COMPACT MULTI PURPOSE VESSEL
OPERATIONAL AREA: OFFSHORE, COASTAL WATERS, HARBOURS, LOCKS AND CANALS

- **Safety**
  - High freeboard
  - Wide beam
  - Large single skeg
  - High stability
  - Full vision bridge
  - Safety glass
  - Dedicated User Interface
  - Spacious working deck without obstacles

- **Reliability**
  - Remote monitoring
  - Damen E&A system
  - Maintenance friendly
  - Simplicity
  - Closed systems
  - Spacious engine room

- **Efficiency**
  - Multi-functional
  - 85t BP ahead
  - 80t BP astern
  - Max steering force 75t
  - Max braking force 90t
  - Good manoeuvrability
  - Compact vessel < 400t GT
  - Low fuel consumption
  - Render & Recovery winch
  - Crew comfort
  - Future proof
  - Available on stock
DAMEN SOLUTIONS

SAFETY

RELIABILITY

EFFICIENCY
Smooth and rounded shape
- Constant flow around the vessel means constant and predictable availability of thrust

Large beam and large freeboard
- High stability and dry working decks

Shaped aft ship large freeboard
- Dry aft deck when sailing astern (bow-to-bow operations)

Large single skeg
- Course stable and steerable, also with only one thruster
LARGE FREEBOARD, NO WATER ON DECK
The tumblehome is up to 40% with the wheelhouse leaning inward, which makes it ideal when working under the flare of container vessels.
SAFETY

LARGE TUMBLEHOME
FULL VISION BRIDGE

A modern, compact wheelhouse with good all round visibility and user-friendly layout, with excellent lines of sight from the wheelhouse on fore deck, shoulders and assisted vessels.
A compact wheelhouse gives the captain an excellent, all round view. Large tinted windows are provided and sky windows give an optimal view on vessels being assisted.
Tests were carried out following the NEN-EN 356 norm Glass in building-Security glazing-Testing and classification of resistance against manual attack.

The tests consisted of a hard body drop test category P3A. Dropping a ball weighing 4.11 kg from 6 meters three times on a window configuration.
Ergonomically designed, easy to use consoles, with operating panels with controls, monitoring and alarms as well as nautical data, main engines, winch and auxiliary controls.
**CLEAR INSTRUCTIONS**

**Instruction Safe Towing Operations**

- Towing equipment to be maintained acc. supplier maintenance manuals;
- All weatherlight and watertight doors and hatches to be closed;
- No persons on deck during towing operations;
- No persons below freeboard deck and engine room during towing operations;
- Stability booklet to be checked for loading conditions and vessels capabilities;
- No water on deck during towing operation;
- Primary quick release is located at the wheelhouse control station;
- Escort operations only to be performed in calm water conditions*;
- Max. towline angles and forces to be respected at all times.

<table>
<thead>
<tr>
<th>Towing over the stern</th>
<th>Towing over the bow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Bollard Pull (Static)</td>
<td>80.1 T</td>
</tr>
<tr>
<td>Safe Working Load (Towing Hook)</td>
<td>100 T</td>
</tr>
<tr>
<td>Max. Bollard Pull (Static)</td>
<td>74.1 T</td>
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<tr>
<td>Max. Towline Escort Force**</td>
<td>86.4 T</td>
</tr>
<tr>
<td>Brake Holding Load (Winch) 2nd layer</td>
<td>200 T</td>
</tr>
</tbody>
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*All towing equipment is designed to withstand the above-mentioned forces, for all towing distances showed below in accordance with:
Recommended Class Approval - Safety Handbook for Design, Construction and Operation of Tugs, only Class.*

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**Max. Towline Escort Force Towing over the bow**

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**Bollard Pull Chart (Static)**

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**Engine Revolutions [rpm]**

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**Max. Towline Escort Force Towing over the bow**

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**Towing over the stern**

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**Towing over the bow**

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**Primary quick release**

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**Secondary quick release**

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**Max. Towline Escort Force**

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**Towing over the stern**

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**Towing over the bow**

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**DAMEN**

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**DAMEN**

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**DAMEN**
Figure 1: Heeling and righting arm curves
SAFETY

OPTIMUM USE OF SPACE
The fore deck has a completely flush design, optimised for various towing modes giving this multipurpose tug optimal performances.

An ergonomic design has been incorporated into the new ASD Tug 2813 with good accessibility to winches, bollards and the fairleads.
An open, clean aft deck with no obstructions for safe working conditions, while giving maximum workability, whether the tug is involved in a salvage, oil recovery operation or in buoy handling.
DAMEN SOLUTIONS

SAFETY

RELIABILITY

EFFICIENCY
The ASD Tug 2813 incorporates solutions for corrosion prevention. All steel parts are well rounded, welding is done without overlap or undercutting and areas like the bulwark are closed for easy maintenance.
Working at sea with a pushing force of 85 tons makes it a great challenge to design fendering that will not damage the ship’s skin. The high waves make it necessary for a tremendous amount of energy to be absorbed.
For maximum safety of the crew, full control of the engine room is possible from the main deck. The crew can monitor alarms, analyse the problem and take action.

The engine room is fully equipped with stores, workbench, a grinding machine, drilling machine and lockers.

The engines are flexibly mounted to ensure low vibrations and noise levels.

All piping systems are fitted carefully to prevent vibrations. They are all colour coded and flow directions are indicated.

Hand grips and handrails are provided throughout for maximum safety.
No pollution
No corrosion
No freezing

Damen uses closed cooling water systems, which are designed for 35 degrees seawater temperatures for diesel engines and AC systems. It is not the cheapest solution but Damen want to avoid any risk of pollution and corrosion so these closed cooling systems are included as standard. The level of quality in turn, makes it maintenance friendly.
To predict the escort capabilities of ASD tugs, Damen Research has developed and computer program ‘TugSim’ in cooperation with Delft University of Technology and Marin.

The TugSim program makes it possible to calculate escort forces on the towing line and the performances of the tug.
TUGSIM – ESCORT CALCULATION, OPTIMISATION AND VISUALISATION
FUEL CONSUMPTION

- Compact vessels need less fuel (at normal operating speed)
- Smooth hull forms have a higher agility with less fuel
- Indirect towage requires less fuel for higher line forces
- Optimised sizing of equipment results in less needed auxiliary power
- Double glazed windows reduce required AC capacity by 50%
Compact winch system
As a result the vessel has a spacious fore deck and excellent view lines from the wheelhouse.

Simple winch concept
No gearbox, no additional clutches, no water cooled disc brakes, no different speed/pull settings.

User friendly and reliable control system
Ergonomic Human – Machine interface.

Rendering capacity, recovery capacity, reaction time, acceleration and deceleration of the Damen R&R winch system are sufficient for significant wave heights up to 3 meter in combination with wave periods up to 6 seconds.
CREW COMFORT

- An efficient, spacious, safe and comfortable working environment
- Durable and easy to maintain waterproof, hard plastic coated marine plywood has been used
- The accommodation has modern furnishings in Damen standard colours
- Entry into changing room
- Every crew cabin equipped with sanitary facilities
CREW COMFORT

- Modern, spacious and air-conditioned crew cabins with writing table, drawers, lockers and book racks
- Comfortable mess room with lockers, settees, radio & tv, alarm info and nautical communication
- Durable stainless steel work top with 4 plate electric cooker, stainless steel combi-magnetron, freezer, refrigerator and diswasher
STRIVING FOR OPTIMAL SOLUTIONS TO BRING VESSELS HOME SAFELY