2124	2124
		Ducted	Ø2400	30	2262	2262	2262	2262	2262	2262	2127
		Ducted	Ø2500	31	2306	2306	2306	2306	2306	2306	2127
		Ducted	Ø2600	32	2306	2306	2306	2306	2306	2306	2127

* Number applies when the upper and/or lower gears are shotpeened.
Ratings are in kilowatts (kW) and are based on both maximum blade load (400 kW/m² for open propeller and 500 kW/m² for ducted propellers) and maximum machinery power.

MAIN PROPULSION RATINGS L-DRIVES (CR)

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)		V_{tip} (m/s)	Veth (kW)
		Front	Aft		
VL-160-CR	1500	Ø650	Ø585	28	183
VL-250-CR	1500	Ø850	Ø765	27	350
VL-450-CR	1200	Ø1100	Ø990	25	500
		Ø1200	Ø1080	27	500
VL-700-CR	900	Ø1350	Ø1210	28	850
VL-900-CR	900	Ø1400	Ø1260	27	975
		Ø1450	Ø1305	28	1000
		Ø1500	Ø1350	29	1000
VL-1250-CR	1000	Ø1650	Ø1485	28	1355
		Ø1700	Ø1530	29	1425
VL-1550-CR	750	Ø1900	Ø1710	29	1800
		Ø2000	Ø1800	30	1920

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
On request	On request	On request	On request	On request	On request
350	339	350	347	350	164
500	500	500	500	500	386
500	500	500	500	500	386
850	850	850	850	850	618
975	975	975	975	975	843
1000	1000	1000	1000	1000	843
1000	1000	1000	1000	1000	843
1355	1355	1355	1355	1355	1140
1425	1425	1425	1425	1425	1140
1800	1800	1800	1800	1800	1672
1920	1920	1920	1920	1920	1672

Ratings are in kilowatts (kW) and are based on both maximum blade load (350 kW/m² for contra-rotating propellers) and maximum machinery power.

Unit	Nominal Speed (rpm)	Propeller Type	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)	LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
						Inland	Seagoing				
VL-200si	1500	Open	Ø900	27	254	254	250	254	254	254	165
		Open	Ø1000	31	265	265	250	265	265	265	165
		Ducted	Ø900	27	265	265	250	265	265	265	165
VL-320si	1500	Open	Ø1100	31	370	370	370	370	370	370	186
		Ducted	Ø1050	30	370	370	370	370	370	370	186
VL-400si	1500	Open	Ø1250	34	491	491	491	491	491	491	367
		Ducted	Ø1130	30	500	500	500	500	500	500	367
VL-550si	900	Open	Ø1250	27	491	491	491	491	491	491	398
	1000	Ducted	Ø1130	27	501	501	501	501	501	501	442
VL-550i	900	Open	Ø1350	29	533	533	533	533	533	533	398
		Ducted	Ø1250	27	533	533	533	533	533	533	398
VL-700i	1000	Open	Ø1500	32	707	707	707	707	707	707	490
		Ducted	Ø1400	30	760	760	760	760	760	760	490
VL-900i	900	Open	Ø1600	32	804	804	804	804	804	804	804
		Open	Ø1700	34	908	908	908	908	908	908	865
		Ducted	Ø1600	32	968	968	968	968	968	968	865
		Ducted	Ø1700	34	968	968	968	968	968	968	865
VL-1100i	900	Open	Ø1900	33	1134	1134	1134	1134	1134	1134	1134
		Ducted	Ø1800	31	1272	1272	1272	1272	1272	1272	1140
		Ducted	Ø1900	33	1305	1305	1305	1305	1305	1305	1140
VL-1250i	900	Open	Ø2100	32	1385	1385	1385	1385	1385	1385	1355
		Ducted	Ø1900	29	1418	1418	1418	1418	1418	1418	1355
		Ducted	Ø2000	31	1425	1425	1425	1425	1425	1425	1355
		Ducted	Ø2100	32	1425	1425	1425	1425	1425	1425	1355
VL-1550i	750	Open	Ø2400	34	1810	1810	1810	1810	1810	1810	1687
		Ducted	Ø2200	31	1901	1901	1901	1901	1901	1901	1687
		Ducted	Ø2300	32	1920	1920	1920	1920	1920	1920	1687
		Ducted	Ø2400	34	1920	1920	1920	1920	1920	1920	1687
VL-1800i	750	Open	Ø2600	32	2124	2124	2124	2124	2124	2124	2124
		Ducted	Ø2400	30	2262	2262	2262	2262	2262	2262	2127
		Ducted	Ø2500	31	2306	2306	2306	2306	2306	2306	2127
		Ducted	Ø2600	32	2306	2306	2306	2306	2306	2306	2127

Ratings are in kilowatts (kW) and are based on both maximum blade load (400 kW/m^2 for open propeller and 500 kW/m^2 for ducted propellers) and maximum machinery power.

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)		V_{tip} (m/s)	Veth (kW)
		Front	Aft		
VL-250si-CR	1500	Ø850	Ø765	27	350
VL-450si-CR	1200	Ø1100	Ø990	25	500
		Ø1200	Ø1080	27	500
VL-700i-CR	900	Ø1350	Ø1210	28	600
VL-720i-CR	900	Ø1350	Ø1210	28	850
VL-900i-CR	900	Ø1400	Ø1260	27	975
		Ø1450	Ø1305	28	1000
		Ø1500	Ø1350	29	1000
VL-1250i-CR	1000	Ø1650	Ø1450	28	1326
		Ø1700	Ø1530	29	1340
VL-1550i-CR	750	Ø1900	Ø1710	29	1800
		Ø2000	Ø1800	30	1920

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
350	339	350	347	350	164
500	500	500	500	500	386
500	500	500	500	500	386
600	600	600	600	600	600
850	850	850	850	850	618
975	975	975	975	975	843
1000	1000	1000	1000	1000	843
1000	1000	1000	1000	1000	843
1326	1326	1326	1326	1326	1140
1340	1340	1340	1340	1340	1140
1800	1800	1800	1800	1800	1672
1920	1920	1920	1920	1920	1672

Ratings are in kilowatts (kW) and are based on both maximum blade load (350 kW/m² for contra-rotating propellers) and maximum machinery power.

AUXILIARY POWER UNIT RATINGS DIESEL-DRIVEN VETH JET

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)	LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
					Inland	Seagoing				
K-800	1800	Ø780	24	191	191	191	191	191	191	191
K-1000	1800	Ø980	30	265	265	265	265	265	265	265
K-1000NR	2100	Ø980	32	280	280	280	225	280	280	280
K-1200	1800	Ø1180	28	404	404	404	235	404	404	300
K-1300	1800	Ø1280	30	478	478	478	437	478	478	300
K-1300A	2100	Ø1280	30	577	577	577	559	577	500	365
K-1400	1800	Ø1420	27	618	618	618	618	618	500	489
K-1400A	1800	Ø1420	30	550	550	550	532	550	550	351
K-1400NR	1500	Ø1420	28	618	618	618	618	618	500	411
K-1650[1]	1800	Ø1650	31	956	956	956	956	956	956	956
K-1800	1800	Ø1800	30	1257	1257	1257	1257	1257	1257	1000

AUXILIARY POWER UNIT RATINGS ELECTRIC-DRIVEN VETH JET

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)	LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
					Inland	Seagoing				
K-800	1800	Ø780	24	191	191	191	191	191	191	191
K-800V	1800	Ø780	24	191	191	191	191	191	191	191
K-1000	1800	Ø980	30	265	265	265	265	265	265	265
K-1000NR	2100	Ø980	32	280	280	280	225	280	280	280
K-1000V	1800	Ø980	30	265	265	265	265	265	265	265
K-1200	1800	Ø1180	28	404	404	404	372	404	404	300
K-1200V	1800	Ø1180	28	404	404	404	404	404	404	300
K-1300	1800	Ø1280	30	478	478	478	478	478	478	330
K-1300V	1800	Ø1280	30	487	487	487	487	487	487	300
K-1300A	2100	Ø1280	30	577	577	577	577	577	500	434
K-1400	1800	Ø1420	27	618	618	618	618	618	500	510
K-1400A	1800	Ø1420	30	550	550	550	550	550	500	418
K-1400NR	1500	Ø1420	28	618	618	618	618	618	500	490
K-1650[1]	1800	Ø1650	31	956	956	956	956	956	956	956
K-1800	1800	Ø1800	30	1257	1257	1257	1257	1257	1257	1000

1 Concept design only; delivery time on request.
Ratings are in kilowatts (kW) and are based on both maximum blade load (500 kW/m^2) and maximum machinery power.

AUXILIARY POWER UNIT RATINGS DIESEL-DRIVEN COMPACT JET (CJ)

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)
CJ-1000	1800	Ø1040	28	340
CJ-1000V	1500	Ø1040	31	340
CJ-1200	1800	Ø1240	30	483
	2000	Ø1240	33	483
CJ-1200V	1000	Ø1240	31	483
CJ-1400[1]	1800	Ø1400	29	616
CJ-1400V[1]	1000	Ø1400	30	616

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
340	340	340	340	340	340
340	340	340	340	340	340
483	483	483	483	483	300
483	483	483	483	483	300
483	483	483	483	483	300
616	616	616	616	600	527
616	616	616	616	616	544

AUXILIARY POWER UNIT RATINGS ELECTRIC-DRIVEN COMPACT JET (CJ)

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)
CJ-1000	1800	1040	28	340
CJ-1200	1800	1240	30	483
	2000		33	483
CJ-1400[1]	1800	1400	29	616

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
330	330	340	340	340	300
483	483	450	483	483	300
483	483	483	483	483	300
616	616	600	616	600	527

AUXILIARY POWER UNIT RATINGS VETH COMPACT GRID (VCG)

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)
VCG-400	1500	Ø400	31	50
VCG-600	1000	Ø580	30	99
VCG-750	750	Ø750	29	177

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
50	50	50	50	50	50
99	99	99	99	99	99
177	177	177	177	177	177

1 Concept design only; delivery time on request.
Ratings are in kilowatts (kW) and are based on both maximum blade load (500 kW/m^2) and maximum machinery power.

AUXILIARY POWER UNIT RATINGS DIESEL-DRIVEN STEERING GRID

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)
VSG-800	1800	Ø780	24	191
VSG-1000(L)	1800	Ø980	30	265
VSG-1200(L)	1800	Ø1180	28	404
VSG-1300(L)	1800	Ø1280	30	478
VSG-1300A	2100	Ø1280	30	577
VSG-1400	1800	Ø1420	30	550

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
191	191	191	191	191	191
265	265	265	265	265	265
404	404	235	404	404	300
478	478	437	478	478	300
577	577	559	577	500	365
550	550	532	550	500	351

Ratings are in kilowatts (kW) and are based on both maximum blade load (500 kW/m²) and maximum machinery power.

AUXILIARY POWER UNIT RATINGS ELECTRIC-DRIVEN STEERING GRID

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)
VSG-800	1800	Ø780	24	191
VSG-1000(L)	1800	Ø980	30	265
VSG-1000V	1800	Ø980	30	265
VSG-1200(L)	1800	Ø1180	28	404
VSG-1200V	1800	Ø1180	28	404
VSG-1300(L)	1800	Ø1280	30	478
VSG-1300V	1800	Ø1280	30	487
VSG-1300A	2100	Ø1280	30	577
VSG-1400	1800	Ø1420	30	550

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
191	191	191	191	191	191
265	265	265	265	265	265
265	265	265	265	265	265
404	404	372	404	404	300
404	404	404	404	404	300
478	478	478	478	478	330
487	487	487	487	487	300
577	577	577	577	500	434
550	550	550	550	500	418

Ratings are in kilowatts (kW) and are based on both maximum blade load (500 kW/m²) and maximum machinery power.

AUXILIARY POWER UNIT RATINGS TUNNEL THRUSTERS

Unit	Nominal Speed (rpm)	Propeller Diameter (mm)	V_{tip} (m/s)	Veth (kW)
VT-50	1800	Ø450	29	64
VT-90	1800	Ø600	30	115
		Ø650	33	135
VT-180	1500	Ø850	29	135
	1800	Ø800	33	202
VT-240	1500	Ø980	30	267
VT-320	1500	Ø1050	30	350
VT-400	1500	Ø1200	32	452
VT-550	1500	Ø1350	30	545
VT-700	1000	Ø1500	32	707
VT-700	1500	Ø1500	33	707
VT-900	750	Ø1800	30	966
VT-900	1500	Ø1600	29	804
		Ø1700	31	908
VT-1250	900	Ø2100	32	1385

LRS (kW)		BV (kW)	ABS (kW)	RINA (kW)	DNV-GL (kW)
Inland	Seagoing				
64	64	64	64	64	64
115	115	115	115	113	68/84*
135	135	135	135	130	94/105*
168	168	168	168	168	168
202	202	202	202	202	202
267	267	267	267	267	267
350	350	350	350	350	275
452	452	452	452	452	452
545	545	545	545	545	440
707	707	707	707	707	525
707	707	707	707	707	490
966	966	966	966	966	966
804	804	804	804	804	782
908	908	908	908	908	782
1385	1385	1385	1385	1385	1385

* Number applies when the upper and/or lower gears are shotpeened.
Ratings are in kilowatts (kW) and are based on both maximum blade load (400 kW/m²) and maximum machinery power.