

As supplier of marine propellers, Exalto has a solid reputation for HS Aquaprop propellers. These are high quality propellers for both the yachting and the professional industries. Besides the propellers quality, the choice of the right kind of propeller is crucial. The right propeller will deliver the optimum propulsion.

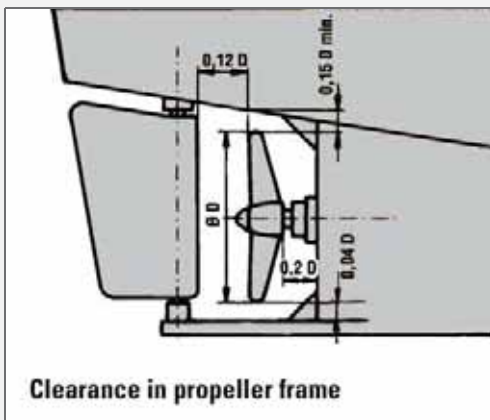
Calculation

Because choosing the right propeller is crucial for an efficient propulsion system, Exalto specializes in propeller calculation. We can give you a solid, thorough advice on the right propeller in your specific situation. You can download our special Propeller questionnaire on www.exalto.com. Just fill in the data and return the form to us. We will then be able to calculate the best propeller for you.

All sorts, shapes and sizes

We supply a very wide range of propellers to choose from. We offer propellers:

- for every kind of application imaginable, varying from standard propellers to propellers for displacement, sailing or planing vessels up to customized propellers for e.g. submarines (EP, CEP, AP, HSP, KCA, KP, NVP, SSP, feathering and folding propellers)
- with diameters measuring from 5" up to almost 5 meters
- from all known materials like Mn.Br, Ni.Al.Br. and stainless steel
- in various qualities, like Class S, I and II, ISO 481/1 and ISO481/2. These propellers are designed with CAD/CAM-technology and fabricated with CNC machines. This contributes to a higher efficiency, less vibrations, a lower noise level and less fuel consumption.
- with approval of various classification societies, e.g. LR, BV, ABS, DNV, GL etc.



Free rotation of the propeller

After the diameter of the propeller has been determined, it is very important to know whether this propeller can be fitted. To prevent vibration it is absolutely necessary to take into account certain clearances of the propeller. Clearance of the propeller needs to be 15% of the diameter of the propeller at the top and 4% at the bottom.

Disturbing frequencies






For example we take an engine with a speed of 3000 rpm:

- Engine frequency 1st order is $3000/60 = 50$ Hz
- Engine frequency 2nd order is $3000/60 \times 2 = 100$ Hz

Propeller blade frequencies and gearbox ratios of 50 and 100 Hz are to be avoided. The possible resonance can create unpleasant vibrations in the ship. When calculating the right propeller, Exalto takes these so called "disturbing frequencies" into account.

Caution!

The incorrect combination of gearbox rotation and/or propeller type may cause vibration problems.

Disturbing frequency		gearbox ratios				
		1,5:1	2:1	2,5:1	3:1	4:1
	1st order prop. shaft frequency	33.3 Hz	25.0 Hz	20.0 Hz	16.7 Hz	12.5 Hz
	2nd order prop. shaft frequency	66.6 Hz	50.0 Hz	40.0 Hz	33.3 Hz	25.0 Hz
	1st order blade frequency	66.7 Hz	50.0 Hz	40.0 Hz	33.3 Hz	25.0 Hz
	2nd order blade frequency	133.4 Hz	100.0 Hz	80.0 Hz	66.6 Hz	50.0 Hz
	1st order blade frequency	100.0 Hz	75.0 Hz	60.0 Hz	50.0 Hz	37.5 Hz
	2nd order blade frequency	200.0 Hz	150.0 Hz	120.0 Hz	100.0 Hz	75.0 Hz
	1st order blade frequency	133.3 Hz	100.0 Hz	80.0 Hz	66.7 Hz	50.0 Hz
	2nd order blade frequency	266.6 Hz	200.0 Hz	160.0 Hz	133.4 Hz	100.0 Hz
	1st order blade frequency	166.7 Hz	125.0 Hz	100.0 Hz	83.3 Hz	62.5 Hz
	2nd order blade frequency	333.4 Hz	250.0 Hz	200.0 Hz	166.6 Hz	125.0 Hz



Efficiency propellers

Type EP

Standard EP propellers are made of manganese bronze (Mn.Br.). These propellers comply to the ISO 484/2 class II tolerances. We always keep 3B and 4B propellers in common dimensions in stock, just to ensure quick deliverance.

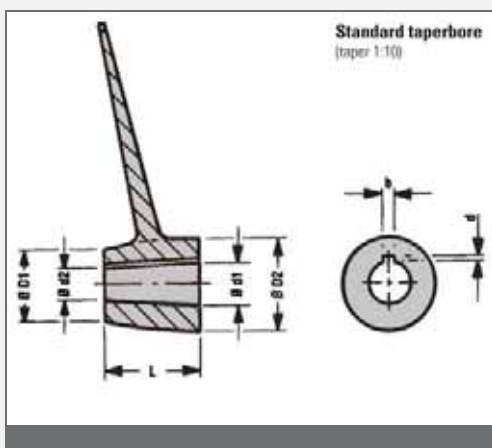
In most situations Mn.Br. is a good material for propellers. But when it comes to aluminium vessels, we advise the use of a nickel aluminium bronze propeller. Manganese bronze contains up to 40% of zinc, which always causes galvanic problems when used with aluminium. Nickel aluminium bronze is free of zinc, so this will not cause any troubles. If there is a lot of cavitation, or if the engine is very powerful, we advise nickel-aluminium bronze as well. All EP propellers can be supplied in nickel-aluminium bronze (Ni.Al.Br.) at a surcharge. If you are not sure which material would be best in your situation, please do not hesitate to ask our experts at the Sales department Propulsion.

D.A.R. EP-3B : 56%
D.A.R. EP-4B : 68%
D.A.R. EP-5B : 86%

All dimensions in mm.



Propeller diam. inch - mm	Outside boss ØD1 x ØD2	Max. taper bore	Keyway w x d (mm)	Standard bore (tapered 1:10) Ø d1 x Ø d2 x L
10 - 254	35 x 38	25	6 x 3.0	25 x 19 x 60
11 - 279	35 x 38	25	6 x 3.0	25 x 19 x 60
12 - 305	38 x 40	30	6 x 3.0	25 x 19 x 60
13 - 330	40 x 46	30	6 x 3.0	25 x 19 x 60
14 - 356	40 x 46	30	6 x 3.0	25 x 19 x 60
15 - 381	40 x 46	30	6 x 3.0	25 x 19 x 60
16 - 406	45 x 50	35	8 x 4.0	30 x 22 x 80
17 - 432	45 x 50	35	8 x 4.0	30 x 22 x 80
18 - 457	53 x 60	40	8 x 4.0	30 x 22 x 80
19 - 483	53 x 60	40	10 x 4.0	35 x 26 x 90
20 - 508	53 x 60	40	10 x 4.0	35 x 26 x 90
21 - 533	60 x 67	45	10 x 4.0	35 x 26 x 90
22 - 559	60 x 67	45	12 x 5.0	40 x 30 x 100
23 - 584	70 x 75	50	12 x 5.0	40 x 28 x 120
24 - 610	70 x 75	50	12 x 5.0	40 x 28 x 120
25 - 635	75 x 86	60	14 x 5.0	45 x 33 x 120
26 - 660	75 x 86	60	14 x 5.0	50 x 38 x 120
27 - 686	85 x 95	65	14 x 5.0	50 x 36 x 140
28 - 711	85 x 95	65	14 x 5.0	50 x 36 x 140
30 - 762	98 x 108	70	16 x 5.0	60 x 45 x 150
32 - 813	98 x 108	70	16 x 5.0	60 x 45 x 150
34 - 864	98 x 108	70	16 x 5.0	60 x 44 x 160
36 - 914	118 x 130	90	18 x 5.5	70 x 54 x 160
38 - 965	118 x 130	90	18 x 5.5	70 x 52 x 180
40 - 1016	127 x 140	95	18 x 5.5	70 x 52 x 180



Custom designed propellers

As well as the mentioned EP propellers, we can also supply many other types. For custom designed propellers, Exalto is the best address to go. We supply and design propellers for special purposes, in various ISO tolerance classes and if necessary with certificates from the major classification societies.

Below you can find some examples of commonly used propellers.



Super trust propellers

Type KCA

KCA propellers are designed for higher speeds and rpm. They have a large blade area that solves cavitation problems. These propellers are especially suited for high outputs on relatively small propeller diameters. KCA propellers are made of manganese bronze.

D.A.R. KCA-4B 83 83%
D.A.R. KCA-4B 100 100%

Propeller diam. inch - mm	Outside boss ØD1 x ØD2	Max. taper bore	Keyway w x d (mm)	Standard bore (tapered 1:10) Ø d1 x Ø d2 x L
16 - 406	45 x 50	35	8 x 4.0	30 x 22 x 80
17 - 432	45 x 50	35	8 x 4.0	30 x 22 x 80
18 - 457	53 x 60	40	8 x 4.0	30 x 22 x 80
19 - 483	53 x 60	40	10 x 4.0	35 x 26 x 90
20 - 508	53 x 60	40	10 x 4.0	35 x 26 x 90
21 - 533	60 x 67	45	10 x 4.0	35 x 26 x 90
22 - 559	60 x 67	45	12 x 5.0	40 x 30 x 100
23 - 584	70 x 75	50	12 x 5.0	40 x 28 x 120
24 - 610	70 x 75	50	12 x 5.0	40 x 28 x 120
25 - 635	75 x 86	60	14 x 5.0	45 x 33 x 120
26 - 660	75 x 86	60	14 x 5.0	50 x 38 x 120
27 - 686	85 x 95	65	14 x 5.0	50 x 36 x 140
28 - 711	85 x 95	65	14 x 5.0	50 x 36 x 140

Highly skewed propellers

Type HSP

HSP propellers are designed to reduce vibration and noise. They offer an unsurpassed level of comfort.

Type	HSP-3B	HSP-4B	HSP-5B
Diameter	16"-40" (406 mm – 1016 mm)	16"-96" (406 mm – 2438 mm)	16"-96" (406 mm – 2438 mm)
Blade area ratio	D.A.R. 45%	D.A.R. 60%	D.A.R. 75%



VARIPROFILE® Feathering Propeller



Ideal for sailing yachts up to 140 hp (= 103 kW, 3-blade propeller). As soon as the engine turns off, the waterflow automatically rotates the blades into the feathered position. This reduces the drag and increases the speed.

Variprofile feathering propellers increase the stopping power. Compared to a fixed blade propeller the stopping power is 30-40% higher.

Unique features Variprofile:

- GAWN/KAPLAN profile of the blades for optimum efficiency and quiet running.
- light weight and slim shape
- minimal turbulence, so the yacht responds better on the directions of the rudder
- separate external pitch adjustments for forward and reverse
- easy mounting with interchangeable hub
- made of Ni.Br.Al.
- dynamically balanced blades for smooth running

Variprofile 2-blade feathering propeller

Saildrive propellers available on request.



Diameter (inch - mm)	Max. diam. shaft (mm)	Hub	Power max. (kW)	Built-in length (mm)	Weight (kg)
13 - 330	30	VP-64	33	243	4.25
14 - 356	30	VP-64	33	246	4.80
15 - 381	30	VP-64	33	251	5.20
16 - 406	30	VP-64	33	255	5.70
17 - 432	30	VP-64	33	257	6.20
18 - 457	30	VP-64	33	261	6.70
17 - 432	35	VP-76	56	363	8.30
18 - 457	35	VP-76	56	367	8.80
19 - 483	35	VP-76	56	370	9.20
20 - 508	35	VP-76	56	373	10.00
21 - 533	35	VP-76	56	377	10.30
22 - 559	35	VP-76	56	381	10.80

Variprofile 3-blade feathering propeller

Saildrive propellers available on request.

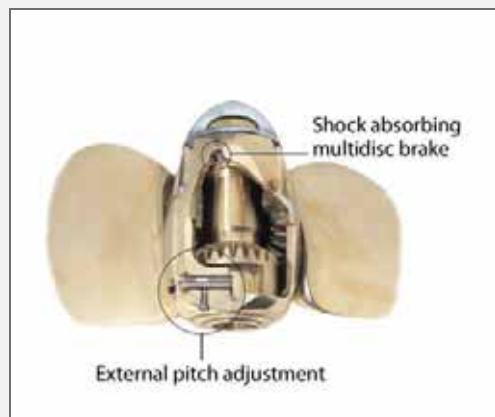


Diameter (inch - mm)	Max. diam. shaft (mm)	Hub	Power max. (kW)	Built-in length (mm)	Weight (kg)
13 - 330	30	VP-64	33	243	4.5
14 - 356	30	VP-64	33	246	5.0
15 - 381	30	VP-64	33	251	5.5
16 - 406	30	VP-64	33	255	6.0
17 - 432	30	VP-64	33	257	6.5
18 - 457	30	VP-64	33	261	7.0
17 - 432	35	VP-76	56	363	9.0
18 - 457	35	VP-76	56	367	9.5
19 - 483	35	VP-76	56	370	10.0
20 - 508	35	VP-76	56	373	10.5
21 - 533	35	VP-76	56	377	11.0
22 - 559	35	VP-76	56	381	11.5

Spare parts for Variprofile feathering propellers

Description	For hub	Cat. no.	For hub	Cat. no.
Anode	VP-64	VP64/ANODE	VP-76	VP76/ANODE
Screw set	VP-64	VP64/SCREW	VP-76	VP76/SCREW
Propeller nut	VP-64	VP64/NUT	VP-76	VP76/NUT
Puller	VP-64	VP64/PULLER	VP-76	VP76/PULLER
Grease	VP-64	DFVP/GREASE	VP-76	DFVP/GREASE
Service kit*	VP-64	VP64/SERVICE	VP-76	VP76/SERVICE

*The service kit contains an anode, grease nipple, grease gun and a cartridge with 300 grams grease (EP/SAL).



Variprop Feathering propellers

Variprop is a user-friendly superior feathering propeller, made of durable Ni.Br.Al. Available for sailing yachts up to 180 HP (132 kW). As soon as the engine is turned off, the waterflow rotates the blades. This reduces the drag to nothing, and increases the speed. Variprop propellers cause little turbulence and therefore optimize the rudder effect.

Within less than one shaft rotation the propeller blade turns 180°. The thrust in reverse is equal to forward. This is approximately 30-40% better than with fixed propeller blades. This improves the stopping power.

The blades are dynamically balanced, so they run smooth, quiet and without vibration. Rope cutters can be mounted close to the blades.

Unique features Variprop:

- independently adjustable external pitch control of reverse and forward thrust
- patented SoftStop shock absorbing multidisc brake. This dramatically reduces shock loads, unpleasant operating noises and wear.
- gears are 35-50% larger than competing propellers to extend the service life
- easy mounting as the propeller will be supplied fully assembled
- short built-in length, so they can be built in to almost every sailing yacht
- Germanischer Lloyd approval

Variprop 2-blade feathering propeller

Saildrive propellers are available on request.

Diameter (inch - mm)	Max. diam. shaft (mm)	Hub	Power (kW)	Built-in length (mm)	Weight ± (kg)
12 - 305	25	DF-80	22	155	4.8
13 - 330	25	DF-80	22	155	5.0
14 - 356	25	DF-80	22	155	5.5
15 - 381	25	DF-80	22	155	6.0
16 - 406	25	DF-80	22	155	6.5
17 - 432	25	DF-80	22	155	7.0
15 - 381	35	DF-107	59	170	8.0
16 - 406	35	DF-107	59	170	8.5
17 - 432	35	DF-107	59	170	9.5
18 - 457	35	DF-107	59	170	10.5
19 - 483	35	DF-107	59	170	11.5



Variprop 3-blade feathering propeller

Saildrive propellers are available on request.

Diameter (inch - mm)	Max. diam. shaft (mm)	Hub	Power (kW)	Built-in length (mm)	Weight ± (kg)
12 - 305	25	DF-80	22	155	4.8
13 - 330	25	DF-80	22	155	5.0
14 - 356	25	DF-80	22	155	5.5
15 - 381	25	DF-80	22	155	6.0
16 - 406	25	DF-80	22	155	6.5
17 - 432	25	DF-80	22	155	7.0
15 - 381	35	DF-107	59	170	8.0
16 - 406	35	DF-107	59	170	8.5
17 - 432	35	DF-107	59	170	9.5
18 - 457	35	DF-107	59	170	10.5
19 - 483	35	DF-107	59	170	11.5
20 - 508	40	DF-112	88	215	17.0
21 - 533	40	DF-112	88	215	17.5
22 - 559	40	DF-112	88	215	18.0
23 - 584	40	DF-112	88	215	19.0
24 - 609	40	DF-112	88	215	20.0
24 - 609	50	DF-128	103	245	26.0
26 - 659	50	DF-128	103	245	26.5
28 - 711	50	DF-128	103	245	27.0
24 - 609	55	DF-140	132	256	26.0
26 - 659	55	DF-140	132	256	28.0
28 - 711	55	DF-140	132	256	32.0
30 - 762	55	DF-140	132	256	39.0
32 - 813	55	DF-140	132	256	40.0

Variprop 4-blade feathering propeller

Saildrive propellers are available on request.



Diameter (inch - mm)	Max. diam. shaft (mm)	Hub	Power (kW)	Built-in length (mm)	Weight ± (kg)
12 - 305	25	DF-80	22	155	4.8
13 - 330	25	DF-80	22	155	5.0
14 - 356	25	DF-80	22	155	5.5
15 - 381	25	DF-80	22	155	6.0
16 - 406	25	DF-80	22	155	6.5
17 - 432	25	DF-80	22	155	7.0
15 - 381	35	DF-107	59	170	8.0
16 - 406	35	DF-107	59	170	8.5
17 - 432	35	DF-107	59	170	9.5
18 - 457	35	DF-107	59	170	10.5
19 - 483	35	DF-107	59	170	11.5
20 - 508	40	DF-112	88	215	17.0
21 - 533	40	DF-112	88	215	17.5
22 - 559	40	DF-112	88	215	18.0
23 - 584	40	DF-112	88	215	19.0
24 - 609	40	DF-112	88	215	20.0
24 - 609	50	DF-128	103	245	26.0
26 - 659	50	DF-128	103	245	26.5
28 - 711	50	DF-128	103	245	27.0
24 - 609	55	DF-140	132	256	26.0
26 - 659	55	DF-140	132	256	28.0
28 - 711	55	DF-140	132	256	32.0
30 - 762	55	DF-140	132	256	39.0
32 - 813	55	DF-140	132	256	40.0

Spare parts for Variprop feathering propellers

Description	For hub	Cat. no.	For hub	Cat. no.	For hub	Cat. no.
Anode	DF-80	DF80/ANODE	DF-112	DF112/ANODE	DF-140	DF140/ANODE
Screw set	DF-80	DF80/SCREW	DF-112	DF112/SCREW	DF-140	DF140/SCREW
Propeller nut	DF-80	DF80/NUT	DF-112	DF112/NUT	DF-140	DF140/NUT
Puller	DF-80	DF80/PULLER	DF-112	DF80/PULLER	DF-140	DF140/PULLER
Grease	DF-80	DFVP/GREASE	DF-112	DFVP/GREASE	DF-140	DFVP/GREASE
Service kit*	DF-80	DF80/SERVICE	DF-112	DF 112/SERVICE	DF-140	DF140/SERVICE
Anode	DF-107	DF107/ANODE	DF-128	DF128/ANODE		
Screw set	DF-107	DF107/SCREW	DF-128	DF128/SCREW		
Propeller nut	DF-107	DF107/NUT	DF-128	DF128/NUT		
Puller	DF-107	DF107/PULLER	DF-128	DF128/PULLER		
Grease	DF-107	DFVP/GREASE	DF-128	DFVP/GREASE		
Service kit*	DF-107	DF107/SERVICE	DF-128	DF128/SERVICE		

*The service kit contains an anode, grease nipple, grease gun and a cartridge with 300 grams grease (EP/SAL).

Propeller extractor



Propeller extractor

To remove a propeller from a shaft, a propeller extractor can be used. The propeller extractor consists of a slot (back plate), nuts, studs, a front plate, an extractor bolt and several adaptor plates to center the slot with the shaft.

Number of blades	Shaft diam.	Cat. no.
3-4	25 t/m 50	9525500
3-4-5	55 t/m 90	9655900



Flexofold propellers reduce the resistance while sailing, giving the boat more speed. The folding propeller unfolds automatically when the shaft starts revolving, as a result of centrifugal force. All blades, which open in synchronisation, are intercepted by strong polyurethane shock absorbers. During sailing, when the engine is not running, the blades close as a result of the water pressure. This results in a propeller that gives as little resistance as possible.

Flexofold propellers are made of NiBrAl (for strength and corrosion resistance) and 82% of copper (for anti-fouling). The propeller hub features the unique patented double spiral corrugation, which ensures that the blades will fold and unfold smoothly and that they have the best balance. This, combined with the small amount of parts, results in a long life span and very little wear.

Flexofold propellers are available in 2 and 3 blades.

Specifications of standard Flexofold propellers:

Standard bore	Taper	Keyway	Propeller nut
25 x 19 x 60 mm	1:10	6 x 3 mm	M16 x 1.5
30 x 22 x 80 mm	1:10	8 x 4 mm	M20 x 1.5

Dimensions as per Euro-standards ISO/DIN 4566. Tolerances ISO 484/2, class 2 standard.

Especially for 3-blade Flexofold propellers hub caps made of zinc are available for electrolytic protection (are supplied with your order).

Flexofold propellers come complete with tools, loctite and manuals.

Flexofold propellers can be used on your shaft or saildrive without modifications.

Flexofold type FP-2B and FP-3B

The two-blade Flexofold is available in diameters from 12" up to 18". The three-blade propeller is available in diameters from 14" up to 21".

A zinc propeller hub cap is available on request for the three-blade Flexofold propellers. Non-standard pitches for a surcharge.

Non-standard pitches for a surcharge.
Available in 2- or 3 blade standard and saildrive.



Diameter (inch-mm)	Pitch (inches)
12 - 305 only RH	7" up to 10"
13 - 330	8" up to 11"
14 - 356	9" up to 12"
15 - 381	9" up to 13"
16 - 406	10" up to 14"
17 - 432	11" up to 15"
18 - 457	12" up to 16"
20 - 508	14" up to 17"
22 - 559	13" up to 18"

Flexofold parts

Description	For	Cat. no.
Anode zinc	FP3B singular hole mount	786000
Cover plate (anode excluded)	for discontinued model flexifold with three hole mounting pattern	786000.01
Disc anode set	sidemount	786001