



# hullvane

WE MASTER HYDRODYNAMICS



# main benefits

## NAVAL & PATROL VESSELS

- higher performance
- reduced noise and signature
- improved seakeeping

## YACHTS

- ultimate comfort
- higher top speeds
- greater range

## COMMERCIAL SHIPS

- reduced fuel costs
- maximum operability
- win public tenders

The Hull Vane® is a hydrodynamic wing attached to a ship's stern. It's positioned so that it suppresses the stern wave and angled so that the flow of water around it generates forward thrust. This also reduces overall resistance and dampens pitching, heaving and rolling when the vessel is in motion. Depending on vessel suitability and factors such as its length, speed and hull design, the Hull Vane® can reduce fuel consumption by anywhere between 5 and 25%.

#### HYDRODYNAMICS MASTERED

We started developing the **Hull Vane®** as a spin-off from research we originally conducted for the America's Cup. Nowadays, we use Computational Fluid Dynamics (CFD) to customise and optimise the design for many vessels. Doing so reveals how a Hull Vane® can reduce the vessel's calculated resistance, suppress its stern wave and improve its hydrodynamic performance.

Armed with this information, we can then calculate your return on investment. On new builds, naval architects can then even factor in smaller, lighter

engines, exhaust systems and fuel tanks to achieve the same maximum range and top speed and thereby create more usable space below deck.

#### INNOVATION

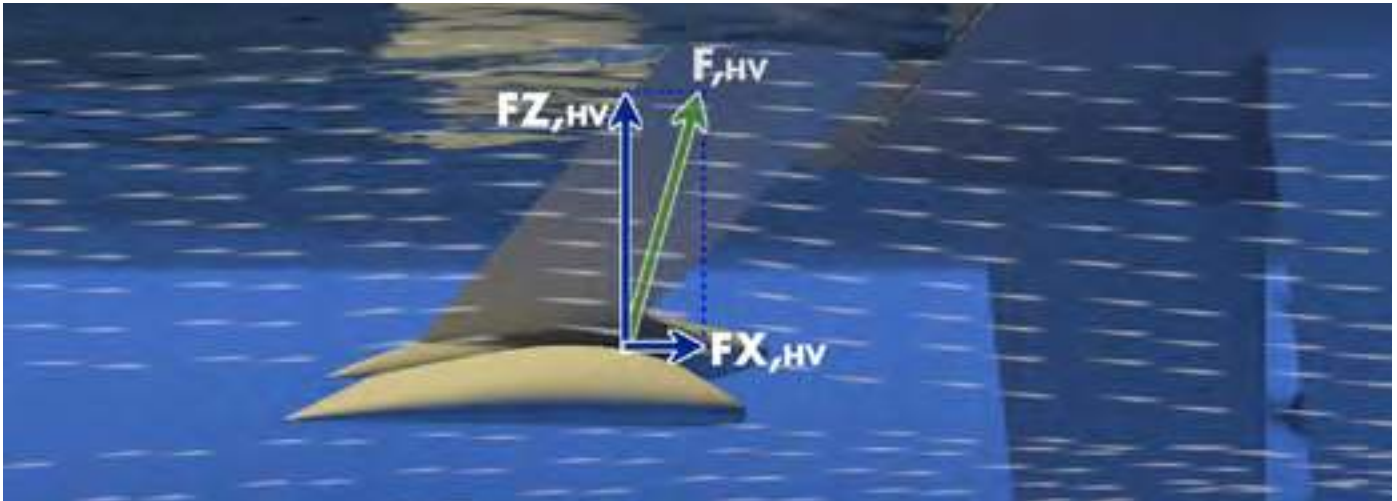
Since 2014, our patented Hull Vane® has been installed on numerous vessels, and it has more than proven its effectiveness and durability.

What's more, we've gone on to develop special-purpose variations, such as the **Dynamic Hull Vane®** for even more increased pitch dampening.

# how

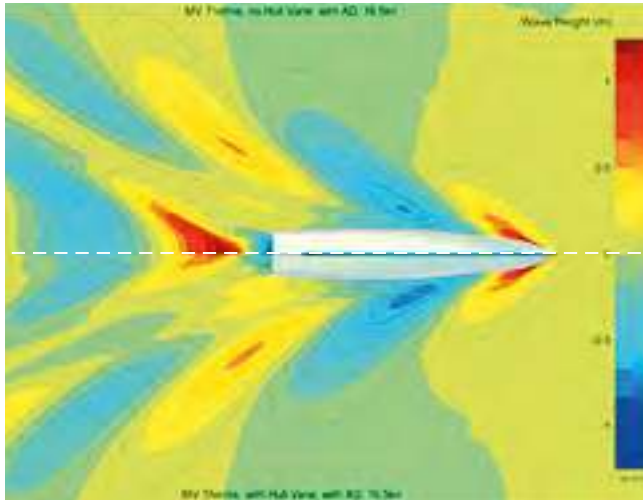
## FORWARD THRUST

The water at a vessel's stern doesn't flow horizontally—instead, it flows at a slight upward angle. Because the Hull Vane® has a wing-shaped profile, it generates lift as the water flows around it. This lift force is angled forward and therefore has a forward-pointing horizontal component that acts as thrust, propelling the vessel forward.



# WAVE REDUCTION

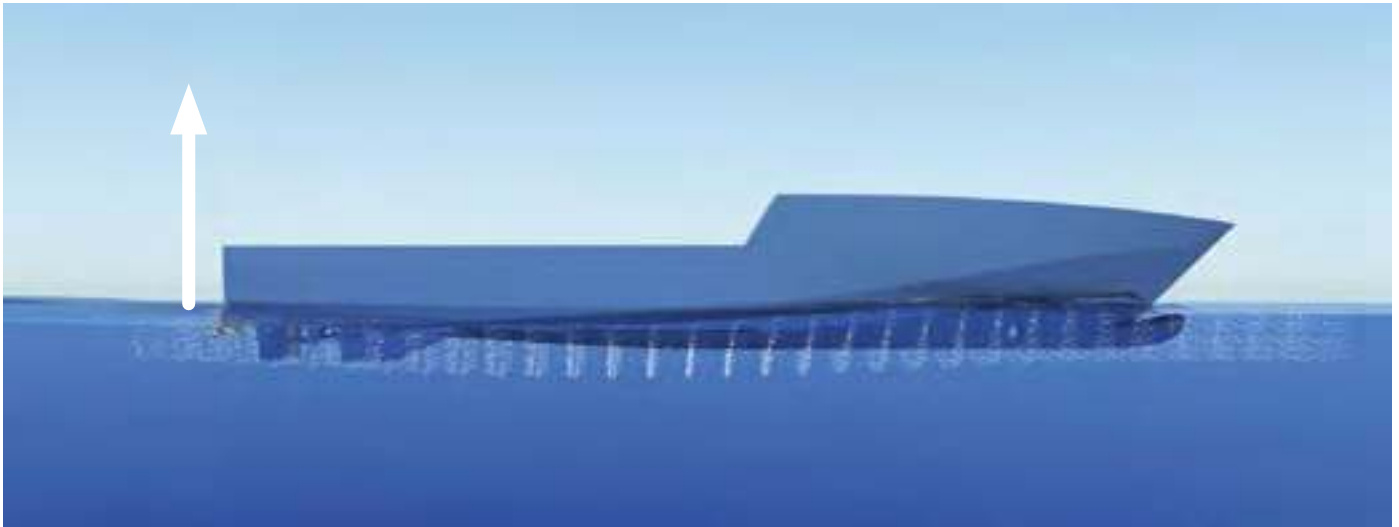
The Hull Vane's wing-shaped profile generates an accelerated flow of water over its upper surface, producing a low-pressure region behind your vessel. This interacts with your vessel's wake to suppress its stern wave in much the same way as a bulbous bow suppresses a vessel's bow wave. And there's a direct correlation between a vessel's wake, or wave pattern, and the power used for propulsion. Suppressing the stern wave reduces fuel consumption. What's more, a suppressed wake pattern reduces noise levels and creates less disturbance for others and—for a naval vessel—minimising its detectability!



# how

## TRIM CORRECTION

The Hull Vane® also reduces a vessel's running trim, keeping it at even keel throughout its entire speed range. Incorporating a Hull Vane® in the early design stages allows naval architects to design their vessels for minimal trim variations. In shallow waters, the vertical lift component significantly reduces a vessel's squatting effect, allowing for higher top speeds.





# PITCH STABILISATION

The Hull Vane<sup>®</sup> dampens pitching in waves. This reduces added resistance from ship motions and, in turn, improves on-board comfort. Reduced vertical accelerations means less seasickness. Safety is also improved, for example, during helicopter operations or while launching/recovering daughter craft. And when a vessel is pitching, the Hull Vane<sup>®</sup> generates even more forward thrust—a phenomenon we call the pumping effect.



BARE HULL

HULL VANE<sup>®</sup>

# Hull Vane series







Our patented Hull Vane® is a proven energy-saving solution for low to medium-speed displacement vessels. Combining Computational Fluid Dynamics (CFD) and our in-depth knowledge of hydrodynamics, we can customise and optimise the design of each Hull Vane® to achieve the highest level of performance. The Hull Vanes are available in three variants, the T- and U-series and Specials.

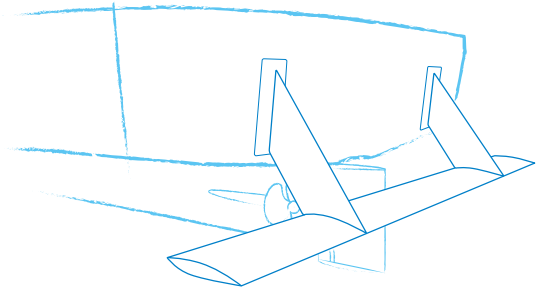
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**THE SIZE OF HULL VANE® WHICH IS MOST SUITABLE FOR YOU  
DEPENDS ON THE VESSEL'S LOA. SEE BELOW:**

T-SERIES	U-SERIES	LOA (metres)	
		FROM	UP TO
T-400	U-400	10	22
T-750	U-750	22	36
T-1000	U-1000	36	49
T-1250	U-1250	49	62
T-1500	U-1500	62	75
T-1750	U-1750	75	87
T-2000	U-2000	87	100
T-2250	U-2250	100	112
T-2500	U-2500	112	>

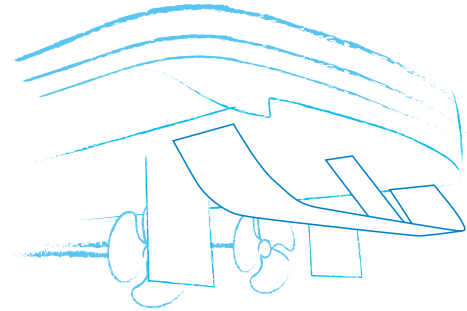
## T-SERIES

With our **T-shaped Hull Vane®**, the Hull Vane® and the struts are separate profiles. This configuration gives our engineers the most freedom in terms of the distance between positions and the number of struts. When space on the transom is limited, this may be the best option. By default, the Hull Vane® is designed and delivered T-shaped.



## U-SERIES

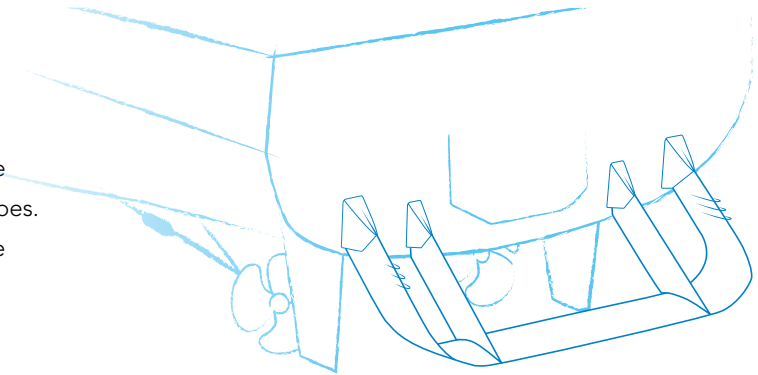
The U-shaped Hull Vane® is applied to achieve even higher performance. Because the struts act as wingtips, there are no wing-tip losses, thereby improving efficiency. With the **U-shaped Hull Vane®**, the Hull Vane's profile is shaped towards the hull and the outer struts are integrated parts of the Hull Vane®. The strut-to-wing connection can be both a rounded and chamfered shape.



## SPECIALS

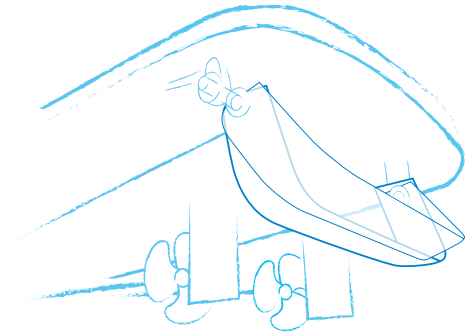
Our Hull Vanes can be designed and built fully custom for special applications. These Hull Vanes can be delivered in various shapes.

**The Special** is offered for vessels that have particular requirements for the application of their Hull Vanes.



## DYNAMIC

With the **Dynamic Hull Vane®**, the in-wave performance is improved even further. All Hull Vanes are available as the Dynamic Hull Vane® option. This solution is used to actively reduce pitching motions. A controller on board continuously varies the angle of the Hull Vane's attack to ensure maximum pitch motion dampening. This improves the performance of sonars, radars, satellite communications and other onboard systems.





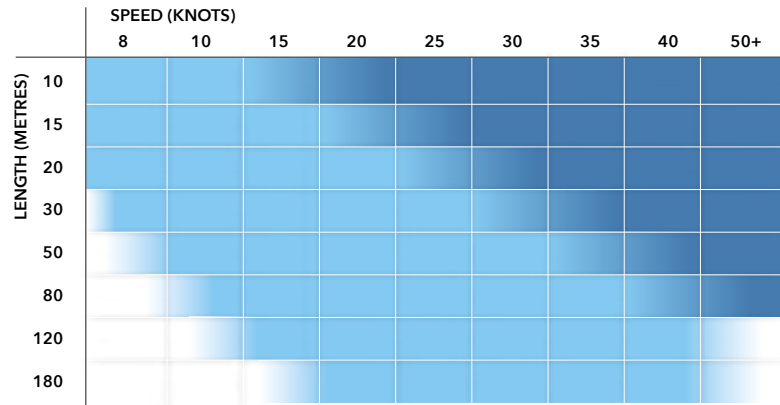
# effectiveness

The Hull Vane® is particularly effective when fitted to displacement, semi-displacement and fast-displacement vessels.

Suitable candidates for a Hull Vane® include coastguard/naval vessels, passenger ships, ro-ro ships, expedition cruise ships, fast supply vessels and motor yachts.

For these types of vessels, energy savings of between 5% and 20% are typical, and in some cases even 25% savings are attainable.

## APPLICATION RANGE



HULL VANE®

FOIL ASSIST

# design & build

We design each Hull Vane® specifically for each vessel, often using advanced techniques, such as Computational Fluid Dynamics (CFD) and finite element analysis (FEA) methods. Hull Vanes can be built from aluminium, steel or composite materials, depending on the application.

The **design phase** begins with an evaluation of the hull form and a proposal showing how the Hull Vane® can be integrated into your vessel. We offer a CFD analysis at an early stage to give insights into the vessel's fuel consumption, dynamic trim and wave-making characteristics. Where fuel consumption reduction is the main goal, we will generally propose an optimisation of the Hull Vane® to obtain the best possible performance. During the **build phase**, our certified welders fabricate the Hull Vane® to our exacting technical specifications and the highest-level finish imaginable.



# proven results

## YACHTS



**20%**  
LESS RPM  
@CRUISING  
SPEED

17.5m Sturiër 565 OC - **Hemera**



**7 dB(A)**  
LESS NOISE ON  
AFT DECK

18.5m Yerseke Offshore 62 - **Colinda**



**20%**  
LESS FUEL  
CONSUMPTION

20m Vripack Trawler - **Amoc**



**18%**  
MORE  
RANGE

36m Dynamiq GTT 115 - **Jaaber**



**25%**  
SMALLER  
ENGINES

42m Heesen - **Ares**



**14%**  
MORE  
RANGE

34m Van der Valk Explorer - **Lady Lene**



DETERMINE WHICH IS  
THE RIGHT SOLUTION  
FOR YOUR VESSEL BY  
USING OUR  
CONFIGURATOR

## COMMERCIAL



**15%**  
LESS FUEL  
CONSUMPTION

55m FSIV - **Karina**



**15%**  
LESS CO<sub>2</sub>  
EMISSIONS

30m Ferry - **Valais**



**14%**  
LESS  
PITCHING

57m Guard Vessel - **Linde-G**

## NAVAL & PATROL



**>10%**  
LESS FUEL  
CONSUMPTION

108m OPV - **HNLMS Groningen**



**57,000 l/year**  
LESS FUEL  
CONSUMPTION

25m Patrol Vessel - **RPA8**



**20%**  
LESS CO<sub>2</sub>  
EMISSIONS

52m OPV - **Thémis**

# get to know us

'We believe ships can always be better, faster and more efficient.'

Hull Vane BV develops and provides innovative solutions to improve your vessel's comfort, performance and seakeeping.

- **Hull Vane®**
- **Optionally as a Dynamic Hull Vane®**
- **Foil Assist** (ask for the specific brochure)

When we say we provide full service, we really do mean full service. From design to delivery anywhere in the world. Drop us a line to find out more.

New build or retrofit ... find out just how big an impact a Hull Vane® could make to your vessel's performance, comfort and sustainability.







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