



## LNG HYBRID BARGE



Becker's LNG Hybrid Barge generates energy for cruise ships lying at port. Compared to the current method of producing energy using on-board diesel engines, power supplied by the LNG Hybrid Barge will lead to a dramatic reduction of harmful CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub> and particle emissions during layovers at port.

Classified as a seagoing ship, the LNG Hybrid Barge is 76.0 m long, 11.4 m wide and has a 2.5 m draught. It is equipped with modular, silent operating 7.5 MW LNG GenSet power plants fuelled by two 17 t LNG containers.

## LNG POWERPAC®



The LNG PowerPac® is a single, stand-alone LNG power plant developed in order to supply clean energy to ships at port such as container, bulker or tanker vessels. Designed in the dimensions of two 40 ft containers, the LNG PowerPac® can be easily loaded, moved or exchanged with standard terminal equipment.

## LNG HYBRID FERRIES



Becker has developed LNG and hybrid concepts for ferries. This is a result of the experience gained from the LNG Hybrid Barge and the PowerPac®. Becker's LNG team has acquired expertise, particularly in the integration and combination of LNG fuel storage, LNG gas supply and power generation.

## BECKER SERVICE



- Service & repair
- Spare parts
- Conversions
- Available worldwide, 24/7

## RUDI – REMOTE UNDERWATER DIGITAL IMAGING



- Camera for underwater inspection during vessel operations
- Post-production, conversion into all common file formats, final reporting of video and/or optional hydrodynamics analyses

## MANOEUVRING TRAINING



- Experienced training staff
- Emergency manoeuvres, berthing, unberthing, crabbing and docking
- Training available as simulation (possible comparison of different rudder types)

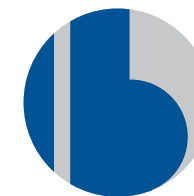
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# becker marine systems

## PRODUCT OVERVIEW





## BECKER FLAP

### HIGH-LIFT RUDDER

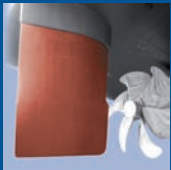
- Improved manoeuvrability
- Better course keeping
- Crabbing
- DP functionality



## BECKER FLAP WITH CLOSED LINKAGE (HERACLES)

### HIGH-LIFT RUDDER

- Protected linkage system
- Friction clutch to avoid damage to linkage
- Silent rudder operation
- DP functionality



## BECKER TWIST

### HIGH PERFORMANCE RUDDER

- Less cavitation
- Improved efficiency, reduction of rotational losses
- Optimised for fast vessel types



## BECKER SCHILLING®

### HIGH-LIFT RUDDER

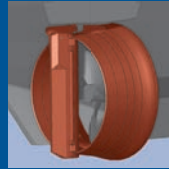
- Improved manoeuvrability
- Better course keeping
- Crabbing
- DP functionality



## BECKER SCHILLING® WITH TWISTED TRAILING EDGE (TT)

### HIGH-LIFT RUDDER

- Improved manoeuvrability
- Better course keeping
- Reduced drag
- Improved efficiency



## BECKER NOZZLE

### HIGH MANOEUVRING PERFORMANCE

- Increased bollard pull
- Increased thrust
- Highest possible lift
- Minimised integration space
- DP functionality



## BIMS – BECKER INTELLIGENT MONITORING SYSTEM

### RUDDER FORCE INDICATION

- Determines rudder lift and drag
- Serial interface to AP and DP systems
- Minimised rudder motions
- Improved safety, display of rudder stall condition
- Reduced fuel consumption
- GL type approved



## BBMS – BECKER BEARING MONITORING SYSTEM

### RUDDER NECKBEARING CLEARANCE MEASUREMENT

- Monitors neck bearing wear
- Indicates neck bearing maintenance
- Allows planning for next servicing
- Interface to maintenance software
- Reduces supervision costs

Other rudder profiles such as NACA are available on request.



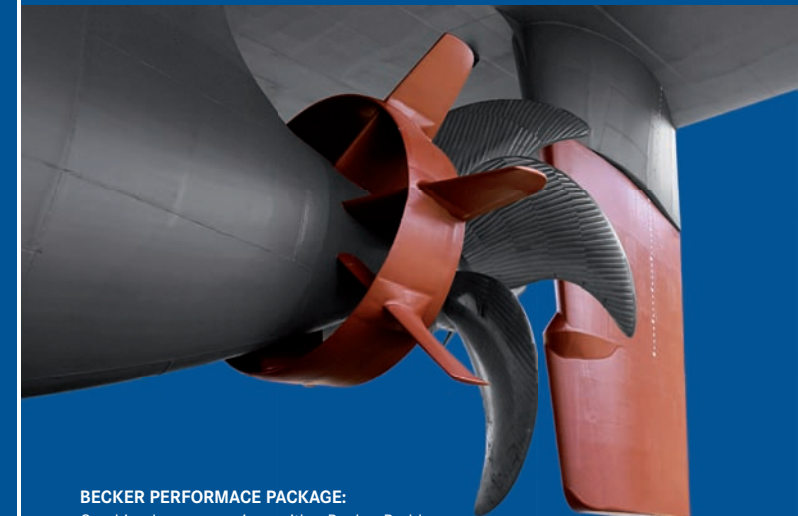
## BECKER MEWIS DUCT®

- Energy-saving device for full form slower vessels (e.g. tankers, bulkers)
- Energy savings averaging 6%
- Energy savings of up to 8% possible when combined with a Becker Rudder
- Reduction of NO<sub>x</sub> and CO<sub>2</sub> emissions
- Reduced vibrations and pressure pulses
- No moving parts, no maintenance required
- Suitable for newbuildings and retrofits
- Installation time approximately 5 days



## BECKER MEWIS DUCT® TWISTED

- Energy-saving device for hull optimised faster vessels (e.g. container ships, ferries)
- Energy savings averaging 3%
- Reduction of NO<sub>x</sub> and CO<sub>2</sub> emissions
- No moving parts, no maintenance required
- Suitable for newbuildings and retrofits
- Installation time approximately 5 days



### BECKER PERFORMANCE PACKAGE:

Combined energy-savings with a Becker Rudder and the Becker Mewis Duct® or Becker Mewis Duct® Twisted