



Damen Air Cavity System

CONTRIBUTES TO LOW EMISSION SHIPPING





Damen Air Cavity System

The Damen Air Cavity System (DACS) originated from a research project at the Delft University of Technology (TU Delft) in the Netherlands. Maintaining a thin layer of air over the flat bottom of a vessel's hull, DACS achieves a significant reduction in water resistance, leading to increased efficiency and a reduction of fuel consumption and, therefore, emissions.

Lowering the ship resistance results in the reduction of the fuel/energy consumption and emissions. The hull optimisation generally helps to reduce the wave making and pressure resistance whereas the frictional resistance, which is dominant, considered as given and it is proportional to the wetted area. Damen Air Cavity System DACS forms stable air cavities on the flat bottom of a ship. The system has a high overall efficiency and can be used on ships for fuel consumption and emission reduction.



Inland waterway ships

Inland waterway ships have a large flat bottom area and they sail at relatively low speeds, often in shallow water. This is why for this type of ship the relative fuel consumption reduction by DACS is the highest. The fuel savings and emission reduction is between 10 and 20%.

Seagoing ships

Depending on a ship type the saving on seagoing vessels are between 5 and 12%. Although the relative saving are smaller compare to the inland waterway vessels the absolute values are often much larger. This is because seagoing ships are larger in size, have more installed power and sailing at higher speed.

Examples of covered area by DACS for different ship types



DACS components

DACS layout

DACS includes the following components integrated into a ship:

- > Bridge control and alarm panel
- > Air blower
- Starter/junction box
- > Automated air valves
- > Air pipe work steel and/or plastic
- Cavitators transversal profiles on the bottom
- Skegs longitudinal profiles on the bottom

Control unit on bridge



Cavitators

Cavities

Skegs

Benefits

- Lowers fuel consumption
- Reduces pollution
- Reduces the negative effect of resistance by fouling
- Qualified for Green Award
- Qualified for EIA tax reduction (for Dutch flag vessels)
- Promises accounted in EEDI & EEXI





Towards zero-emission shipping

Emission-free sailing is now becoming feasible for inland and short sea navigation. Electricallydriven ships use batteries or electricity generated on board from 'clean' fuels such as hydrogen.

Wide application of emission-free ships is currently limited by energy storage and production capacity, as well as the associated high costs. As such, energy efficiency is especially critical for such vessels. Its potential to reduce the fuel consumption / reduce the (Electrical) power consumption / reduce propulsion power of ships, can reduce the size of the energy generation and storage system or extend the vessel's range. The benefits for battery powered vessels are reduced battery size and weight, as well as charging time.



Reduce up to 12% on your fuel consumption.
Improve CII and EXI rating by reducing CO₂ emission
Result: Lower CO₂ taxes.



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