

TRUSTED WORLD WIDE



# COMPLETE THRUSTER SYSTEMS

- FOR ANY  
KIND OF SHIP



**BRUNVOLL**

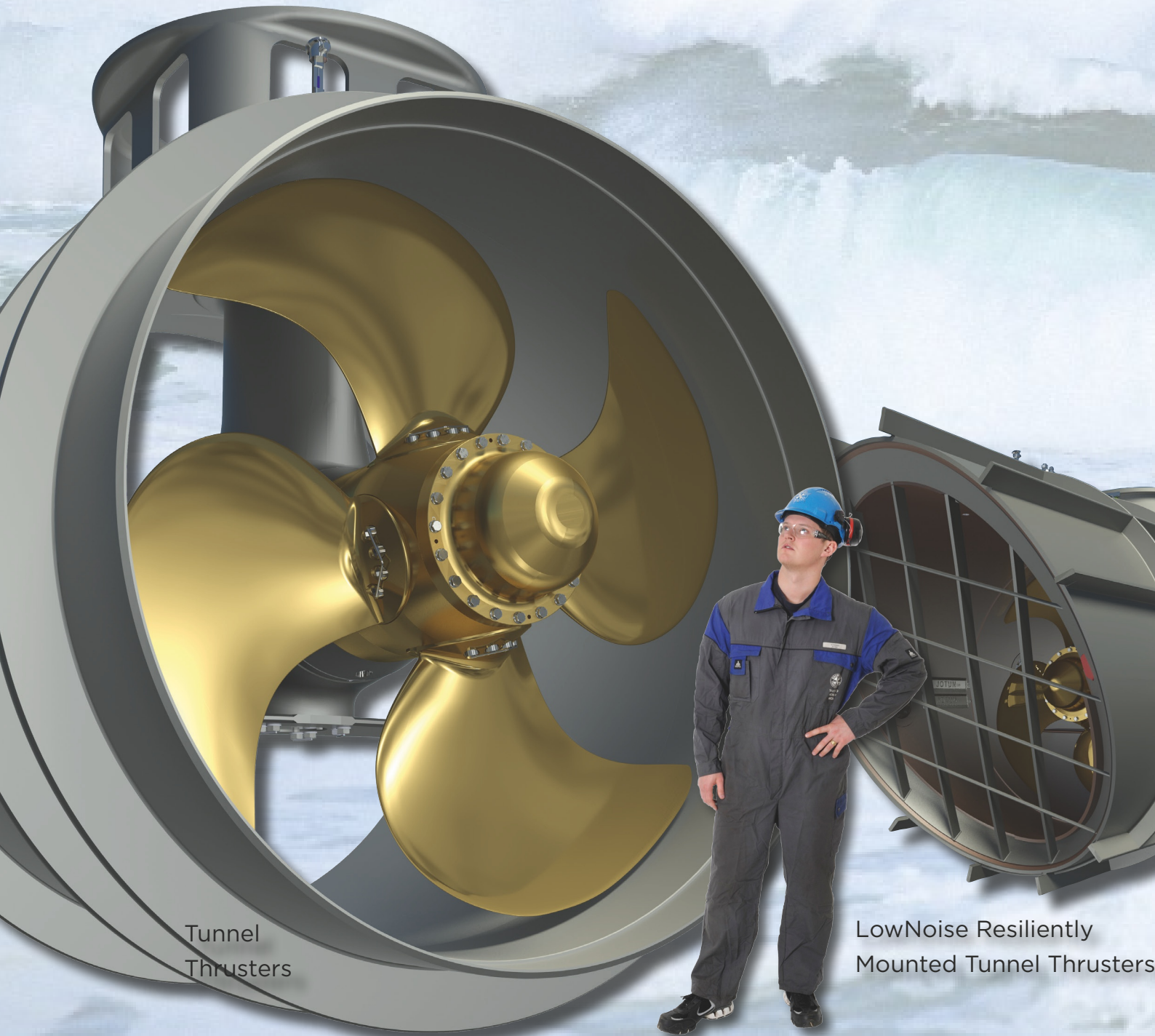


# Brunvoll Thrusters

**- for any kind of ship**

Brunvoll is your single source supplier and takes full responsibility for the whole thruster package.

This saves time and costs.



Tunnel Thrusters

LowNoise Resiliently Mounted Tunnel Thrusters

Each package can be tailor made to meet individual requirements.

Our experience and expertise ensure a optimized thruster system, designed to handle all the challenges of the harsh marine environment.



Rim Driven Thrusters

Azimuth Combi Thrusters

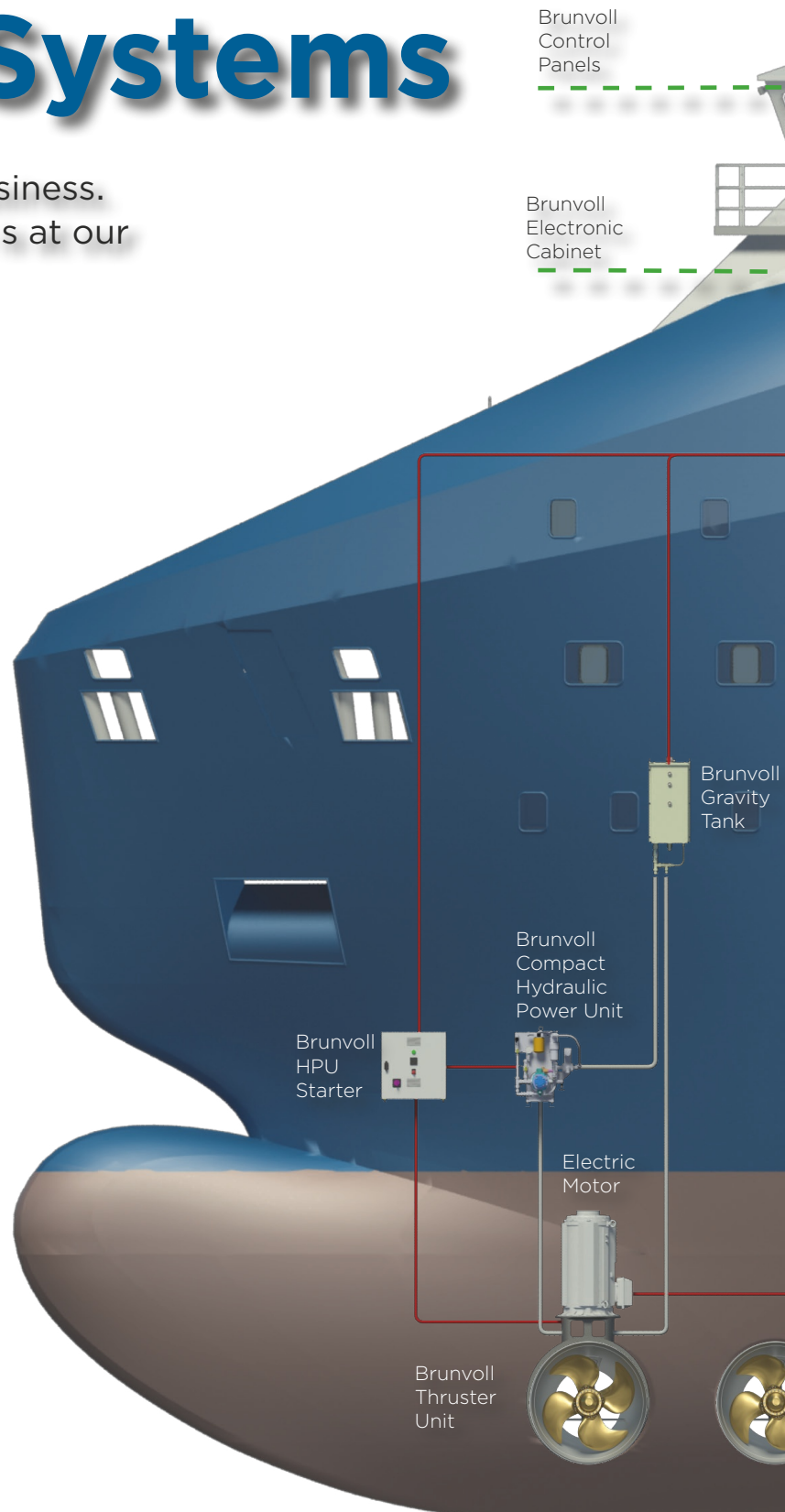
Retractable Azimuth Thrusters



# BRUNVOLL Complete Thruster Systems

Thruster Systems are our only business.  
All our experience and expertise is at our  
customer's disposal.

- One source - one responsibility
- Thruster System Packages including control systems, bridge panels, drive motors, starters, hydraulic power units, special arrangements and services.
- Brunvoll provides support for the lifetime of the thruster systems.
- Our complete thruster package simplify installation and maintenance.





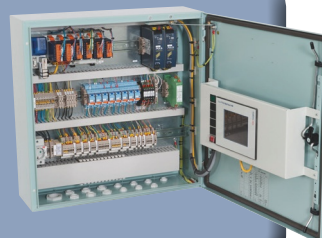
### BRUNVOLL THRUSTER CONTROL PANELS

- have an intuitive Human Machine Interface control system. Designed for easy integration with flexible design of the panels for easy integration.



### BRUNVOLL ELECTRONICS CABINET

Brunvoll's user-friendly thruster control system - with easy access for troubleshooting and adjustments.



### BRUNVOLL GRAVITY TANK

- ensures steady supply of hydraulic fluid to the HPU and thruster gearbox.



### BRUNVOLL COMPACT HYDRAULIC POWER UNIT

A variable displacement pump responds to the command signal and delivers the exact amount of oil needed for the propeller pitch movements.



### BRUNVOLL HPU STARTER

- with starter for the HPU motor and interconnections for the HPU.



### BRUNVOLL ELECTRIC MOTOR STARTER

Brunvoll's own design provides an elegant and cost-effective technical solution. Easy access to every component, simplifying the cabling process.



Interface to other ship systems (VDR, DP, Joystick, PMS etc.)

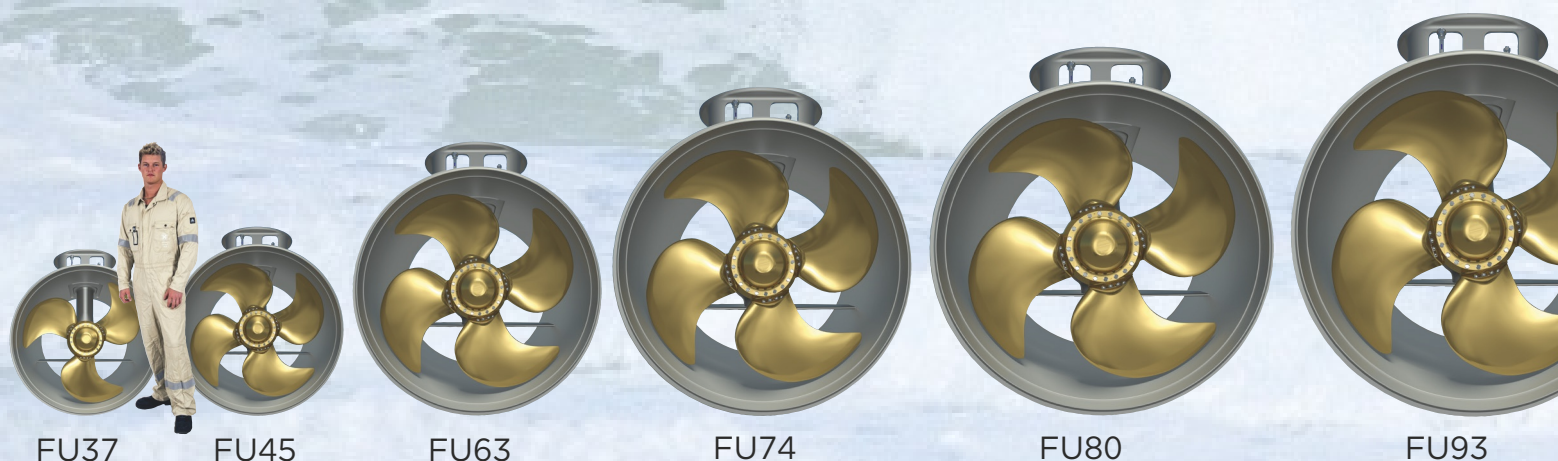
Brunvoll Electric Motor Starter

# A comprehensive range of Tunnel Thrusters

## PRODUCT RANGE

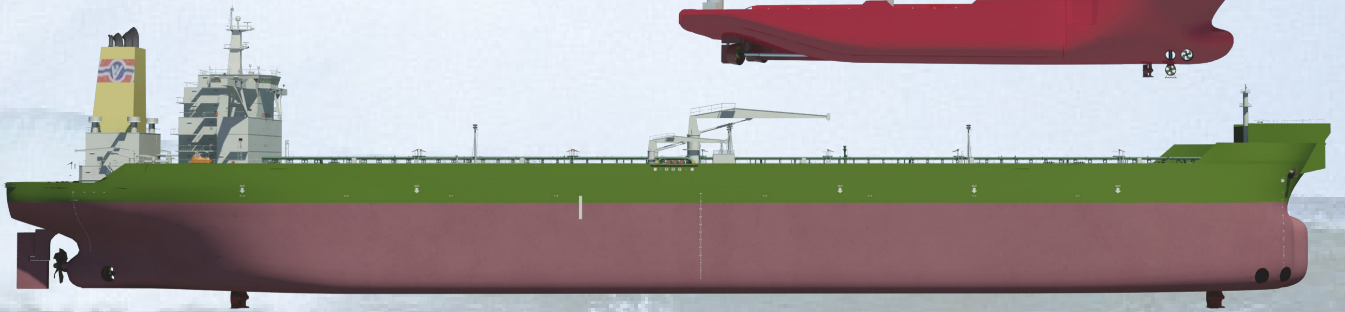
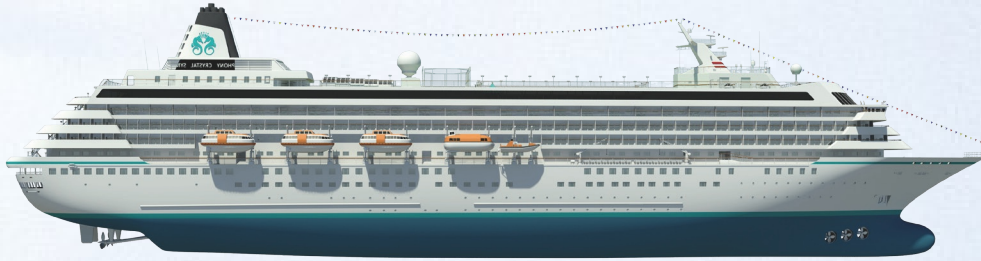
	Propeller Diameter mm	Power Range kW
FU 37	850	75 - 200
	1000	100 - 250
FU 45	1225	185 - 300
	1375	275 - 450
FU 63	1550	400 - 700
	1750	550 - 900
FU 74	2000	800 - 1400
FU 80	2250	1000 - 1500
FU 93	2500	1400 - 2200
FU 100	2750	1800 - 2500
FU 115	3000	2000 - 3500
FU 120	3300	3000 - 4000

Brunvoll standard tunnel thrusters are designed for the most demanding requirements according to North Sea offshore standards, and are used on all types of ships.



Brunvoll introduced the FU93 in 2010. This type is optimal for offshore, cruise and merchant vessels.





FU100

FU115

Planned FU120

Brunvoll introduced the FU115 in 2010. Brunvoll has developed this unit specifically for large merchant vessels, shuttle tankers and cruise vessels.

Brunvoll FU120 is under construction.

# A constant search for competitive edge

Brunvoll Thrusters continuously refined through 4 generations.

## **Gearbox Design**

- NEW! Improved hydrodynamic design for optimal performance
- Robust gear maintaining optimum tooth contact for various operating conditions

## **Seals**

- Drive shaft seal for various drive configurations
- Separate outer seal barrier with axial shaft seal combined with radial seals
- NEW! Option for non-pollution seal
- NEW! Replaceable blade bearing liners
- NEW! Option - lip seal system replaceable without removal of propeller hub

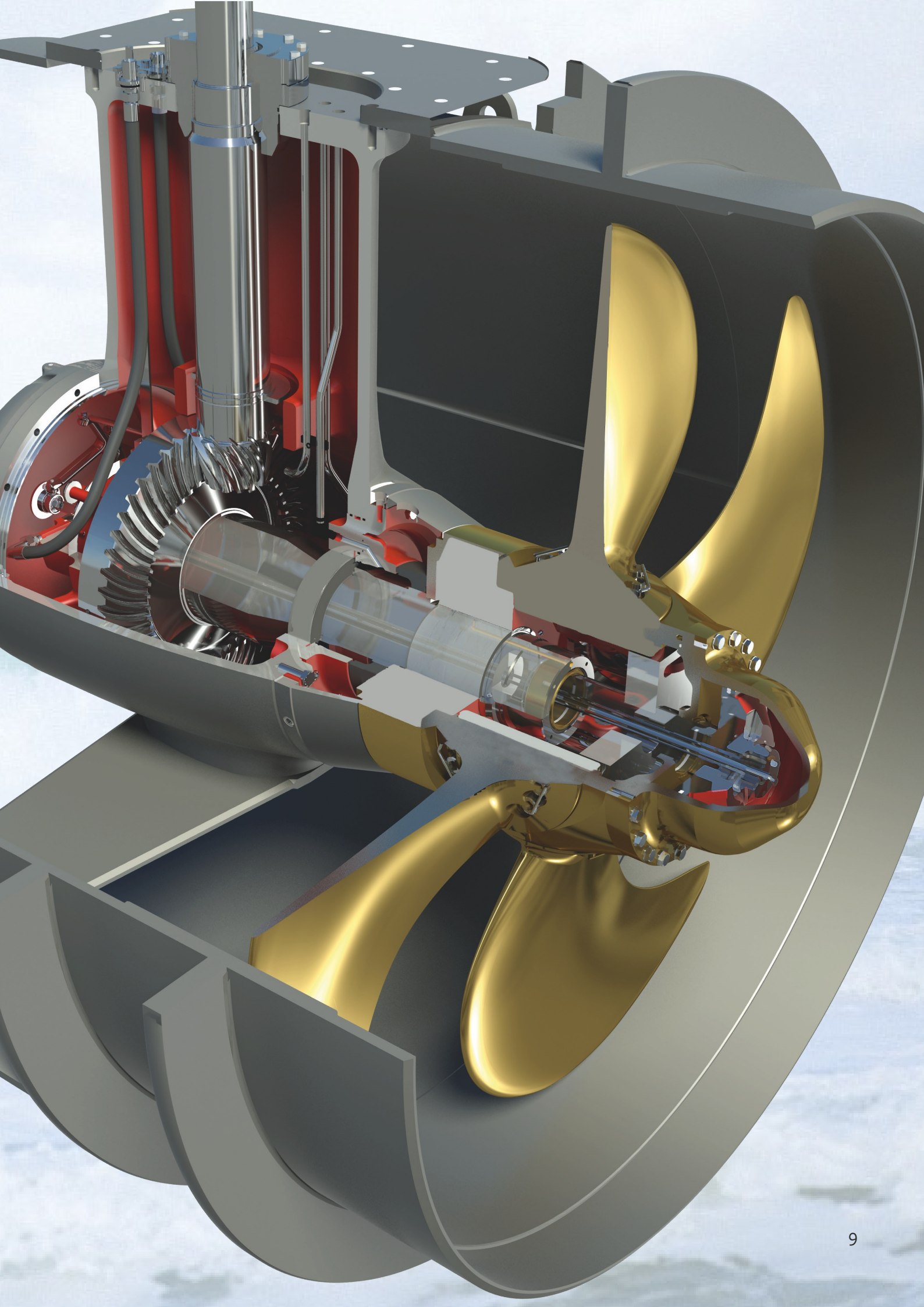
## **Optimized and more compact**

- Compact propeller hub
- With the unique LINKAGE mechanism to give reduced and minimal wear
- Reducing Life Cycle Cost
- Balanced backward skew blades for minimum servo and excitation forces

## **Cast motor foundation**

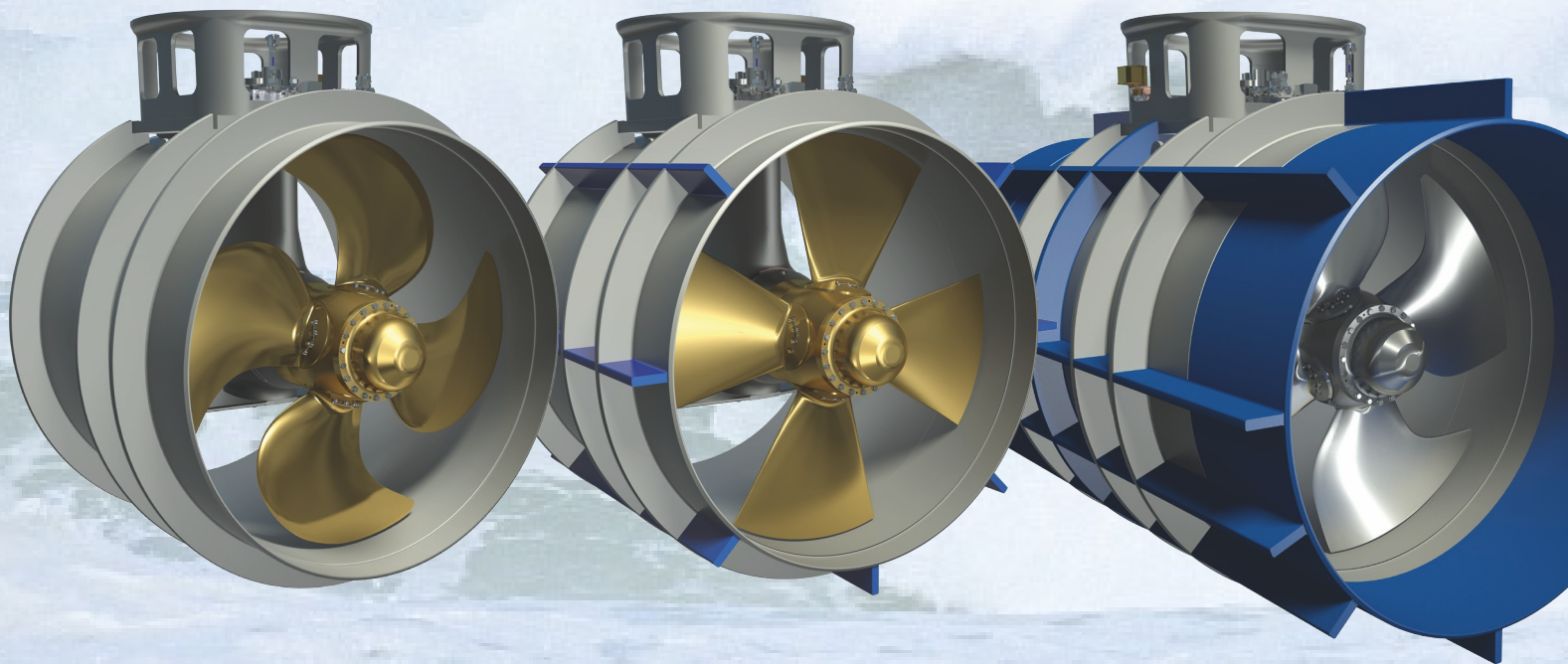
- Cast iron is more stable
- Reduces vibration
- Reduces noise
- More elegant and competitive solution
- Flange-mounted motor foundation and robust tunnel construction to facilitate easy hull integration and vibration control





# Tunnel Thrusters

Standard or Customized.



## The standard Brunvoll Tunnel Thruster Unit

- Rigid tunnel construction
- Ring stiffeners
- Modularized motor foundation

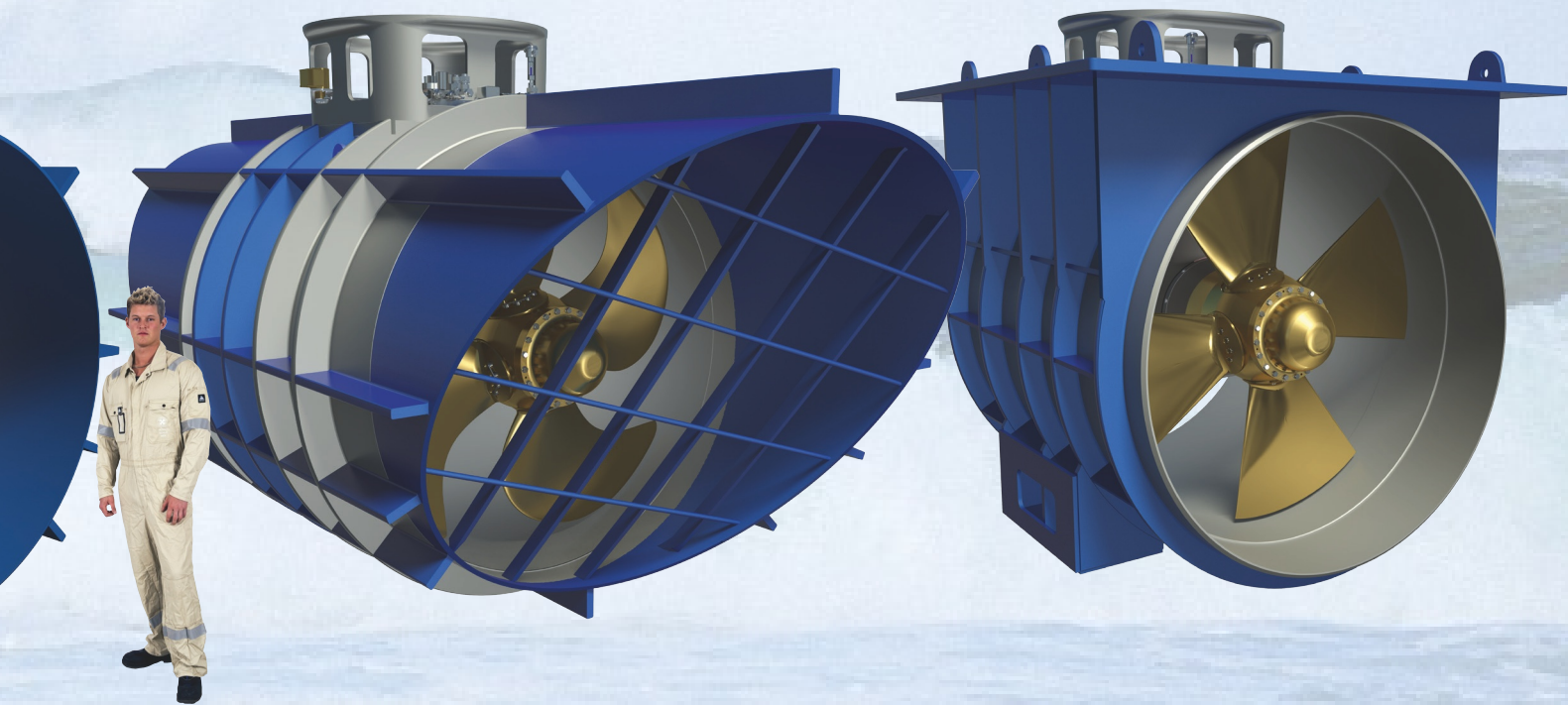
## With landing bars to avoid direct welding on the wall

- Rigid tunnel construction
- Ring stiffeners
- Modularized motor foundation
- Landing bars adapted to tank top and hull frames

## With straight-cut tunnel extension

- Rigid tunnel construction
- Ring stiffeners
- Modularized motor foundation
- Landing bars adapted to tank top and hull frames
- Straight cut tunnel extensions for trimming at the yard
- Extra rigid stiffeners adapted to centre girder





**With tunnel extensions cut to suit hull lines and protection grids**

- Rigid tunnel construction
- Ring stiffeners
- Modularized motor foundation
- Landing bars adapted to tank top and hull frames
- Tunnel extensions customized to suit to the hull lines
- Protection grids in the tunnel entrances

**With trunk extensions to fit designed steel section**

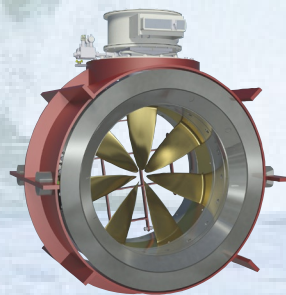
Brunvoll can supply thruster units fitted in a steel section designed on the basis of hull section drawings for the specific vessel

# LowNoise Tunnel Thrusters

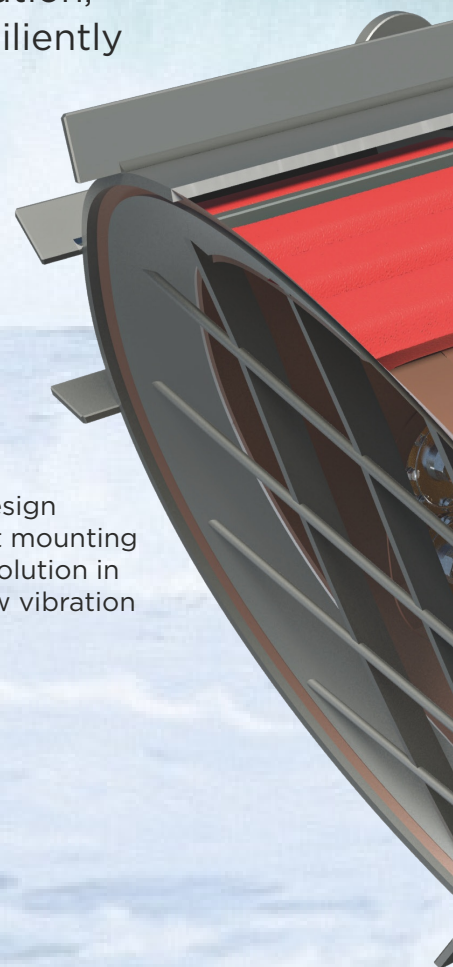
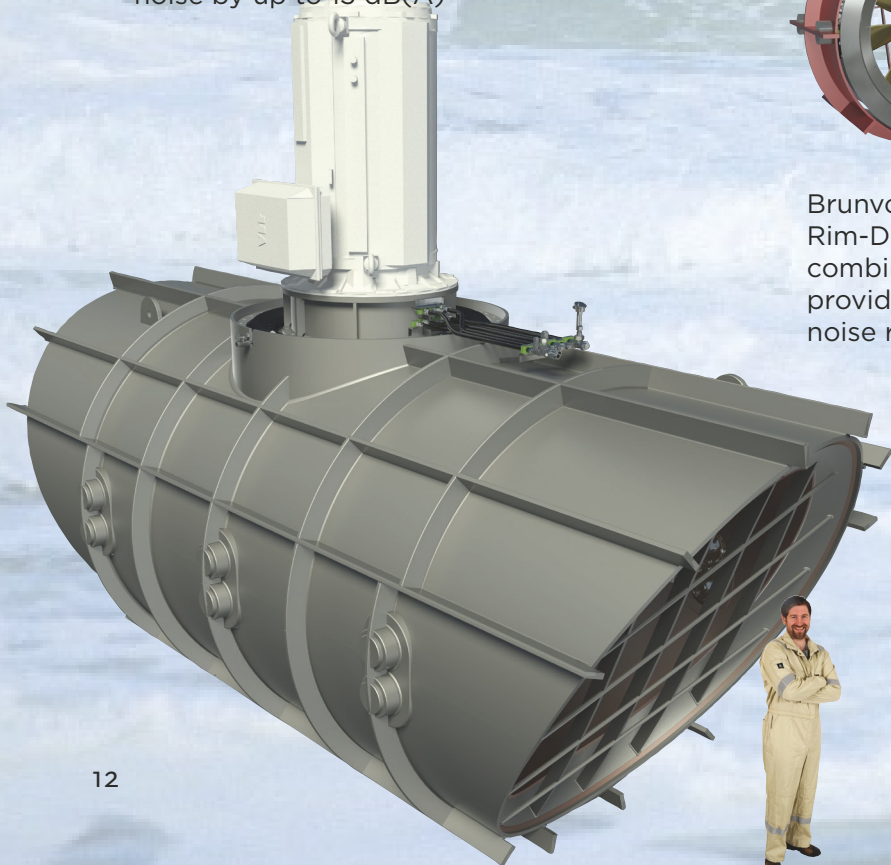
The Brunvoll LowNoise Tunnel Thruster design, Resiliently Mounted with full length double tunnel, results in a noise reduction of 11 to 15 dB(A). This design is mainly used on cruise liners, super yachts, passenger ships, research- and offshore vessels where extensive noise suppression is necessary.

- The trend is towards low-noise thrusters, and Brunvoll has shown the way
- Thruster noise represents a major problem for crews
- The stress and discomfort it causes may threaten both performance and safety on board
- Quieter sailing means better sleep, improving the alertness and efficiency of the crew. Passengers enjoy a new degree of comfort
- Brunvoll introduced the low-noise thruster in 1977. Through several technological generations we have refined our patented solutions into a proven concept, reducing noise by up to 15 dB(A)
- We supply 8 out of 10 thruster units in the demanding low-noise niche to ships including cruiseliners, mega yacht, passenger ferries, research vessels, and offshore support vessels with intensive use of DP

The ultimate solution,  
Brunvoll RDT resiliently  
mounted



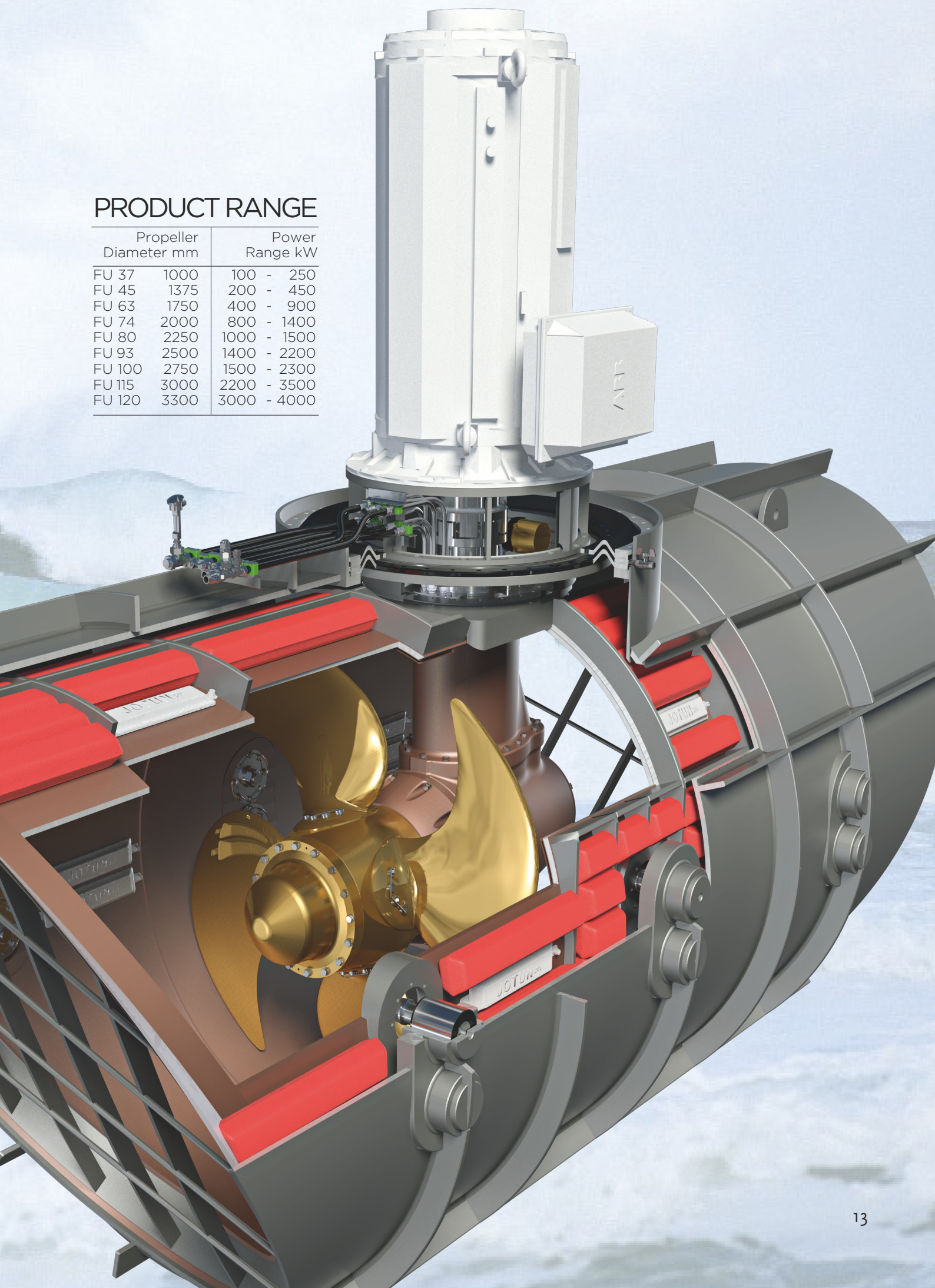
Brunvoll's innovative  
Rim-Driven Thruster design  
combined with resilient  
mounting provides the ultimate  
solution in noise reduction  
and low vibration





## PRODUCT RANGE

	Propeller Diameter mm	Power Range kW
FU 37	1000	100 - 250
FU 45	1375	200 - 450
FU 63	1750	400 - 900
FU 74	2000	800 - 1400
FU 80	2250	1000 - 1500
FU 93	2500	1400 - 2200
FU 100	2750	1500 - 2300
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FU 120	3300	3000 - 4000



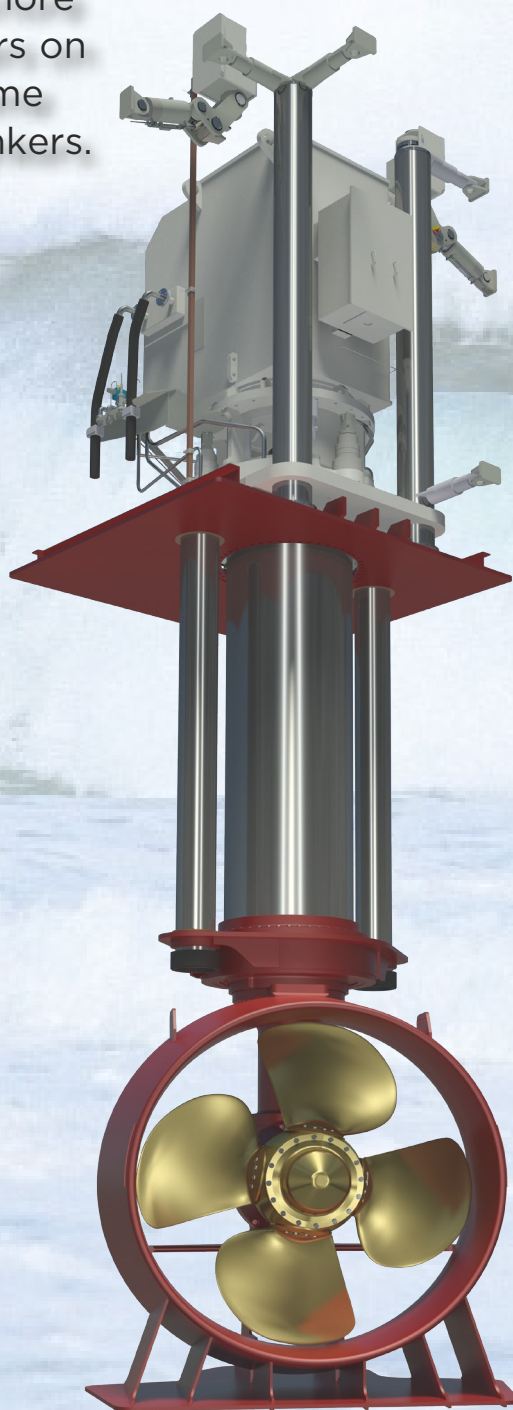
# Retractable Azimuth Thrusters

The Brunvoll Retractable Azimuth Thrusters are used for dynamic positioning on offshore and research vessels, as mooring thrusters on shuttle tankers, and as stand by/take home propulsion on naval ships and coastal tankers.

*Product Range; - see page 17*

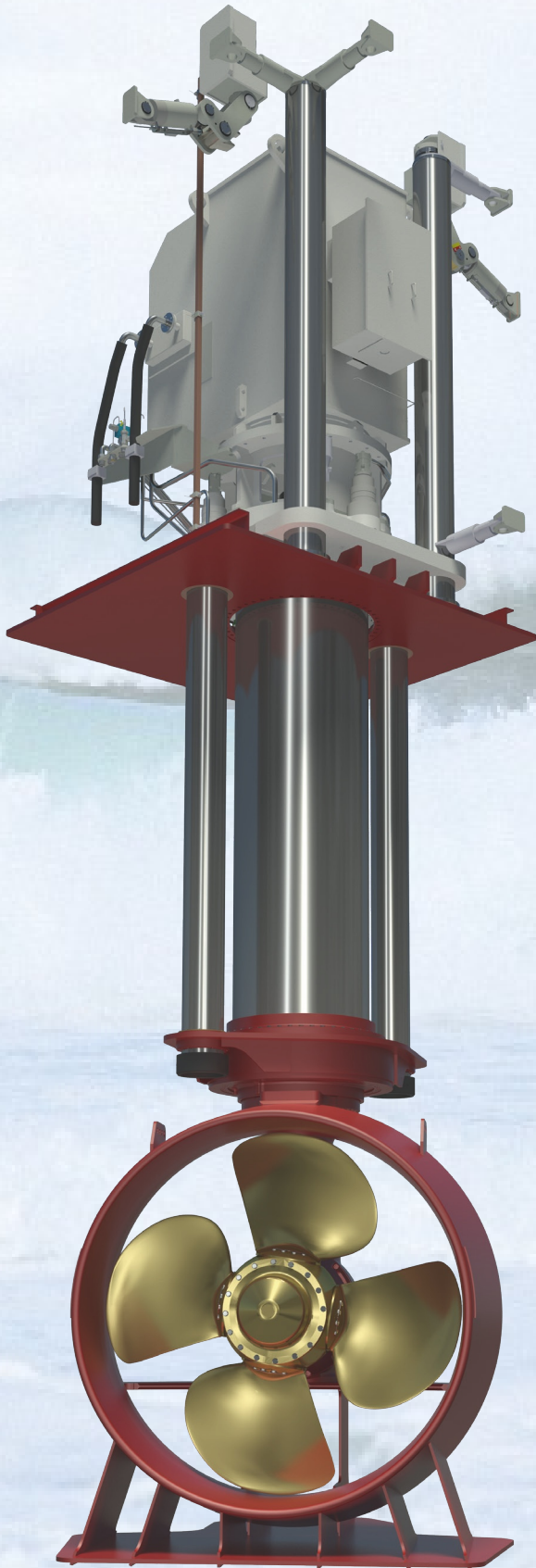


AR63

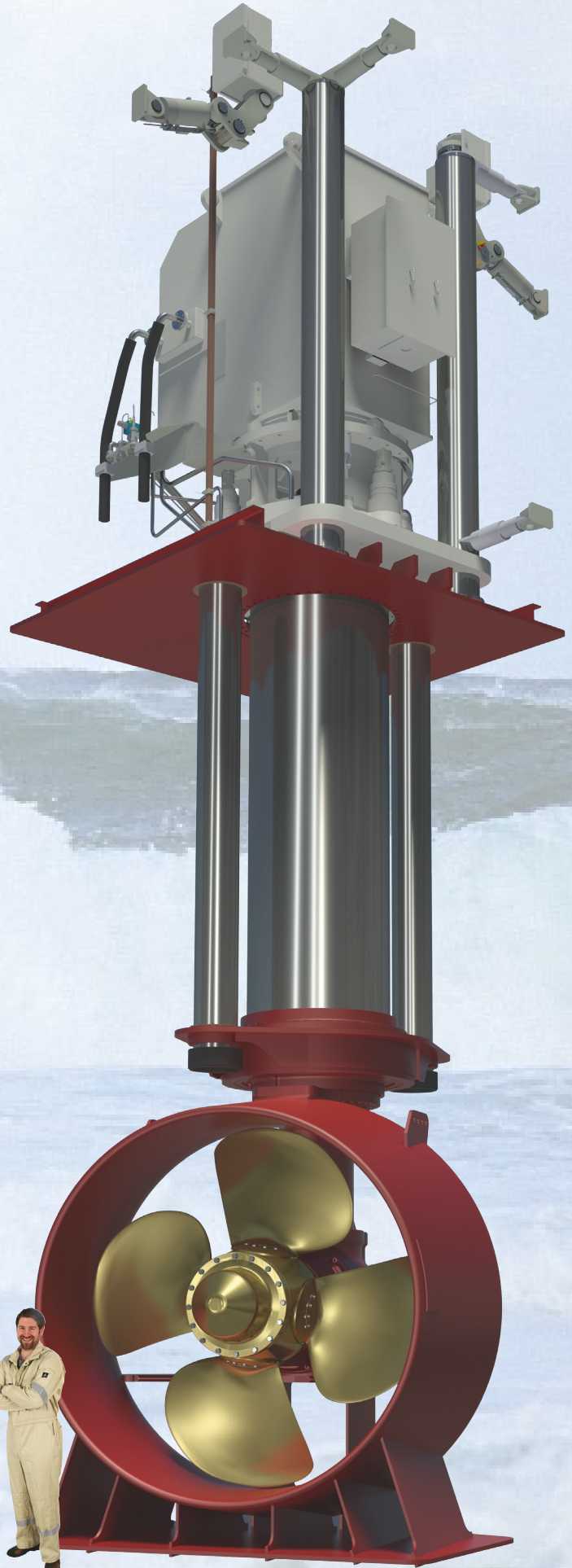


AR80





AR100



AR115 (Planned)

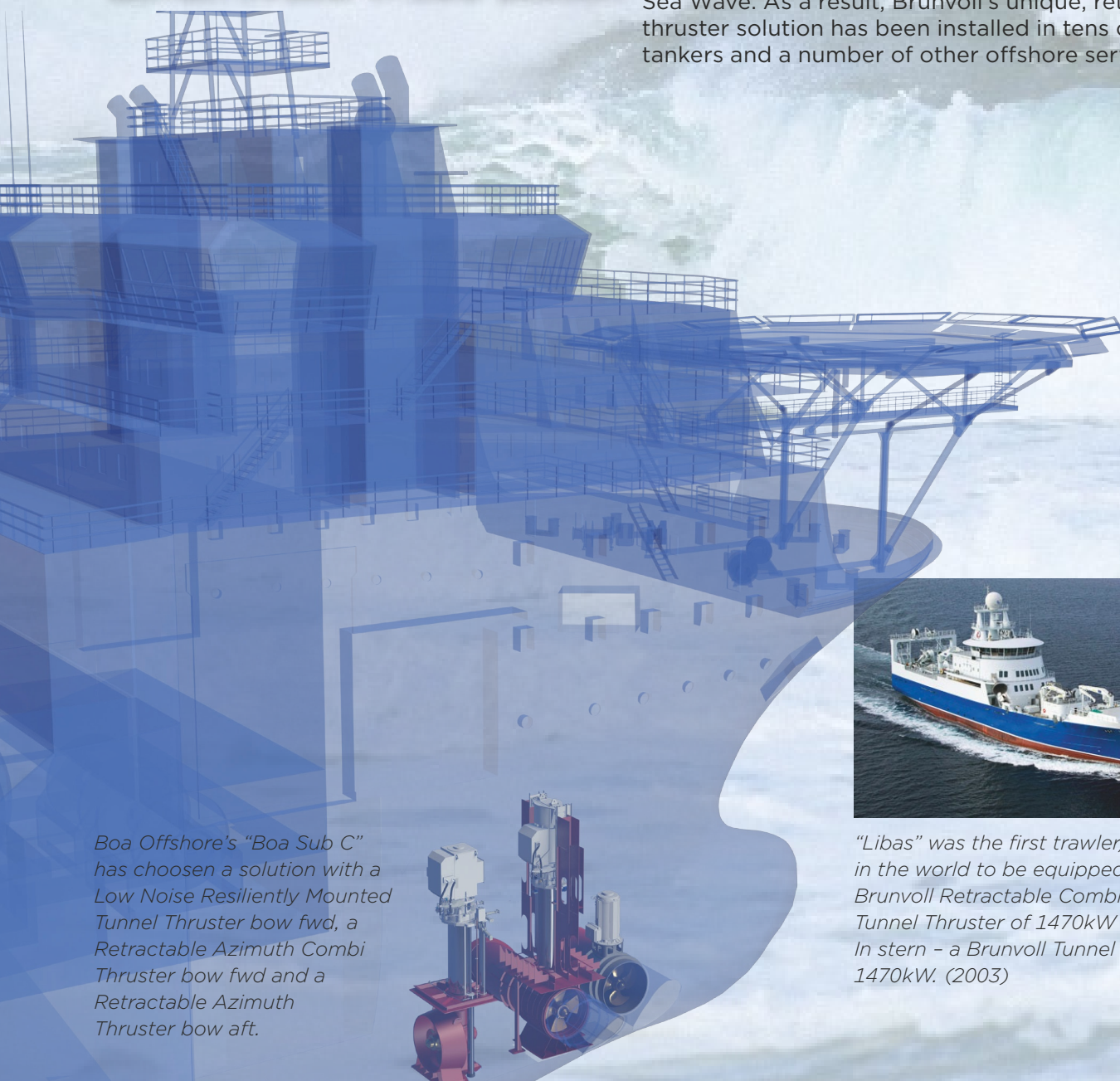
# Brunvoll Azimuth Combi Thrusters

A special version of the retractable Azimuth is the Combi-Azimuth/Tunnel Thruster.

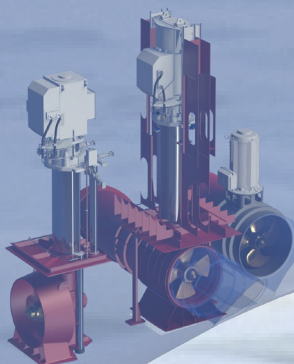
This works as a tunnel thruster in upper position, and as an azimuth thruster in lower position.

In 1996 Brunvoll developed a thruster that could perform as a traditional tunnel thruster and also be lowered underneath the hull and operate under the keel during offshore loading in high seas. This solution has been refined into today's Retractable Azimuth Combi Thruster.

The design is based on extensive simulation of hull movements for dimensioning of the unit and to ensure that the solution can even withstand the 100-year North Sea Wave. As a result, Brunvoll's unique, retractable thruster solution has been installed in tens of shuttle tankers and a number of other offshore service vessels.



*Boa Offshore's "Boa Sub C" has chosen a solution with a Low Noise Resiliently Mounted Tunnel Thruster bow fwd, a Retractable Azimuth Combi Thruster bow fwd and a Retractable Azimuth Thruster bow aft.*



*"Libas" was the first trawler/purse seiner in the world to be equipped with a Brunvoll Retractable Combi Azimuth/Tunnel Thruster of 1470kW forward. In stern - a Brunvoll Tunnel Thruster - 1470kW. (2003)*



## PRODUCT RANGE

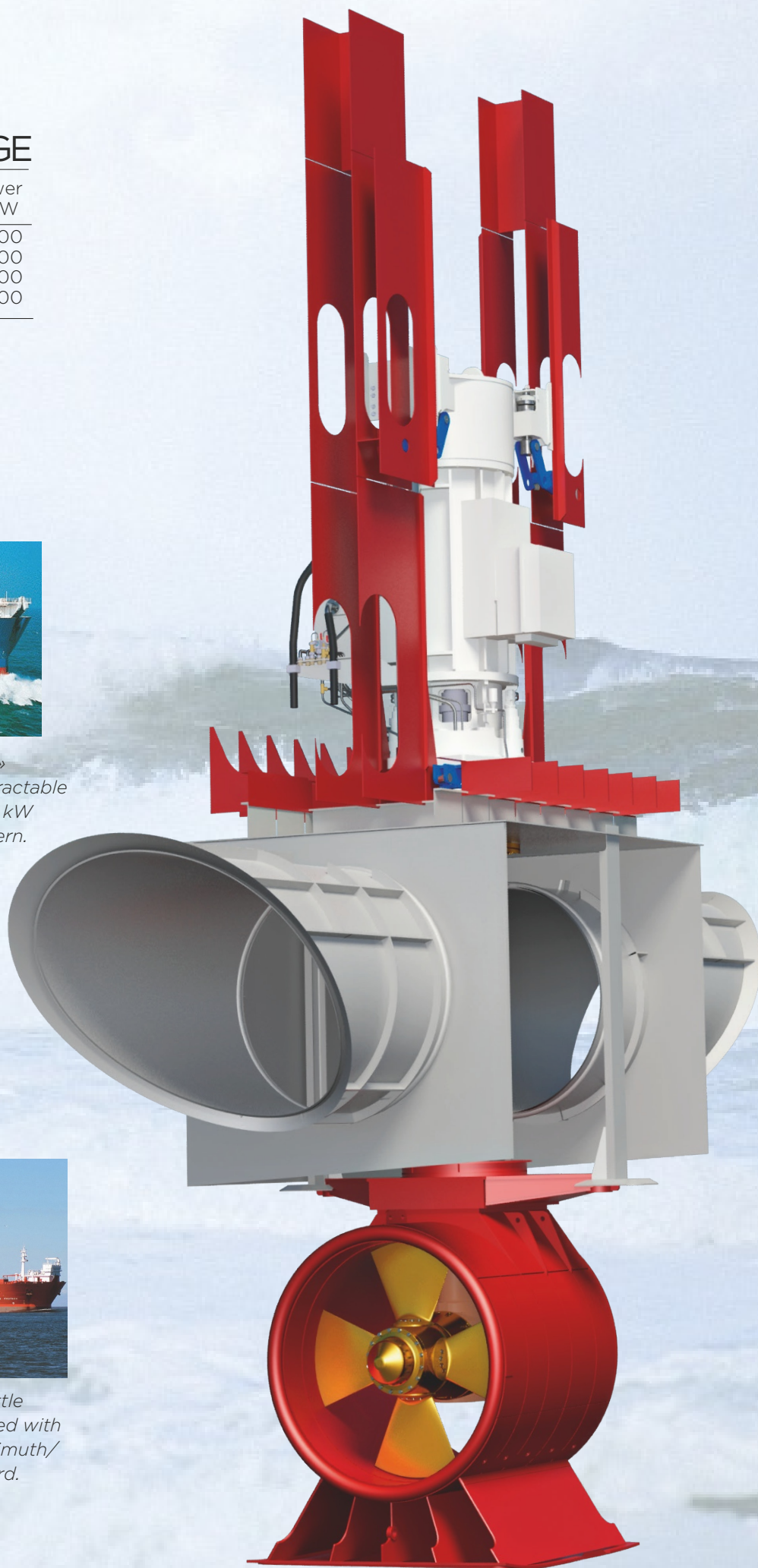
	Propeller Diameter mm	Power Range kW
AR 63	1650	400 - 900
AR 80	2100	1000 - 1500
AR 100	2600	1800 - 2200
AR 115	2900	2300 - 3000



*Shuttle Tanker «Navion Brittania» is equipped with 2x2200 kW Retractable Tunnel Thrusters in bow, 1x1400 kW Retractable Tunnel Thruster in stern. (1998)*



*«Tove Knutsen» was the first Shuttle Tanker in the world to be equipped with a Brunvoll Retractable Combi Azimuth/Tunnel Thruster - 2000 kW forward. (2004)*



# The new Brunvoll RDT Concept

- with major potential in different areas.

## The azimuth RDT offers a variety of advantages

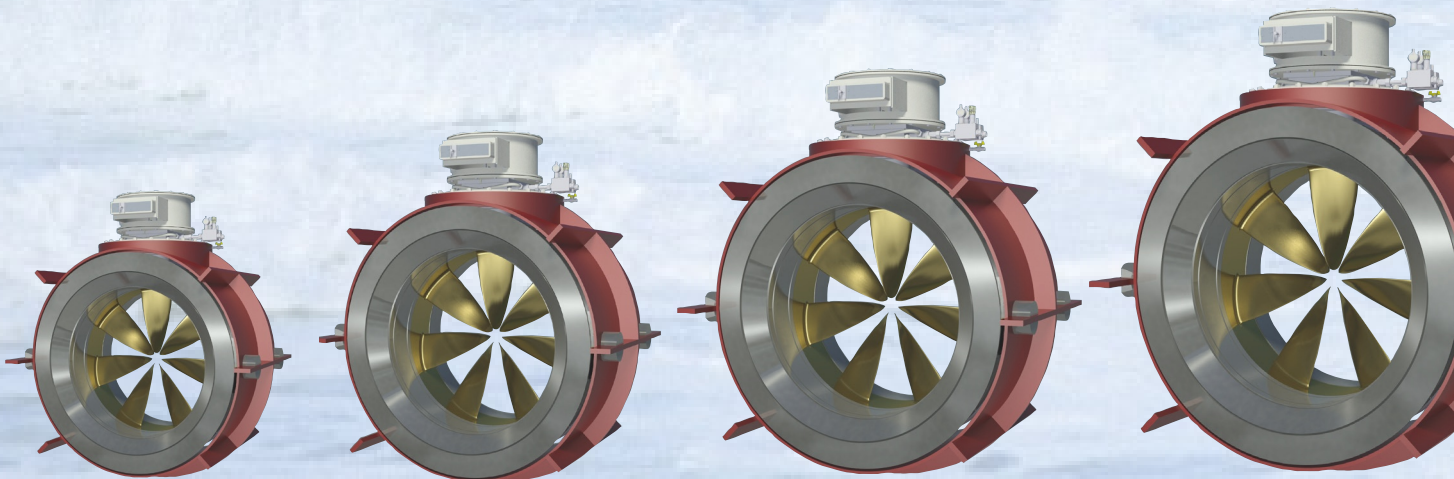
- The simplicity of the system reduces costs
- The RDT frees up valuable space
- Propulsion efficiency is improved
- Noise and vibration are reduced
- A high degree of manoeuvrability is achieved

### Environmental benefits:

The RDT has no gears and bearings that need oil lubrication



*One of the Azimuthing RDTs installed in the ferry "Eiksund"*



RDT 800

RDT1000

RDT1250

RDT1500



OSV "Edda Fram" and "Edda Frende" have a 810kW RDT Bow Thruster.



Fishing Research Vessel "Nordsøen" have a 300kW RDT in bow and a 160kW RDT in stern.



## Propulsion

The RDT concept is available for main propulsion



Megayacht "Pacific" have a 240 kw RDT in bow.



The ferry "Eiksund" have 2x380kW Azimuth Propulsion RDT.

Research Vessel "Janan" have a 200kW RDT in stern and a 250kW Tunnel-Thruster in bow.



RDT1750



RDT Propulsion



**TRUSTED WORLD WIDE**

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