

## German Navy FD Boot (Type 423)

BIOLOGICAL BMA® MEMBRANE PLANT  
WITH SICLARO® FILTRATION TECHNOLOGY

### Task

MARTIN Systems has been contracted to upgrade the Germany Navy's OSTE class reconnaissance vessels. Built in 1988 and 1989, they will now be retrofitted with MARTIN Systems new biological membrane technology for on-board black and grey water treatment. MARTIN Systems will deliver an ultrafiltration wastewater treatment plant with a pre-treatment module and a new vacuum plant to meet the Navy's updated complex wastewater management requirements.

### Ship Details

These vessels are highly efficient warning, communication and reconnaissance vessels. Operating alone or within fleets, their ultra-modern electromagnetic, hydro-acoustics and electro-optic devices successfully collect strategic information in conflict areas. Their range of operation with more than 5,000 sea miles makes them the perfect choice for long term missions.

### Wastewater Management

The ship is supplied with a BMA® reactor and one filtration cell, installed in the machine room. Furthermore, the system consists of a flotation system, a fine screen and a pump station for black water. The BMA® operates fully automated and is integrated into the ship's central control systems.



### Treatment Capacity

|   |      |
|---|------|
| Population Equivalent (PE)              | 86   |
| Raw sewage input (m <sup>3</sup> /d)    | 13,1 |
| Grey water input (m <sup>3</sup> /d)    | 11,7 |
| BOD <sub>5</sub> input (kg/d)           | 7,8  |
| No. of membrane modules                 | 16   |
| Total BMP tank volume (m <sup>3</sup> ) | 5    |

### Final Effluent Quality

The final effluent exceeds all requirements given by the IMO (International Maritime Organization), the German "Seeberufsgenossenschaft", Germanischer Lloyd and the German Navy.

