



# becker marine systems

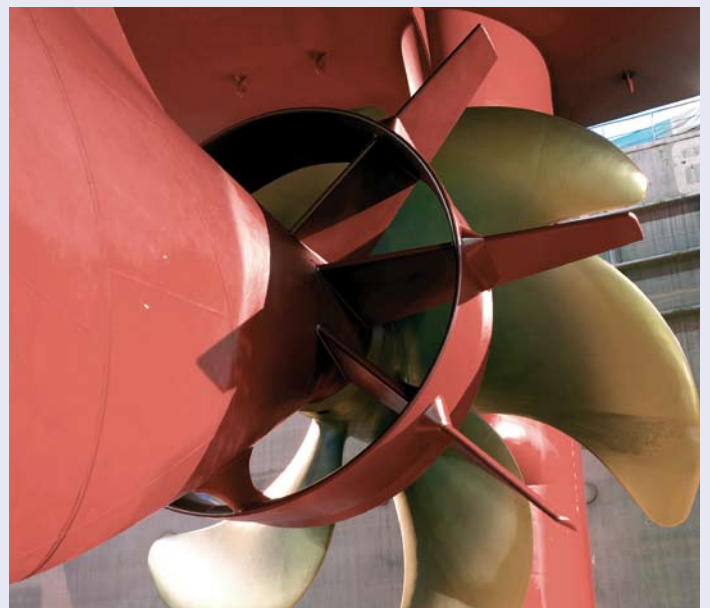


## Becker Twisted Fin®

ADVANCEMENT OF BECKER MEWIS DUCT® FOR FAST VESSELS WITH BULBOUS STERN

Becker Marine Systems has reacted to the heavy demand of shipping companies for an energy-saving device for faster vessels. After two years of research and based on three years operational experience with the Becker Mewis Duct® a new energy-saving device for container ships and other types of fast vessels with bulbous stern is entering the market – the Becker Twisted Fin®.

- Fuel savings of up to 3%
- Reduction of NO<sub>x</sub> and CO<sub>2</sub> emissions
- Return on investment in 6-15 months
- Structural guarantee of many years
- Guarantee of power reduction as verified by model test: "Money saved or money back"
- Suitable for newbuildings and retrofits
- No moving parts, no maintenance required
- Fast installation



*The Becker Twisted Fin® installed on Hamburg Süd's Santa Clara*

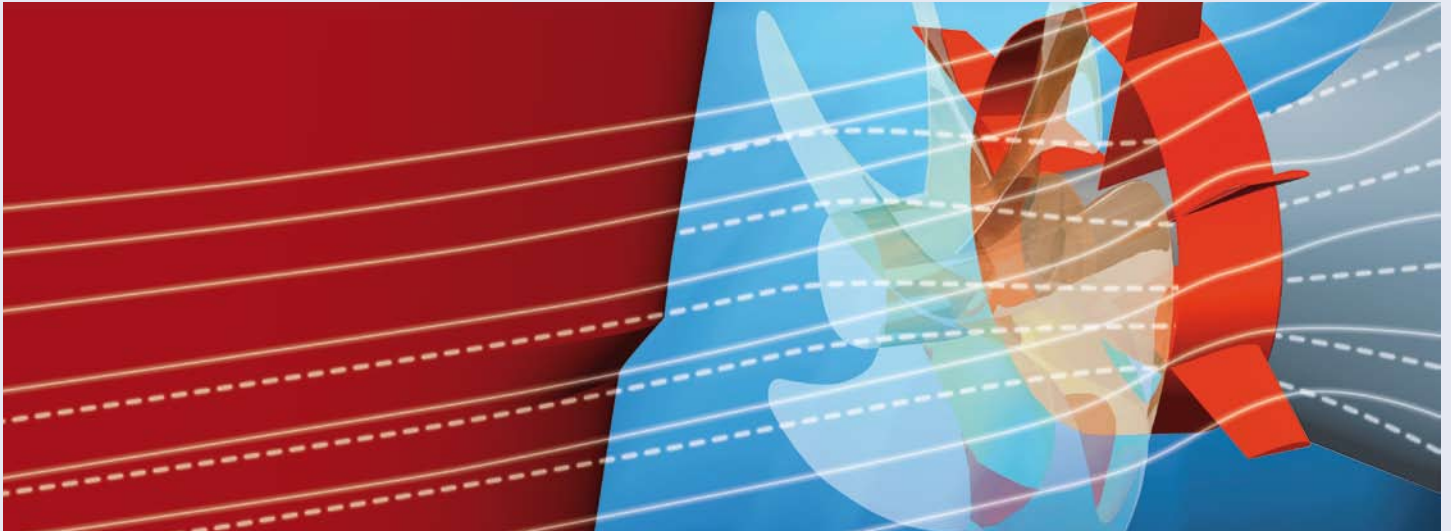


Illustration of water flow influences on the Becker Twisted Fin®

### The development from duct to fin

Becker Marine Systems has focused on energy savings and provides one of the most efficient energy-saving devices for the maritime market with the Becker Mewis Duct®. On average, power savings of over 6% could be achieved for large and slow vessels such as tankers and bulkers.

The savings from the Becker Mewis Duct® are reduced at speeds above approx. 20 knots. Becker Marine Systems is now introducing the Becker Twisted Fin® for faster ships with speeds above 18 knots. Like the Becker Mewis Duct®, the Becker Twisted Fin® has no movable parts, is also installed in front of the propeller and generates a pre-swirl. The system thus provides fast ships tangible energy savings. The nozzle ring is significantly smaller than that of the Becker Mewis Duct® and has a special, flat profile with much lower drag. The fins familiar from the Becker Mewis Duct® on the inside of the nozzle ring extend outwards beyond the nozzle. To prevent the formation of a swirl with cavitation at the ends of the fins Becker has developed special end caps for the fins. The small nozzle ring generates thrust, provides stability to the fins and reduces vibrations.

Computational Fluid Dynamics (CFD) tests, model tests and full scale operation have shown fuel savings averaging 3% for container ships. Even better results can be obtained with the combination of a Becker Twisted Fin® and the Becker TLKSR® Twisted Rudder.

Each Becker Twisted Fin® is individually designed according to hull geometry, propeller design and engine data. The design takes into account the newest strength, fatigue and vibration requirements from classification societies.



Model test for the first Becker Twisted Fin® order at HSVA

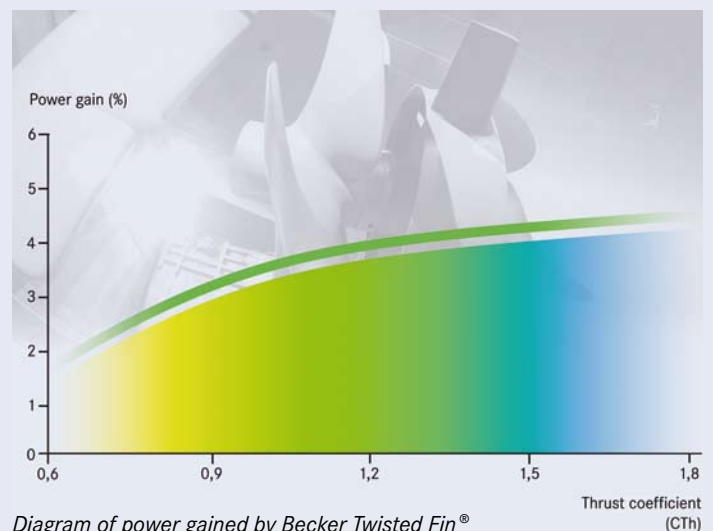


Diagram of power gained by Becker Twisted Fin®

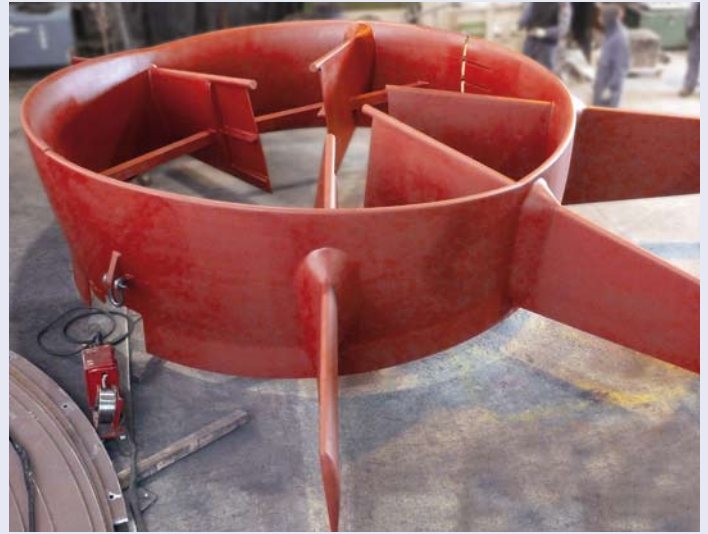


### First order – ten installations

After the successful model tests of the Becker Twisted Fin® prototype at the beginning of 2012, Becker Marine Systems signed a contract with Hamburg Süd in June 2012.

The Hamburg-based ship owner ordered the new energy-saving device for fast types of ships as retrofits for a series of ten 7,100 TEU container vessels. The fuel-savings potential of the Becker Twisted Fin® for these vessels has been verified in a model test with an average savings of 3.5%.

The experience of hundreds of successful Becker Mewis Duct® installations made it possible to deliver such a complex device in record-breaking time. It took Becker's team just two years from the first sketch drawings to the installation of ten tailor-made systems that are already in service and proving their worth to the full satisfaction of our valued customer Hamburg Süd.



*Production of Becker Twisted Fin® for 7,100 TEU container vessel*



*Becker's service team assisting the yard to minimise installation time*



*Becker Twisted Fin® installed on Santa Teresa in just three days*



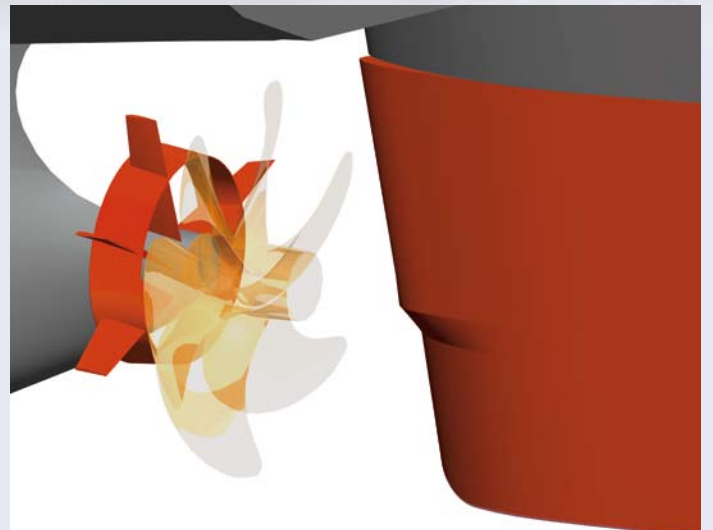
*Hamburg Süd's Santa Teresa, one in a series of ten container ships retrofitted*



**Maximising energy-saving effects –  
Becker Twisted Fin® combined with the  
Becker Twisted Rudder TLKSR®**

The combination of a Becker rudder and a Becker Twisted Fin® allows maximum possible energy savings in front of and behind the propeller. Both products are available from a single company and are thus perfectly harmonised via CFD calculations in the design of optimised manoeuvring and maximum energy savings.

Becker Marine Systems constantly reviews the best combinations of a Becker Twisted Fin® or a Becker Mewis Duct® with a Becker rudder, thus making an important contribution to meeting the new EEDI requirement.



*The Becker Twisted Fin® combined with a Becker's TLKSR® Twisted Rudder*