



**BEACON FINLAND**  
NAVAL ARCHITECTS & MARINE SOLUTIONS

**JAK<sup>®</sup> ATB**  
**Coupling System**  
for ATB Tug/Barge Combinations



**For ATB Tugs with 350 to 10 000 horsepower**

# JAK<sup>®</sup> ATB Coupling System

Beacon's **JAK<sup>®</sup>** ATB Coupling System is an operationally tested, competitive innovation for ATB Tug/barge coupling. It provides multiple significant benefits.

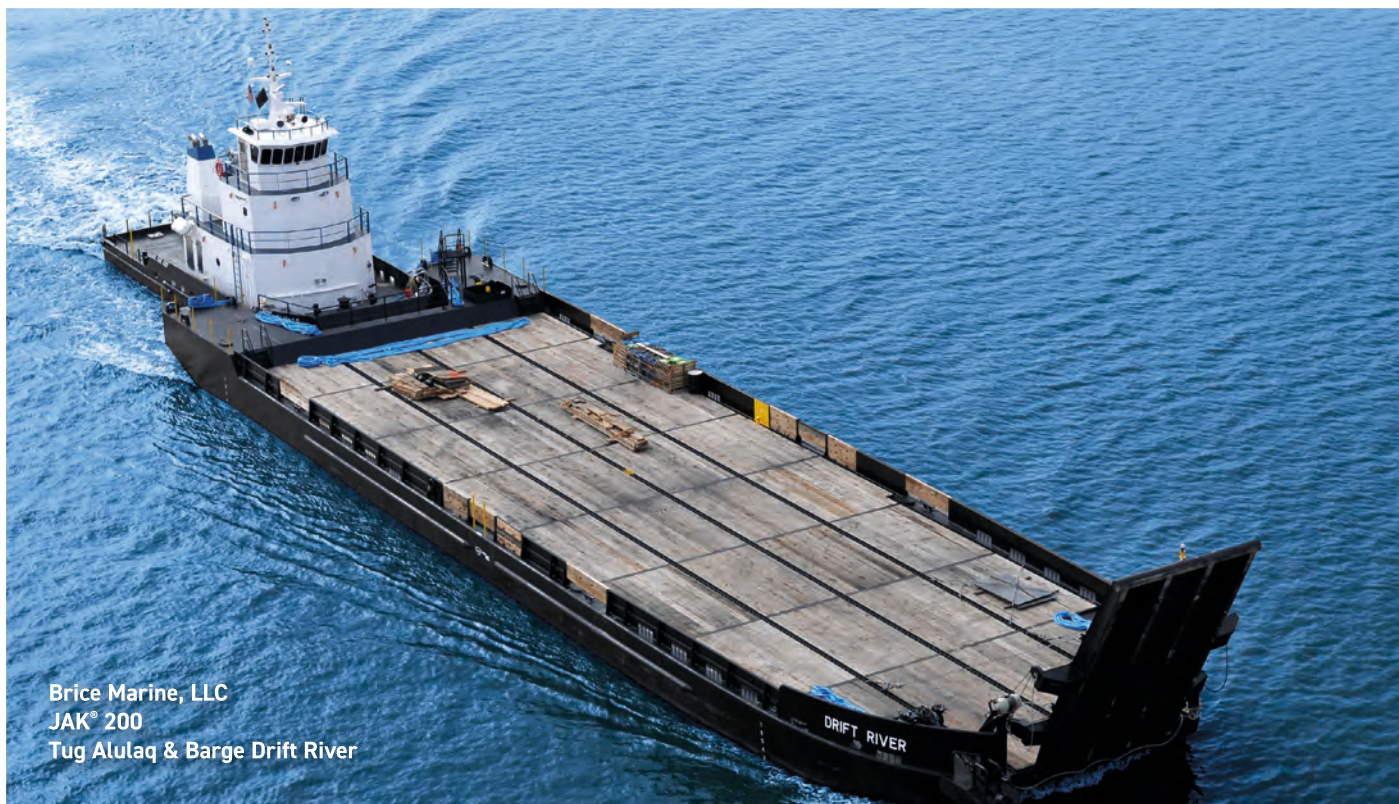
## Customer benefits

### Shipyards

- ✓ cost saving
- ✓ simplified steel structures
- ✓ less man-hours required for installation
- ✓ less man-hours required for design
- ✓ reduced weight
- ✓ smaller space demand

### Ship owners

- ✓ smaller draught
- ✓ less maintenance needed
- ✓ easy to use
- ✓ strong construction enhances safety and reliability
- ✓ energy savings
- ✓ less spare parts needed
- ✓ no on-deck equipment needed
- ✓ environmentally friendly



Photograph: Skeets Folse

Brice Marine, LLC  
JAK<sup>®</sup> 200  
Tug Alulaq & Barge Drift River

# JAK® ATB Coupling System

Photograph: Vane Brothers



The Vane Brothers Company  
JAK® 700 PHL-L  
Tug Assateague

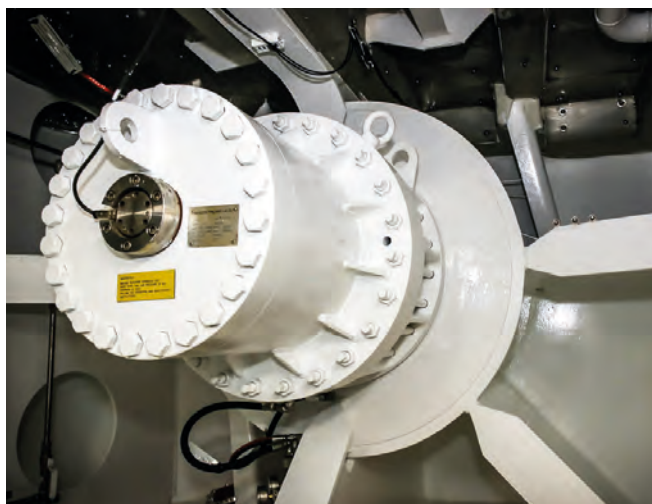


Reinauer Transportation Companies  
JAK® 400 PHL  
Tug Haggerty Girls

## JAK® ATB Coupling –Five Standard Sizes

ATB Coupling Size	Tug Displacement in tons	Tug Main Engine Power in hp	Barge Displacement in tons	Max. Significant Wave Height in m	Typical Operational Area
JAK® 100	50 – 150	350 – 750	200 – 1 000	up to 2	Sheltered Waters
JAK® 200	100 – 500	500 – 2 500	500 – 8 000	up to 5	Rivers, Lakes
JAK® 400	350 – 1 000	600 – 6 000	1 000 – 25 000	up to 7	Coastal
JAK® 700	650 – 1 800	2 000 – 7 000	10 000 – 30 000	up to 7	Offshore, Coastal
JAK® 1000	1 500 – 2 500	5 000 – 10 000	20 000 – 35 000	up to 7	Offshore, Coastal

NB: Table values are for estimation purposes only



JAK® family covers coupling systems suitable for tugs with engine power from 350 HP up to 10 000 HP.

### JAK® 2000 AND JAK® 3000

The JAK® family has also project related versions. These applications are intended for bigger tugs and barges, which are used in most demanding operational areas. These project based versions are called JAK® 2000 and JAK® 3000.



Socket plate installation to the barge in progress. The assembly jig (not included in Beacon's scope of supply) between the red socket plates ensures correct spacing.



Couplers compartment in the bow of the pusher: the port side coupler unit assembly is clearly visible.



Coupler unit seen from the Port side bow of the pusher.

## JAK® ATB Coupling System

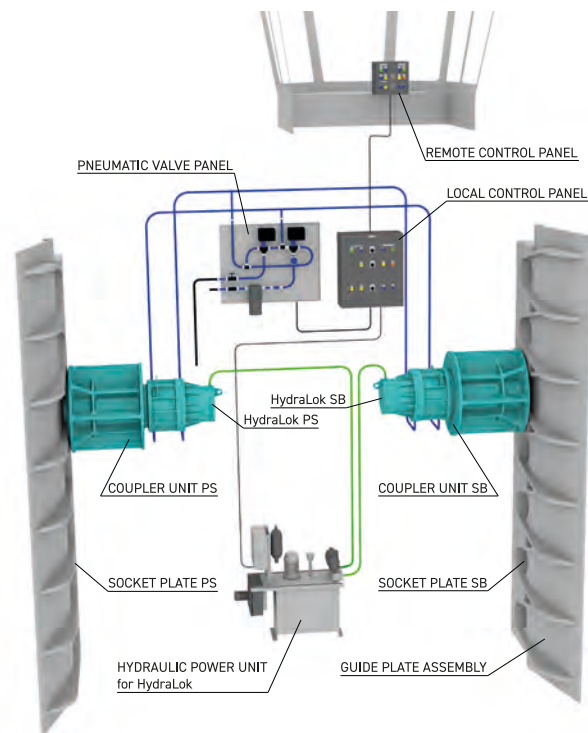
The **JAK®** ATB Coupling System is a pneumatically actuated electrically controlled articulated tug-barge connecting system. The coupling action is controlled from a control panel on the vessel's bridge or/and from the local control panel in the coupler unit compartment.

## JAK® Hydraulic Coupling System

The Hydraulic system is an option to the pneumatically operated **JAK®** ATB Coupling System.

## Installation

The **JAK®** coupler unit is mounted by welding the housing to the hull structures of the ATB Tug (SB- and PS-side), directly under the deck. The socket plates, including the guide plates – the counterpart of the coupler pins – are welded to the SB- and PS-sides of the notch of the barge. The location of the coupler units in the bow makes it necessary to construct a blister to level the coupler units and to fit the ATB Tug into the notch.



The scope of delivery normally also includes design and classification material, FEM analysis, control equipment and the tailored supporting structure parts for each delivery.

# JAK® Innovative Features

## JAK® Hydralok System

The hydraulic interlock system, **HYDRALOK**, is an attachment for the pneumatically operated **JAK®** ATB Coupling System. The **HYDRALOK** system's purpose is to significantly reduce, or possibly eliminate, the horizontal movement of the tug while engaged with the barge by "locking" the coupler pins, while in the extended position. The hydraulic pressure is produced by a separate hydraulic power unit and is controlled by an adjustable pressure relief valve.

## Control system:

The **HYDRALOK** control system is integrated into the **JAK®** control panels, which are located in the coupler compartment and the pilot house. The **HYDRALOK** system is operated manually. The release of the unit occurs automatically when retracting the coupler pins.

## Indication system:

The control lights will illuminate automatically when the **HYDRALOK** system is activated.

## JAK® Lightering System

Beacon Finland Ltd has developed the capability of the **JAK®** ATB Coupling System so that the tug remains in the notch of the barge during loading and unloading operations in harbor and calm sea conditions. The method is simple, as the Coupling System's coupler pins remain extended in the vertical grooves of the socket plates, port and starboard, allowing the barge to move vertically, up or down.



Supervision

## Tested Performance

Beacon has conducted an extensive series of model scale tests to gather basic data of the behavior of tug/barge combinations in different sea states. The tests have been carried out by the Ship Laboratory of VTT Technical Research Centre of Finland. Providing design data for each individual tug/barge sea state combination, the results form the basis for selecting the suitable size of the **JAK®** ATB Coupling. The tests and the calculation method are recognized by major Classification societies.

## Higher Strength Materials

Beacon Finland uses the highest strength steels in all of its **JAK®** ATB Coupling Systems. For example the coupler pins are made of solid stainless steel. All of the **JAK®** ATB Coupling's equipment meets or exceeds the ASTM standards and ABS' and other Classification societies' requirements.

# Inquiry Data

In order to enable us to provide you with an accurate and realistic quotation, at least the following data need to be included in the request for proposal:

## Pusher (Tug) Data:

- Length
- Breadth
- Draught
- Displacement
- Bow shape
- Power
- Propulsion system
- General Arrangement Plan (at least of the foreship area)
- Lines Plan (at least the bow foreship area)

## Barge Data:

- Length
- Breadth
- Draught
- Displacement
- Required draught range (min. ballast draught; max. loaded draught)
- General Arrangement Plan (at least of aft area)
- Lines Plan (at least of aft area)



## Common Data

Classification society and class notation • Flag authority • Operating sea area • Operating sea state (defined by the WMO sea state code) • Required delivery time and delivery address (shipyard)



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JAK® 400 PHL-L  
Tug Cape Ann

Photograph: Master Boat Builders

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