WHY VETUS STERN GEAR SYSTEMS?

The stern gear is one of the most important systems in a boat and deserves special attention. After all, a well-calculated, manufactured and installed propeller shaft system can greatly enhance the performance and reliability of your boat. Our engineers, responsible for propulsion systems, feel like they represent the heart of the boat. They work with only the best quality propellers, propeller shafts, stern tubes and couplings to design perfectly tuned systems.

The desired boat speed, waterline length, hull shape and weight are the key factors to determine the perfect engine and gear box combination for a boat. Stern gear transfers the power of the engine to the water. The determination of the optimum propeller is specialized work that has to be carried out with sophisticated propeller calculation programmes and needs above all, experience.

VETUS has many years of experience with stern gear and offers a wide range of products which are environmentally friendly and which increase comfort on board. Water-lubricated propeller shafts eliminate the need for oil or grease while flexible couplings absorb deviations in the alignment of the propeller shaft and ensure that vibration transferred from the propeller shaft system to the boat is kept to a minimum.

A well-designed stern gear system needs

- A dynamically balanced propeller to prevent vibration, resonance and cavitation
- A propeller shaft to transmit the engine power to the propeller
- Rubber bearings to ensure that vibration and noise are reduced to a minimum
- A stern tube and reliable stern gland
- A coupling to make alignment of the shaft and engine easier

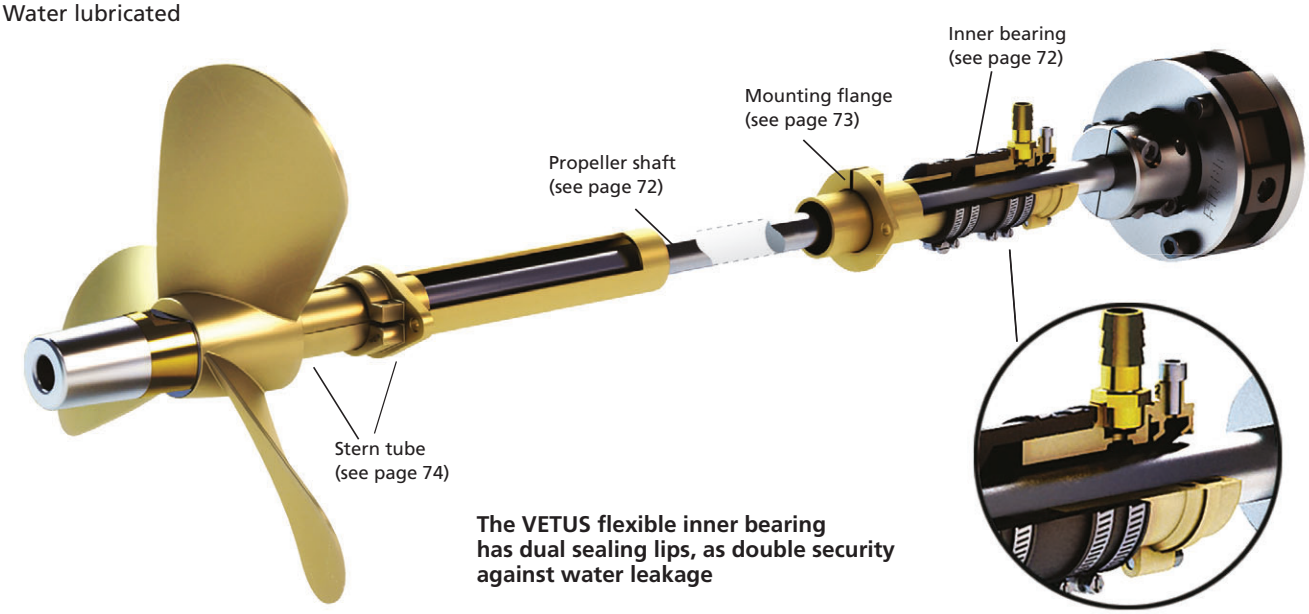
Good reasons to choose a VETUS stern gear system

- VETUS offers free calculation of the correct propeller size using a special computer program
- VETUS' large stock of standard high quality propellers in various sizes, pitches and blade areas
- VETUS provides in-house emergency repairs and modifies the bore and taper of stock propellers if necessary
- VETUS uses high quality corrosion-free materials designed for long life
- VETUS supplies a complete system, using both standard and custom made products
- VETUS offers various stern tube systems for shafts from 25 to 60 mm diameter
- VETUS offers various flexible couplings which significantly reduce vibration
- VETUS shaft assemblies protect the environment; water lubrication means no oil or grease pollution

Water lubricated stern gear for wooden, steel or polyester (G.R.P.) vessels

VETUS is able to deliver stern gear assemblies directly from stock. Machining, threading and keyway cutting have all been taken care of, so easy installation is guaranteed.

Specifications
- All VETUS propeller shafts are made of stainless steel type Duplex 1-4462, corrosion-free and with excellent running properties in rubber bearings
- Dual shaft seal (eliminating the need for a stuffing box)
- A propeller nut with integrated zinc anode is supplied as standard
- Water lubricated

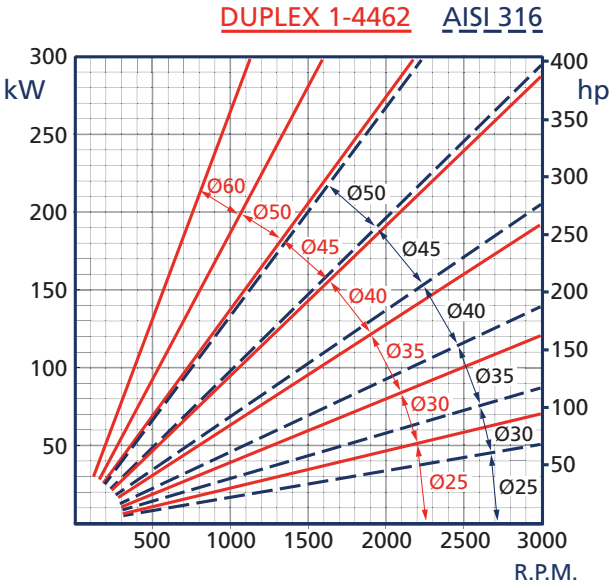


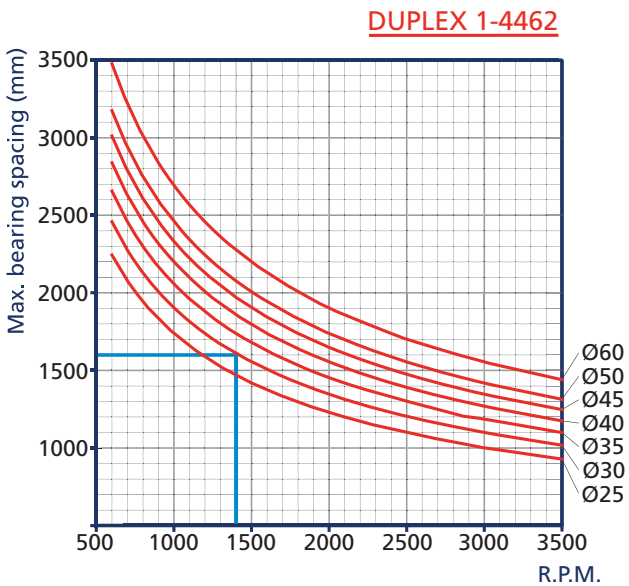
The VETUS flexible inner bearing has dual sealing lips, as double security against water leakage

Why Duplex 1-4462 instead of AISI 316
All VETUS propeller shafts are made of stainless steel type "Duplex 1- 4462". In comparison with stainless steel materials like AISI 316 and Aquamet 17 or 22, the corrosion resistance of "Duplex 1-4462" is much greater. In addition the tensile strength of "Duplex 1-4462" is about 30% greater than AISI 316 and its hardness is approximately 40% higher. It is precisely this high degree of hardness, which gives "Duplex 1-4462" its excellent running properties in rubber bearings.

Depending on shaft length, diameter and speed of rotation (rpm), 1, 2 or 3 cutless bearings must be installed.

Example
Imagine, you have a shaft with a maximum shaft speed of 1400 r.p.m. and a diameter of 30 mm. The diagram shows (blue line) that the maximum distance between 2 bearings amounts to 1600 mm. If you have a shaft of e.g. 1500 mm. length, then one rubber bearing will be sufficient. Should you have a shaft of 2000 mm. length, in this case 2 rubber bearings have to be used. For shafts with a length of 3200 mm or longer, 3 bearings are needed.





FLEXIBLE COUPLINGS

VETUS offers a variety of solutions to connect the propeller shaft to the engine. The flexible rubber element of the flexible coupling ensures low-noise vibration-free transmission, without backlash between the engine and the propeller shaft.
For smaller stern gear installations up to 30 mm, depending on the space available in the engine room, you can either choose the Bullflex, Combiflex, Uniflex type 13 or the KO5. These couplings all permit a misalignment of 2°. Only the KO5 is suitable for V-drives. For stern gear installations up to 70 mm, you can choose between Bullflex and Uniflex type 16.

Last but not least, VETUS offers the VDR. This double acting constant velocity joint comes with a thrust bearing. The VDR is used when considerable misalignment angles need to be overcome.

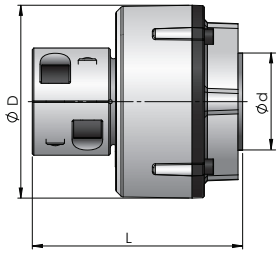
Type COMBIFLEX

Optimum damping of torsional vibrations

The Combiflex coupling has been designed to ensure optimum damping of torsional vibrations, created by cycle irregularities especially at low engine revolutions. The Combiflex coupling is secured against shearing off, both axially and radially, thus ensuring safe transmission under all circumstances. The Combiflex coupling also provides excellent alignment of the propeller shaft. Aligning the engine and propeller shaft can be a rather time consuming affair, however the Combiflex will remain perfectly centred onto the gearbox flange, even if the shaft has a misalignment of 2°. The parallel clamping hub ensures easy installation and probably even more importantly, easy dismantling of the shaft assembly.
Available for shafts of Ø 25 or 30 mm. Comes with a 4" flange to fit most common gearbox models.

For specifications, please see table on the next page.

COMFL



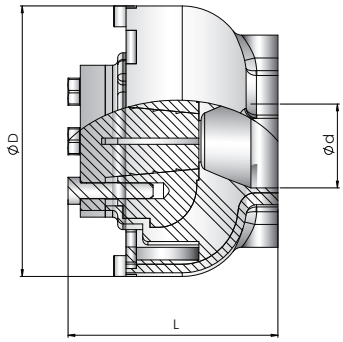
Type Uniflex

Exact alignment and concentric installation of propeller shaft

Couplings of type Uniflex permit a misalignment of 2°. Uniflex couplings will centre the shaft on the gearbox by means of a conical clamping hub and are an ideal flexible coupling between a propeller shaft with a self-aligning bearing and an engine on flexible supports. These couplings are axially and radially secured against shearing off. When the propeller shaft is connected to the engine at an angle of 2°, the maximum admissible number of revolutions is 1.500 r.p.m. on the shaft.

Specifications Uniflex type 13 and 16
- With cylindrical bore
- Clamping hub for shafts with a diameter of 20, 25 and 30 (type 13), and 30, 35 or 40 mm for type 16
- 4" Connection (type 13) and/or 5" (type 16) for Hurth, Velvet, TD, ZF, PRM and other makes
- Not suitable for V-Drives

UNIFL



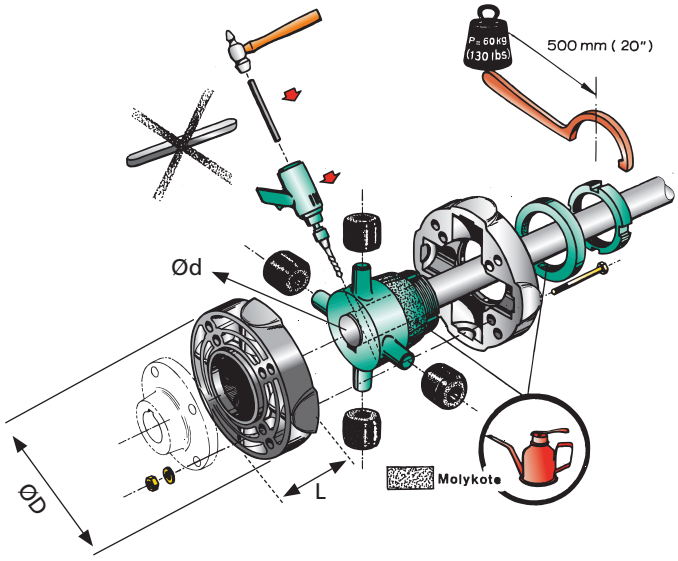
Type KO5 (type 6)

100% Concentric fit

This flexible coupling has a special conical clamping hub and is suitable for V-drives.

Type 6 saves considerable installation time. It is pilot bored Ø 20 mm or with a cylindrical bore for Ø 25, 30 and 35 mm shaft. Comes with 4 and 5" connectors for Hurth, Velvet, TD, ZF and PRM.

KO5



Specifications

Type	DIN 6270 B = pleasure craft. kW/100 r.p.m. on shaft (HP)	Example: at 1500 r.p.m. the max. admissible power is (DIN B)	DIN 6270 A = commercial craft. kW/100 r.p.m. on shaft (HP)	D mm	L mm	Ø d	Weight kg
COMFL1225	2,4 (3,2)	15 x 2,4 = 36 kW (48 hp)	1,7 (2,2)	126	137	25	3,5
COMFL1230	2,4 (3,2)	15 x 2,4 = 36 kW (48 hp)	1,7 (2,2)	126	137	30	3,2
KO51	3,9 (5,3)	15 x 3,9 = 58,5 kW (79,5 hp)	3,3 (4,5)	137	84	25	2,7
KO52	3,9 (5,3)	15 x 3,9 = 58,5 kW (79,5 hp)	3,3 (4,5)	137	84	30	2,7
KO53	3,9 (5,3)	15 x 3,9 = 58,5 kW (79,5 hp)	3,3 (4,5)	137	84	35	2,7
KO54 (type 6)	3,9 (5,3)	15 x 3,9 = 58,5 kW (79,5 hp)	3,3 (4,5)	137	84	20 Pilot	2,7
UNIFL1320	2,6 (3,6)	15 x 2,6 = 39 kW (53 hp)	1,8 (2,5)	130	98	20	2,4
UNIFL1325	2,6 (3,6)	15 x 2,6 = 39 kW (53 hp)	1,8 (2,5)	130	98	25	2,4
UNIFL1330	2,6 (3,6)	15 x 2,6 = 39 kW (53 hp)	1,8 (2,5)	130	98	30	2,4
UNIFL1630	5,2 (7,1)	15 x 5,2 = 79 kW (107 hp)	3,6 (5)	199	131	30	6,9
UNIFL1635	5,2 (7,1)	15 x 5,2 = 79 kW (107 hp)	3,6 (5)	199	131	35	6,9
UNIFL1640	5,2 (7,1)	15 x 5,2 = 79 kW (107 hp)	3,6 (5)	199	131	40	6,9

Bolt sets required to attach flexible coupling to gearbox drive flange

Type	Description
SET64	Set bolts for coupling type 6, for flange 4"
SET65	Set bolts for coupling type 6, for flange 5"
UNISET4/5	Set studs and bolts (M10) for couplings Combiflex, Uniflex and Bullflex 1-8, for flange 4"/5"

Type Bullflex

Ensuring optimum damping of vibrations

The Bullflex is the answer to the increasing demand of greater boating comfort. It is especially designed to ensure optimum damping of vibrations. Torsional vibrations are smoothed out extremely efficiently by its very flexible rubber element, ensuring low-noise and vibration-free transmission without backlash between the engine and propeller shaft. Another strong characteristic is the excellent alignment of the propeller shaft. For the most popular Volvo, Yanmar and Kanzaki gearboxes special (also custom made) adapter flanges are available (see page 71).

Features
- Very high flexibility
- Secured against shearing off (axially and radially) ensuring safe transmission under all circumstances
- Misalignment of up to 2° permissible
- Excellent centring of the shaft, allowing high shaft revolutions
- Shaft remains centred even in reverse gear
- Possibility to remove the centring ring, in case two or more bearings are applied
- Built-in thrust damper reducing axial vibrations
- Non-tapered clamping hub for perfect centring and easy dismantling of the shaft assembly

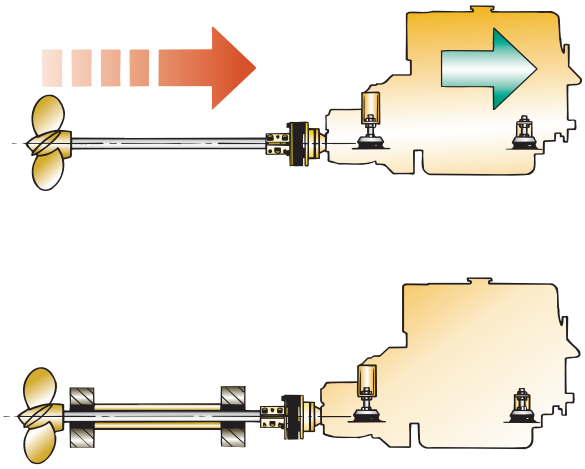
Specifications
- Models 1, 2 and 4 have a 4" gearbox connection
- Models 8, 12 and 16 feature a 4" and 5" gearbox connection
- Model 32 is provided with 6 threaded M16 holes on a pitch circle diameter of Ø 120,65 mm / 4,75" enabling mounting of the couplings to most models of gearboxes (Hurth, Velvet, TD, ZF and P.R.M.)
- VETUS can also supply the required fastenings for installation of the Bullflex onto the gearbox. This coupling is not suitable for V-Drives

For specifications, please see table on the next page.

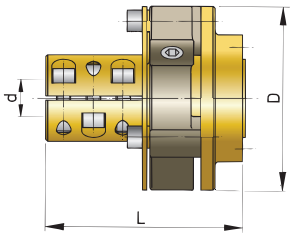
Centring the Bullflex

An engine on flexible mountings will by definition, always move. When the propeller shaft is installed rigidly - which means to say: supported by two or more non-flexible bearings - the propeller shaft should not be affected by engine movements.

If this should happen, damage of engine mounting, coupling and sealing of the shaft may result. Where a rigid shaft assembly is installed, the centring ring can be removed from the Bullflex coupling. This must be done if the distance between the output flange of the gearbox and the first shaft bearing is less than 20 times the shaft diameter. Pendulum movements of the flexibly mounted engine will then not be transmitted onto the propeller shaft, but will be effortlessly absorbed by the Bullflex coupling. Naturally, removal of the centring ring has no adverse effects on the vibration damping properties. Where the propeller shaft is supported by one rigid bearing only, the Bullflex coupling - with its centring ring installed - will function as a flexible ball joint. The propeller shaft will thus be supported and centered inside the Bullflex coupling, regardless of any engine movements.



Type Bullflex



Example

An engine has an output of 84 kW at maximum 3,600 r.p.m. and a gearbox ratio of 2.1:1.

The maximum speed of the propeller shaft is $\frac{3.600}{2,1}$ = 1,714 r.p.m.

Therefore, the power to be transmitted per 100 r.p.m. is $\frac{84}{17,14}$ = 4.9 kW/100 r.p.m.

From the table, the correct model is a Bullflex 8 for a pleasure craft or a Bullflex 12 for a commercial craft.
This formula can also be used with the relevant tables for Uniflex, Combiflex and Type 6 flexible couplings.

Type Bullflex	DIN 6270 B = pleasure craft kW (HP)/ 100 shaft RPM	DIN 6270 A = commercial craft kW (HP)/ 100 shaft RPM	maximum torque Nm		max. r.p.m. at zero misalignment	max. r.p.m. at 2° misalignment	D mm	L mm	d mm
			DIN 6270B	DIN 6270A					
1	0.8 (1.1)	0.5 (0.7)	75	45	7000	3500	100	85	20, 25
2	1.6 (2.1)	0.9 (1.3)	150	90	6500	3250	120	120	20, 25
4	3.1 (4.3)	2.1 (2.8)	300	200	6000	3000	150	152	25, 30
8	6.3 (8.5)	4.3 (5.8)	600	410	5000	2500	170	166	30, 35, 40
12	9.8 (12.8)	7.1 (9.6)	900	540	4000	2000	200	177	35,40,45
16	12.6 (17.1)	9.8 (13.3)	1200	935	4000	2000	205	197	40, 45, 50
32	23.0 (31.3)	18.6 (25.3)	2200	1780	3600	1800	260	263	40, 50, 60, 70

Specifications

Type	DIN 6270 B = pleasure craft kW (HP)/ 100 shaft RPM	DIN 6270 A = commercial craft kW (HP)/ 100 shaft RPM	maximum torque Nm		max. r.p.m. at zero misalignment	max. r.p.m. at 2° misalignment	D mm	L mm	d mm
			DIN 6270B	DIN 6270A					
BULFL0120	0.8 (1.1)	0.5 (0.7)	75	45	7000	3500	100	85	20
BULFL0125	0.8 (1.1)	0.5 (0.7)	75	45	7000	3500	100	85	25
BULFL0220	1.6 (2.1)	0.9 (1.3)	150	90	6500	3250	120	120	20
BULFL0225	1.6 (2.1)	0.9 (1.3)	150	90	6500	3250	120	120	25
BULFL0425	3.1 (4.3)	2.1 (2.8)	300	200	6000	3000	150	152	25
BULFL0430	3.1 (4.3)	2.1 (2.8)	300	200	6000	3000	150	152	30
BULFL0830	6.3 (8.5)	4.3 (5.8)	600	410	5000	2500	170	166	30
BULFL0835	6.3 (8.5)	4.3 (5.8)	600	410	5000	2500	170	166	35
BULFL0840	6.3 (8.5)	4.3 (5.8)	600	410	5000	2500	170	166	40
BULFL1235	9.8 (12.8)	7.1 (9.6)	900	540	4000	2000	200	177	35
BULFL1240	9.8 (12.8)	7.1 (9.6)	900	540	4000	2000	200	177	40
BULFL1245	9.8 (12.8)	7.1 (9.6)	900	540	4000	2000	200	177	45
BULFL1640	12.6 (17.1)	9.8 (13.3)	1200	935	4000	2000	205	197	40
BULFL1645	12.6 (17.1)	9.8 (13.3)	1200	935	4000	2000	205	197	45
BULFL1650	12.6 (17.1)	9.8 (13.3)	1200	935	4000	2000	205	197	50
BULFL3245	23.0 (31.3)	18.6 (25.3)	2200	1780	3600	1800	260	263	45
BULFL3250	23.0 (31.3)	18.6 (25.3)	2200	1780	3600	1800	260	263	50
BULFL3260	23.0 (31.3)	18.6 (25.3)	2200	1780	3600	1800	260	263	60
BULFL3270	23.0 (31.3)	18.6 (25.3)	2200	1780	3600	1800	260	263	70

Model	Type	Shaft Size Imperial Ø
BUFL011	Type Bullflex1	1"
BUFL021	Type Bullflex2	1"
BUFL041	Type Bullflex4	1"
BUFL0814	Type Bullflex8	1¼"
BUFL0812	Type Bullflex8	1½"
BUFL1212	Type Bullflex12	1½"

Model	Type	Shaft Size Imperial Ø
BUFL1213	Type Bullflex12	1¾"
BUFL1612	Type Bullflex16	1½"
BUFL1613	Type Bullflex16	1¾"
BUFL162	Type Bullflex16	2"
BUFL3213	Type Bullflex32	1¾"
BUFL322	Type Bullflex32	2"

Type	Description	
BUL16SET	Set stud & bolts	7/16" UNF for couplings type Bullflex 12 and 16
BUL32SET	Set stud & bolts	For couplings type Bullflex 32
TMCSET	Set stud & bolts	For couplings type Bullflex with Technodrive Gearbox
UNISET4/5	Set stud & bolts	For couplings type 1-8, and for flange 4"/5"

DRIVE FOR PROPELLER SHAFT

Type VETUS DRIVE

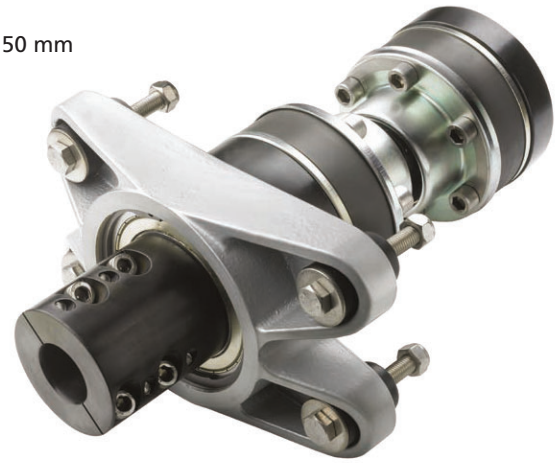
More freedom for engine movement, less freedom for vibration

The VETUS DRIVE (Type VDR) is a combination of a self-aligning thrust bearing and a double acting constant velocity joint. The propeller thrust is absorbed by the inbuilt thrust bearing allowing the engine to be set up on softer mountings, resulting in lower vibration and transmitted noise. The VDR is made of stainless, black passivated steel and high performance rubber. This heavy duty VDR has been tested under the toughest conditions and is suitable for maximum thrust up to 24 000 N.

Specifications
- VDR6 is available for shaft diameters of 50, 60 or 70 mm
- VDR2 and 4 are available for shaft diameters of 25, 30, 35, 40, 45 or 50 mm
- Interchangeable with other well-known models
- Durable design with long lifetime

Note
For the most popular Volvo, Yanmar and Kanzaki gearboxes special (also custom made) adapter flanges are available (see page 71).

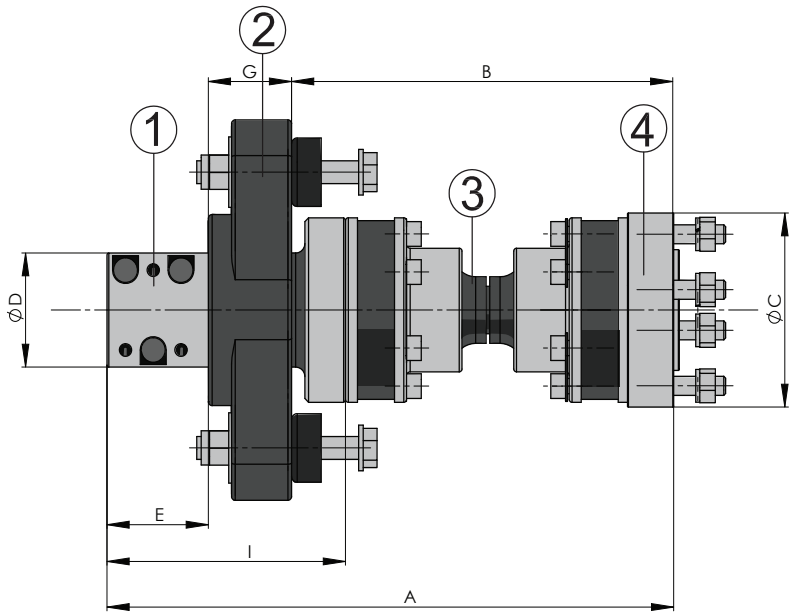
VDR

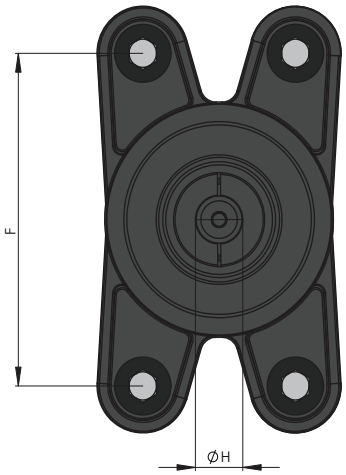


Dimensions for VDR constant velocity joint

Type	A mm	B mm	C mm	D Ø	E mm	F mm	G mm	H mm	I mm
VDR210254	325	217	101.6	60	63	145	45	25	143
VDR210255	325	217	127	60	63	145	45	25	143
VDR210304	325	217	101.6	60	63	145	45	30	143
VDR210305	325	217	127	60	63	145	45	30	143
VDR215254	376	268	101.6	60	63	145	45	25	175
VDR215255	376	268	127	60	63	145	45	25	175
VDR215304	376	268	101.6	60	63	145	45	30	175
VDR215305	376	268	127	60	63	145	45	30	175
VDR215354	401	268	101.6	69	88	145	45	35	200
VDR215355	401	268	127	69	88	145	45	35	200
VDR221304	429	321	101.6	60	63	145	45	30	183
VDR221305	429	321	127	60	63	145	45	30	183
VDR221354	454	321	101.6	69	88	145	45	35	208
VDR221355	454	321	127	69	88	145	45	35	208
VDR221404	454	321	101.6	69	88	145	45	40	208
VDR221405	454	321	127	69	88	145	45	40	208
VDR421404	437	294	101.6	85	90	214	53	40	188
VDR421405	437	294	127	85	90	214	53	40	188
VDR421454	437	294	101.6	85	90	214	53	45	188
VDR421455	437	294	127	85	90	214	53	45	188
VDR421505	448	294	127	89	102	214	53	50	199
VDR430404	538	395	101.6	85	90	214	53	40	233
VDR430405	538	395	127	85	90	214	53	40	233
VDR430454	538	395	101.6	85	90	214	53	45	233
VDR430455	538	395	127	85	90	214	53	45	233
VDR430504	549	395	101.6	89	101	214	53	50	244
VDR430505	549	395	127	89	101	214	53	50	244
VDR630505	522	333	127	87.5	87.5	250	87	50	250
VDR630605	522	333	127	87.5	87.5	250	87	60	250
VDR630705	522	333	127	87.5	87.5	250	87	70	250
VDR630506	522	333	152.4	87.5	87.5	250	87	50	250
VDR630606	522	333	152.4	87.5	87.5	250	87	60	250
VDR630706	522	333	152.4	87.5	87.5	250	87	70	250
VDR642505	579	362	127	87.5	87.5	250	87	50	250
VDR642605	579	362	127	87.5	87.5	250	87	60	250
VDR642705	579	362	127	87.5	87.5	250	87	70	250
VDR642506	579	362	152.4	87.5	87.5	250	87	50	250
VDR642606	579	362	152.4	87.5	87.5	250	87	60	250
VDR642706	579	362	152.4	87.5	87.5	250	87	70	250

DRIVE FOR PROPELLER SHAFT





1. Clamp Hub
2. Thrust Bearing
3. CV Joint (Constant Velocity Joint)
4. Flange

The selection of the right VDR constant velocity joint is dependent on some variables: boatspeed, engine HP, RPM, gearbox and shaft diameter. We therefore recommend that you use the VETUS drive selection at our website.

Type FLANGE

Adapter flanges for connecting gearboxes to flexible couplings

These adapter flanges can be used for many gearboxes made by Volvo, Yanmar and Kanzaki and are available as an option. When the pump unit on some hydraulic gearboxes is positioned in a way that it is impossible to install a flexible coupling directly onto the output flange, an intermediate flange will have to be fitted as well.
Intermediate flange are available on special request.

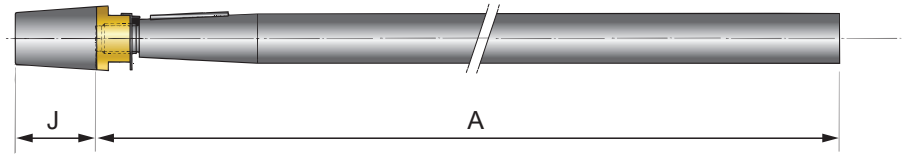
Type	Description
FLANGE1	Adapter flange for Yanmar KM2C; KMP2P; KM3P, Kanzaki KC30; KC45 and KC100
FLANGE2	Adapter flange for Volvo MS10A/L; MS15A/L and MS25A/L
FLANGE2A	Adapter flange for Volvo MS; MSB and all types MS2
FLANGE3	Adapter flange for Yanmar KM4A; KM4A1; KMH4A; KBW20-1; KBW21 and Kanzaki KC180

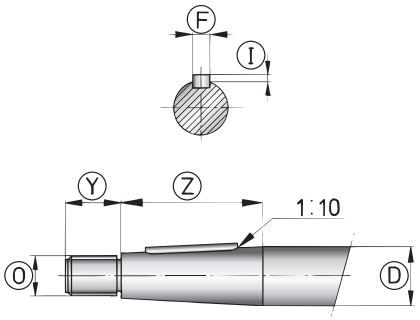
FLANGE

Propeller shaft type SA

Duplex 1-4462 stainless steel propeller shaft

This shaft is machined with 1:10 taper and a keyway as standard. It is supplied with key and propeller nut with integrated zinc anode. The dimensions of taper and keyway are in accordance with ISO 4566.





Shaft types with all dimensions in mm

Type	Ø D mm	Shaft lengths (A) (mm)	F	I	J	O	Y	Z
SA25	25	1000 / 1500 / 2000 / 2500 / 3000	8	3	40	M16 x 1.5	25	55
SA30	30	1000 / 1500 / 2000 / 2500 / 3000	8	3	57	M20 x 1.5	30	75
SA35	35	1000 / 1500 / 2000 / 2500 / 3000	10	3	54	M24 x 2	35	85
SA40	40	on request	12	3	64	M24 x 2	35	95
SA45	45	on request	14	3,5	69	M30 x 2	40	105
SA50	50	on request	14	3,5	79	M36 x 2	45	115
SA60	60	on request	18	4	96	M42 x 3	55	130

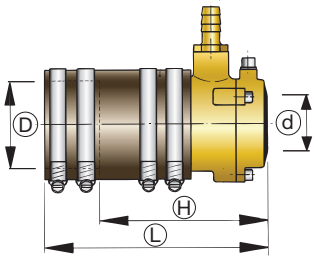
Type	
SA25/+	Extra charge per 500 mm
SA30/+	Extra charge per 500 mm
SA35/+	Extra charge per 500 mm

Type	
SA40/+	Extra charge per 500 mm
SA45/+	Extra charge per 500 mm
SA50/+	Extra charge per 500 mm
SA60/+	Extra charge per 500 mm

Bronze self-aligning inner bearing and dual shaft seal

The VETUS flexible inner bearing used in this system has dual sealing lips for double security against water leakage.

Type	Description	H	L	D	d
ZWB25I	Bronze flexible inner bearing Ø 25 mm, with dual lip seal	112	144	43	25
ZWB30I	Bronze flexible inner bearing Ø 30 mm, with dual lip seal	112	144	49,5	30
ZWB35A	Bronze flexible inner bearing Ø 35 mm, with dual lip seal	112	145	56	35
ZWB40A	Bronze flexible inner bearing Ø 40 mm, with dual lip seal	114	150	61	40
ZWB45A	Bronze flexible inner bearing Ø 45 mm, with dual lip seal	129	165	71	45
ZWB50A	Bronze flexible inner bearing Ø 50 mm, with dual lip seal	129	165	76	50
ZWB60	Bronze flexible inner bearing Ø 60 mm, with dual lip seal	129	165	90	60
ZWB2540	Replacement set for VETUS 25 mm inner bearing with stuffing box				
ZWB3044	Replacement set for VETUS 30 mm inner bearing with stuffing box				



ZWB

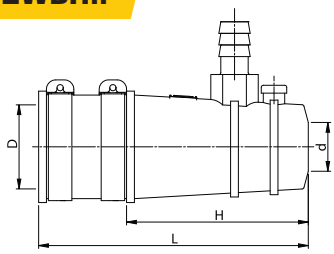
All dimensions are in mm.

Self-aligning inner bearing and triple shaft seal for extra security

ZWBH seals are developed for use with water lubricated stern gear. This updated monoblock design works in the same way as the trusted ZWB seals, with the addition of one extra lip seal (three total) for added security. Minimal friction, oil and grease resistant and with a 10 mm vulcanised hose pillar for water injection; the ZWBH is ready for another round!

VETUS advices annual lubrication with silicon grease to keep this sterngear seal in optimal condition. ZWBH seals can withstand temperatures between -15° and + 85° and are suitable for VETUS bronze, steel or GRP stern tubes. The set comes with two stainless steel hose clamps and grease.

ZWBH..



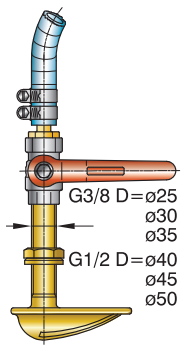
Type	Description	H	L	D	d
ZWBH25	Flexible inner bearing, with triple lip seal	112	144	43	25
ZWBH30	Flexible inner bearing, with triple lip seal	112	144	49,5	30
ZWBH35	Flexible inner bearing, with triple lip seal	112	145	56	35

Water lubrication connections

There are two possibilities to water lubricate your shaft assembly
1. By means of a water scoop G 3/8, with ball valve, hose pillar, 1 metre of water hose and hose clamps, or
2. By tapping a small amount of water from the main engine's raw water cooling circuit.

Type	Description
WCAPSET	Water scoop kit for Ø 25-30-35 mm, shaft
WCAPS1/2	Water scoop kit for Ø 40-45-50 mm, shaft

WCAPS



For the second option we offer the ZWBKIT. With this kit you have all you need to water lubricate your shaft assembly by using water from the main engine's raw water cooling circuit. The kit consists of a T-piece (18 -10 -18 mm), 3 metres of Ø 10 mm hose (DWHOSE10A) and 4 hose clamps.

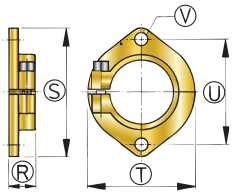
Type	Consist of	Code
ZWBKIT	1 TP1810 T-piece	TP1810
	3 Fresh water hose per metre	DWHOSE10A
	4 Hose clamps AISI 304 9 mm Ø 8 - 16 mm	HCS08

ZWBKIT

Mounting flange for stern tube

The propeller end of the bronze stern tube is provided with an outer cutless bearing and a mounting flange. The slots in the tube are designed for easy replacement of the cutless bearing. A second flange maybe required to secure the inboard end of the stern tube and can be ordered separately.

Type	Ø D	R	S	T	U	Ø V
FLK25	25	18	86	72	70	8,5
FLK30	30	18	90	78	74	8,5
FLK35	35	23	112	97	92	10,5
FLK40	40	23	116	101	96	10,5
FLK45	45	28	132	118	108	13
FLK50	50	28	138	125	114	13
FLK60	60	28	148	136	124	13

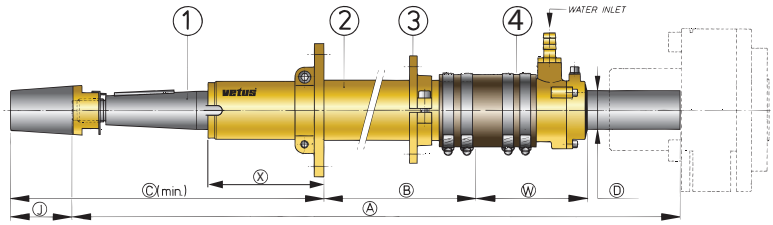


FLK

WATER LUBRICATED STERN GEAR

Bronze stern tube assembly

1. Propeller shaft
2. Stern tube
3. Mounting flange
4. Inner bearing

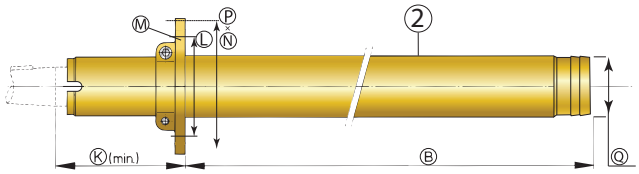


When ordering, please specifiy dimensions A, B and D.

Type	Ø Shaft (D)	A	B	X	C	W	J
BL25	25	Shaft length	Stern tube length	88	210	112	40
BL30	30			105	267	112	57
BL35	35			117	291	112	54
BL40	40			113	327	114	64
BL45	45			145	359	129	69
BL50	50			162	401	129	79
BL60	60			190	430	129	80

Type BL

Bronze stern tube with mounting flange and 1 cutless bearing aft. The slots in the tube are designed for easy replacement of the cutless bearing.



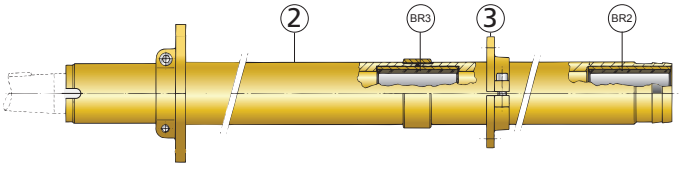
Type	Ø D	Length B				K	L	Ø M	N	P	Q
BL25	25	500	1000	1500	2000	88	90	8,5	110	60	43
BL30	30	500	1000	1500	2000	105	100	8,5	120	67	49,5
BL35	35	on request				117	110	10,5	132	76	57
BL40	40	on request				113	116	10,5	138	82	62
BL45	45	on request				145	150	13	180	93	71
BL50	50	on request				162	165	15	197	99	76,1
BL60	60	on request				190	155	15	180	106	92

Type	
BL25/+	Extra charge per 500
BL30/+	Extra charge per 500
BL35/+	Extra charge per 500

Type	
BL40/+	Extra charge per 500
BL45/+	Extra charge per 500
BL50/+	Extra charge per 500
BL60/+	Extra charge per 500

Type BR2

Forward cutless bearing for bronze stern tube. When ordering please specify type BL and type BR2. The tube will be supplied with the second bearing already installed.



Type BR3

Intermediate cutless bearing for bronze stern tube. When ordering please specify type of BL, type BR2 and type BR3.

The tube will supplied with ordered bearings already installed.

Forward bearing for stern tubes

Type	Description
BR225	Bearing for Ø 25 mm stern tube
BR230	Bearing for Ø 30 mm stern tube
BR235	Bearing for Ø 35 mm stern tube
BR240	Bearing for Ø 40 mm stern tube
BR245	Bearing for Ø 45 mm stern tube
BR250	Bearing for Ø 50 mm stern tube
BR260	Bearing for Ø 60 mm stern tube

Intermediate bearing for stern tubes

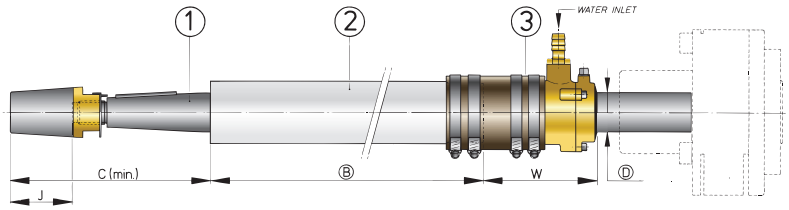
Type	Description
BR325	Bearing for Ø 25 mm stern tube
BR330	Bearing for Ø 30 mm stern tube
BR335	Bearing for Ø 35 mm stern tube
BR340	Bearing for Ø 40 mm stern tube
BR345	Bearing for Ø 45 mm stern tube
BR350	Bearing for Ø 50 mm stern tube
BR360	Bearing for Ø 60 mm stern tube

WATER LUBRICATED STERN GEAR

G.R.P. (Polyester) stern tube assembly

Type	Ø D	Length	J	Ø Q	W	C	Length B			
BG25	25	500	40	44	112	127	581,5	1081,5	1581,5	2081,5
BG30	30	500	57	50	112	172	595,5	1095,5	1595,5	2095,5
BG35	35	500	54	57	112	184	595,5	1095,5	1595,5	2095,5
BG40	40	500	64	62	114	214	595,5	1095,5	1595,5	2095,5

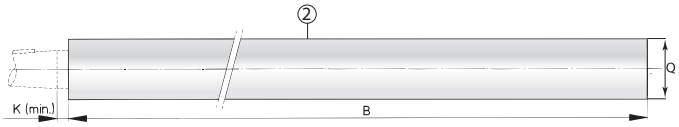
1. Propeller shaft
2. Stern tube
3. Inner bearing



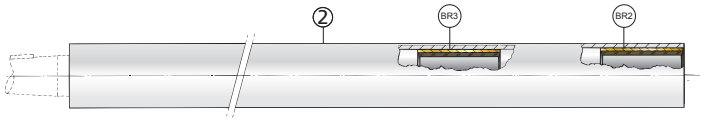
Note
G.R.P. tubes, can be supplied with the same ZWB dual shaft seal as shown on page 72. For the BG25 also the Triple lip seal shown at page 73 cane be used. The stern tubes which are provided with a cutless bearing, must be bonded directly into the hull.

G.R.P. stern tubes - type BG

The propeller end of the G.R.P. stern tube is provided with an outer cutless bearing. The stern tubes must be bonded directly into the hull.



Type	Ø D	Length B				K	Ø Q
BG25	25	581,5	1081,5	1581,5	2081,5	8	44
BG30	30	595,5	1095,5	1595,5	2095,5	10	50
BG35	35	595,5	1095,5	1595,5	2095,5	10	57
BG40	40	on request				12	62



Depending on the length, diameter and RPM of the shaft, there is a need for 1, 2 or 3 cutlass bearings.

Forward bearing for stern tubes

Type	Description
BR225	Bearing for Ø 25 mm stern tube
BR230	Bearing for Ø 30 mm stern tube
BR235	Bearing for Ø 35 mm stern tube
BR240	Bearing for Ø 40 mm stern tube

Intermediate bearing for stern tubes

Type	Description
BR325	Bearing for Ø 25 mm stern tube
BR330	Bearing for Ø 30 mm stern tube
BR335	Bearing for Ø 35 mm stern tube
BR340	Bearing for Ø 40 mm stern tube

All dimensions are in mm.

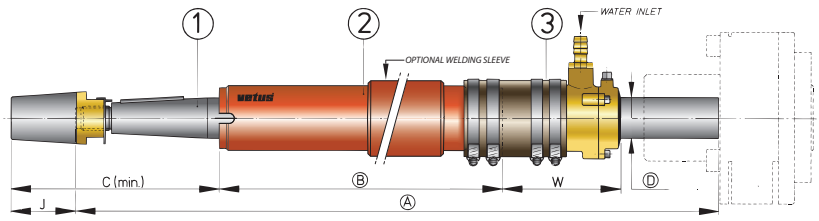
WATER LUBRICATED STERN GEAR

Steel stern tube assembly

When ordering, please specify dimensions A, B and D.

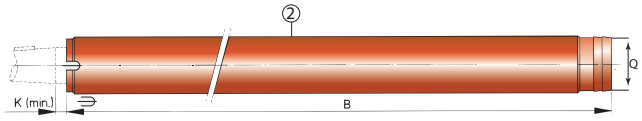
Type	Ø Shaft (D)	Shaft length A	Stern tube length B	C	W	J
BS25	25	on request	on request	127	112	40
BS30	30	on request	on request	172	112	57
BL35S	35	on request	on request	184	112	54
BL40S	40	on request	on request	206	114	64
BL45S	45	on request	on request	226	129	69
BL50S	50	on request	on request	254	129	79
BL60S	60	on request	on request	287	93	96

1. Propeller shaft
2. Stern tube
3. Inner bearing



Steel stern tubes

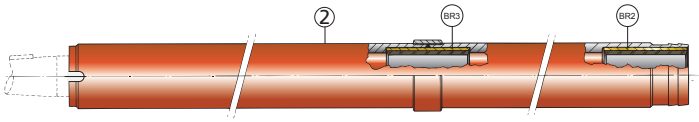
The propeller end of the steel stern tube is provided with an outer cutless bearing. The slots in the tube are designed for easy replacement of the cutless bearing. All steel stern tubes may be supplied with additional sleeves to reduce distortion when welding. Please specify when ordering.



Type	Ø D	Length B	K	Ø Q
BS25	25	on request	8	44
BS30	30	on request	10	51
BL35S	35	on request	10	57
BL40S	40	on request	12	62
BL45S	45	on request	12	70
BL50S	50	on request	15	76,1
BL60S	60	on request	15	92

Type BR2

Forward cutless bearing for steel stern tube. When ordering please specify type BL and type BR2. The tube will be supplied with second bearing already installed.



Type BR3

Intermediate cutless bearing for steel stern tube. When ordering please specify type BL, type BR2 and type BR3.

The tube will supplied with ordered bearings already installed.

Forward bearing for stern tubes

Type	Description
BR225	Bearing for Ø 25 mm stern tube
BR230	Bearing for Ø 30 mm stern tube
BR235	Bearing for Ø 35 mm stern tube
BR240	Bearing for Ø 40 mm stern tube
BR245	Bearing for Ø 45 mm stern tube
BR250	Bearing for Ø 50 mm stern tube
BR260	Bearing for Ø 60 mm stern tube

Intermediate bearing for stern tubes

Type	Description
BR325S	Bearing for Ø 25 mm stern tube
BR330S	Bearing for Ø 30 mm stern tube
BR335S	Bearing for Ø 35 mm stern tube
BR340S	Bearing for Ø 40 mm stern tube
BR345S	Bearing for Ø 45 mm stern tube
BR350S	Bearing for Ø 50 mm stern tube
BR360S	Bearing for Ø 60 mm stern tube

All dimensions are in mm.

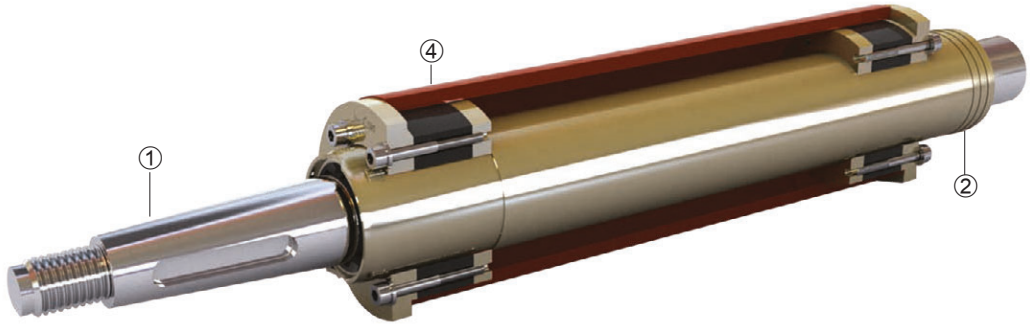
WATER LUBRICATED STERN GEAR

Type CS with dual lip seal and rubber bushings

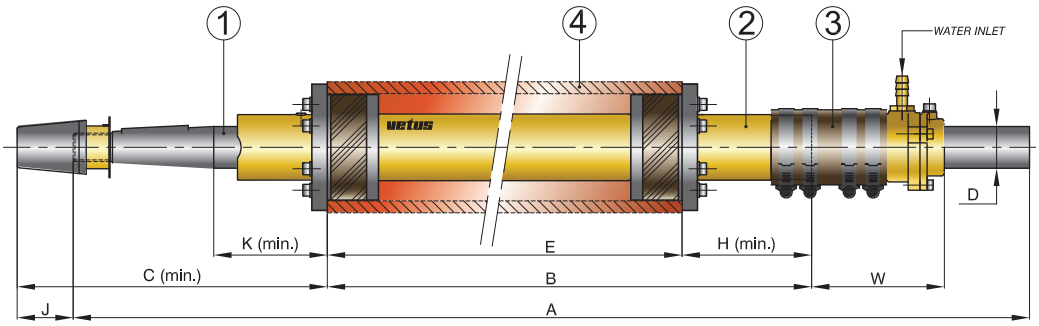
This water-lubricated propeller shaft assembly uses a thick walled steel outer tube which can be welded into a steel boat with minimum distortion. In this steel tube you can easily fit a bronze stern tube with the aid of rubber bushings.

Specifications
- 1 rear cutless bearing (additional bearings can be supplied on request)
- Bronze stern tube (can be supplied with a VETUS self-aligning inner bearing with dual lip seal type ZWB)

For dimensions see table below. Please state dimensions A, B, D and E when ordering.



1. Propeller shaft
2. Stern tube
3. Inner bearing
4. Thick walled steel outer tube



Ø D	A	B	C	E	H	J	K	W	Precision steel tube
Ø 35	on request	on request	291	on request	60	54	117	112	I.D. = 89 / O.D. = 101.6
Ø 40	on request	on request	327	on request	63	64	133	114	I.D. = 89 / O.D. = 101.6
Ø 45	on request	on request	359	on request	63	69	145	129	I.D. = 112.8 / O.D. = 127
Ø 50	on request	on request	401	on request	63	79	162	129	I.D. = 112.8 / O.D. = 127

All dimensions are in mm.

PROPELLERS

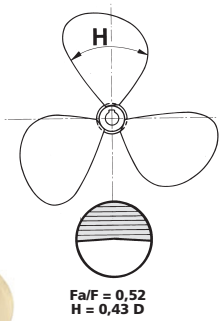
The most essential component of your boat

VETUS makes good use of an especially developed computer programme, which determines exactly the right propeller for your boat. The most important elements of propeller design and manufacture are balance, dimensions, material and the blade area.

1. If you bear in mind that a propeller is often rotating at 2.000 r.p.m. (more than 30 revolutions per second), you will understand that it is an absolute must that a good propeller is well-balanced.
2. In order to achieve the best performance and to minimize vibration, it is extremely important to ensure that the pitch of each blade is identical and that the distance between the blades does not vary. This requires great manufacturing precision.
3. VETUS propellers are made of manganese bronze, an extremely resilient, yet flexible material.
4. The choice of a good propeller with all above combined qualities, is of the utmost importance.
5. A propeller specialist must always determine the diameter and pitch and the required (fixed) Fa/F ratio. This means the total area of the propeller circle (F) in comparison to the surface area (stretched and developed) of all blades (Fa). The choice of the Fa/F ratio is dependent on the shape of the underwater section and the speed of the boat in question.

3-Bladed propeller
Type P3B

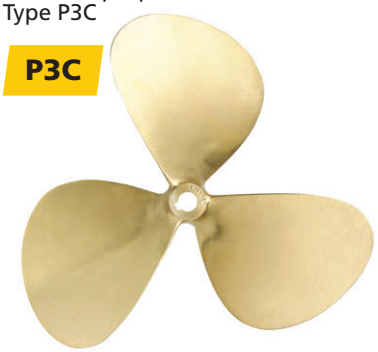
P3B

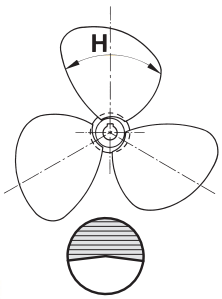


Fa/F = 0,52
H = 0,43 D

3-Bladed propeller
Type P3C

P3C

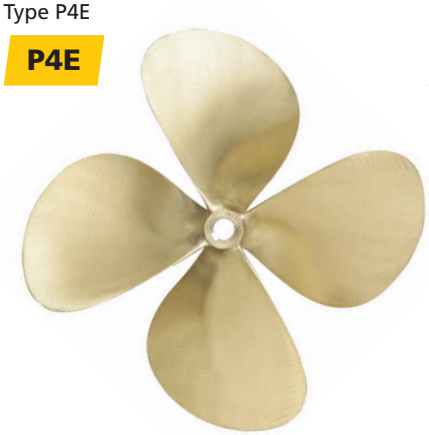


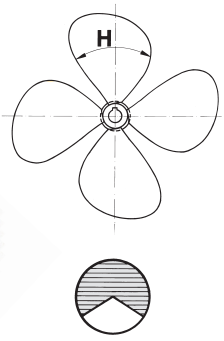


Fa/F = 0,55
H = 0,45 D

4-Bladed propeller
Type P4E

P4E

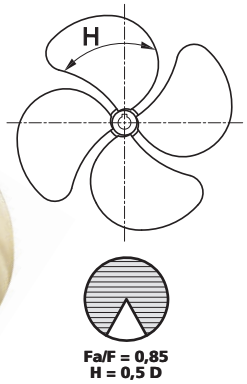




Fa/F = 0,69
H = 0,43 D

4-Bladed propeller
Type P4G

P4G



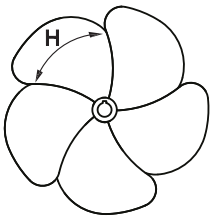
Fa/F = 0,85
H = 0,5 D

PROPELLERS

Propellers of different types and dimensions are available to special order

5-Bladed propeller
Type P5G

P5G



Fa/F = 1,06
H = 0,5 D

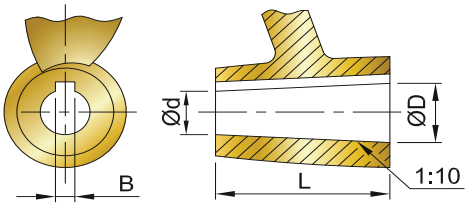
Note
Types P3B, P3C and P4E have standard shaft holes and keyway. Dimensions are according to ISO 4566. Sizes are indicated in the tables. VETUS can also supply matching propeller shafts from stock (see page 72).

Standard taper of shaft holes of VETUS propellers (1:10). Dimensions according to ISO 4566

Propeller diameter					Shaft hole		Hub	
3-bladed propeller P3B	3-bladed propeller P3C	4-bladed propeller P4E	4-bladed propeller P4G	5-bladed propeller P5G	Largest diameter D (mm)	Smallest diameter d (mm)	Hub length L (mm)	Keyway width B (mm)
12”-15”	12”-15”	14”-15”	-	-	25	19	60	8
16”-18”	16”-18”	16”-17”	on request	on request	30	22	80	8
19”-21”	19”-21”	18”-20”	on request	on request	35	26	90	10
22”-24”	22”-24”	21”-22”	on request	on request	40	30	100	12
25”	25”	23”-24”	on request	on request	45	34	110	14
greater than 25”	greater than 25”	on request	on request	on request	50	38	120	14

How to order?

Please give us the propeller diameter and pitch, as well as the number of blades, the sense of rotation and the dimensions of the hub and the taper as shown below. In case propeller details are not known to you: VETUS makes use of an especially developed programme, which determines the exact right propeller for your boat.



Propeller shaft taper

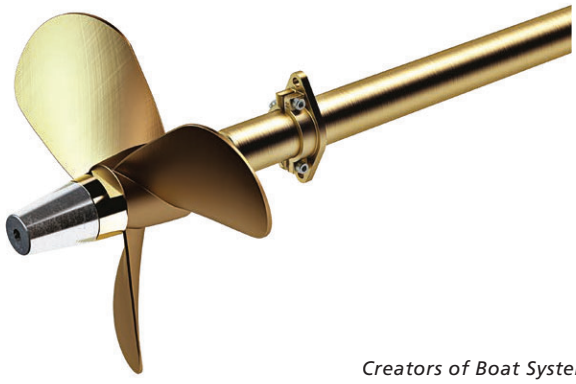
All stock VETUS propellers have a standard taper of 1:10. This means that the difference between the largest and the smallest diameter of the tapered hole represents 10% of the propeller hub length (D-d=0.1xL). If required, we can machine the hub to a taper of 1:12, 1:16, etc. It takes a few days extra delivery time plus a small surcharge (see pricelist).

Note
VETUS offers a wide variety of propeller sizes to special order. Propellers are supplied in manganese bronze. Aluminium bronze propellers can also be supplied to special order.

Zinc anode for shaft nut

Type	Specifications
SN25B	Spare zinc anode for Ø 25 mm shaft nut
SN30B	Spare zinc anode for Ø 30 mm shaft nut
SN35B	Spare zinc anode for Ø 35 mm shaft nut
SN40B	Spare zinc anode for Ø 40 mm shaft nut
SN45B	Spare zinc anode for Ø 45 mm shaft nut
SN50B	Spare zinc anode for Ø 50 mm shaft nut
SN60B	Spare zinc anode for Ø 60 mm shaft nut

For more information or a overview of anodes see page 398.

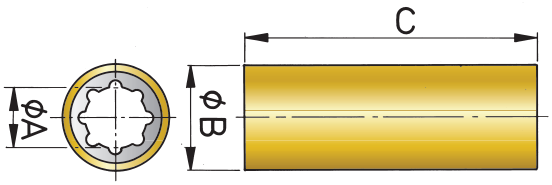


BEARINGS

Water lubricated cutless bearings

These cutless bearings have a polyurethane-rubber lining. The outer bushings are made of either brass or phenolic resin. Phenolic resin is lightweight, cannot corrode and can easily be replaced. These bearings are available for shaft diameters between Ø 20 and Ø 100 mm and from Ø 1" through Ø 4". VETUS rubber bearings are also available for larger shaft diameters to special order.

For dimensions please see tables below.



Rubber bearings with shaft size (A) in mm and shell size (B) in inches. Length (C) in mm.

Brass shell	Phenolic shell	A	B**	C
RULAGER20	RULAG25PH	20 *	1 1/4	76
RULAGER22		22 *	1 1/4	76
RULAGER25		25	1 1/2	100
RULAGER30	RULAG30PH	30	1 3/4	127
RULAGER35	RULAG35PH	35	1 7/8	140
RULAGER40	RULAG40PH	40	2 1/8	160
RULAGER45	RULAG45PH	45	2 3/8	180
RULAGER50	RULAG50PH	50	2 5/8	200
RULAGER60	RULAG60PH	60	3	240
RULAGER65		65 *	3 3/8	260
RULAGER70	RULAG70PH	70	3 1/2	280
RULAGER80	RULAG80PH	80	4	320

Rubber bearings with shaft size (A) in mm and shell size (B) in mm. Length (C) in mm.

Brass shell	Phenolic shell	A	B	C
RL2540	RL2540PH	25	40	100
RL3045	RL3045PH	30	45	120
RL3550	RL3550PH	35	50	140
RL4055	RL4055PH	40	55	160
RL4565	RL4565PH	45	65	180
RL5070	RL5070PH	50	70	200
RL6080	RL6080PH	60	80	240
RL7090	RL7090PH	70	90	280
RL8010	RL8010PH	80	100	320
RL9011	RL9011PH	90	110	360
RL1012	RL1012PH	100	125	400

Rubber bearings with shaft size (A) in inches and shell size (B) in inches. Length (C) in inches.

Brass shell	Phenolic shell	A	B	C
RULAG1	RL1PH	1	1 1/2	4
RULAG11/8	RL11/8PH	1 1/8	1 5/8	4 1/2
RULAG11/4	RL11/4PH	1 1/4	1 3/4	5
RULAG13/8	RL13/8PH	1 3/8	1 7/8	5 1/2
RULAG11/2	RL11/2PH	1 1/2	2	6
RULAG15/8		1 5/8	2 1/8	6 1/2
RULAG13/4	RL13/4PH	1 3/4	2 3/8	7
RULAG2	RL2PH	2	2 5/8	8
RULAG21/4	RL21/4PH	2 1/4	3	9
RULAG21/2	RL21/2PH	2 1/2	3 1/4	10
RULAG23/4	RL23/4PH	2 3/4	3 3/4	11
RULAG3	RL3PH	3	4	12
RULAG31/2	RL31/2PH	3 1/4	4 1/2	14
RULAG4	RL4PH	4	5	16

* Available to special order
** Used in VETUS stern gear

RULAGER RULAG..PH RL