EXECUTIVE SUMMARY
TRAILING SUCTION PIPE SYSTEMS
### COMPLETE RANGE

<table>
<thead>
<tr>
<th>TSP diameter (mm)</th>
<th>Dredging depth (max, m)</th>
<th>Mixture capacity (average, m³/h)</th>
<th>Hopper volume (average, m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>15</td>
<td>1,750</td>
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<tr>
<td>900</td>
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<td>11,450</td>
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</tbody>
</table>

**Images:**
- Ship with equipment on deck.
- Close-up of equipment.
- Equipment in action.
- Ship at sea with wake.
Customised complete dredging packages.

**Complete dredging systems for**

- Newbuild's
- Retrofits

The yard brings in the shipbuilding knowledge,

Damen is the dredging specialist.
Trailing suction pipe system made to measure, making use of
- Your General Arrangement plan and outline specification
- Our standard dredging component range

The dredging system is designed to fit your vessel
OVERVIEW
TSP SYSTEM

Trailing Suction Pipe system
- Trailing suction pipe
- Gantries
- Winches
- Swell compensator
- Dredge pump(s)

Additional dredging systems required
- Loading system (dredge valves, overflow, degassing, …)
- Discharging system (bottom doors, self emptying system, bow coupling, …)
- Dredging instrumentation (pressure transmitters … to full automation)

Option
- Double trailing pipe
Trailing suction pipe components

- Drag head
- Lower suction pipe
- Turning gland
- Cardan hinge
- Upper suction pipe
- Single hinge
- Suction elbow
- Slide flange (runs in hull recessed rails)
- Along trailing pipe: jetwater piping, e-cabling

Additional options

- Submerged dredge pump unit
- Customized options (safety joint at drag head, recovery buoy, …)
HOISTING EQUIPMENT

Gantries
- Parallel gantry
- Intermediate gantry
- Drag head gantry

Winches
- Slide flange winch
- Intermediate winch
- Drag head winch

Swell compensator Options
- Emergency hoisting wire
- Electrically driven winches
Damen in-house designed dredge pumps

Available in various pressure stages
- Low pressure
- Medium pressure
- High pressure

Available in various types
- Submerged dredge pumps
- Inboard dredge pumps
- Double walled pump casing

For all Damen dredge pumps applies
- Mechanical shaft seal
- Wear resistant cast pump parts
- Diesel, electrically or hydraulically driven
Damen rubberring gate valves for mixture control

- Fit for mounting in dredging pipe lines
- Hydraulic actuator
- Open / closed indication
- Class approval (optional)

<table>
<thead>
<tr>
<th>Diameter mm</th>
<th>Maximum pressure 6 bar</th>
<th>10 bar</th>
<th>16 bar</th>
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<tr>
<td>1100</td>
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</tbody>
</table>
Overflows
- Telescopic
- Option: anti turbidity valve

Light mixture overboard (LMO)
- Rubberring gate valves
- Density measurement
- Automation

Delivery chute

Degassing system
- Fully automated
- Closed system
- For submerged and in board dredge pumps
Self emptying system
- Jetwater nozzles
- Jetwater monitor
- High pressure dredge pump in board

Bottom doors
- Doors incl. frames and actuating mechanisms

Discharge units
- Bow coupling unit
- Rainbow nozzle
- Side coupling

Separate booster station
- Containerized on deck
INSTRUMENTATION

Dredge pump performance
- Vacuum & pressure transmitters
- In board and submersed use

Production measurement
- Electro-magnetic flow meter
- Non radioactive density meter

Suction Tube Position Indication
- Vertical angles & position slide flange
- Windows OS software

Load & Draught Indication (L&DI)
- Draught measurement by pressure transmitters
- Efficient control loading process

Position visualization system
- Survey Software
**Suction Tube Position Indication**

- Horizontal angles
- Positions gantries
- Pipe at rest
- Winch encoders for pay-out length
- Visualization double trailing pipe

**Load**

- Continuous position indication overflows, bottom doors, …
- Tons Dry Solids (TDS) measurement

**Navguard positioning system**

- Additional RTK shore based station
- Office work station for post-processing
<table>
<thead>
<tr>
<th>Type</th>
<th>Hopper volume m³</th>
<th>TSP diameter mm</th>
<th>Dredging depth min/max, m</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSHD 650</td>
<td>650</td>
<td>400</td>
<td>5.5 / 15</td>
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<tr>
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<td>7.5 / 20</td>
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<tr>
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<tr>
<td>TSHD 2500</td>
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<td>9.0 / 25</td>
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</table>
**RoRo Deep Dredge**
- Modular dredging system
- Unlimited dredging depth
- Continuous dredging process

**DOP system**
- Complete dredging system
- Modular units
- Can be mounted on any barge
After sales department
- Components with short delivery time
- Complete package of spare parts
- Registration of components
- Advice and support
- Dedicated team involved from order to shipment

Damen Field Service
- Post delivery support
- Warrantee and after sales services
- Training courses (in house and on site)
- Technical check-ups
- Service in remote areas
YOUR JOB, OUR TOOLS