

WASTE & FRESH WATER MANAGEMENT
FOR NAVY VESSELS

With over 40 years of experience in marine sanitation, Wärtsilä offer innovative water management solutions that meet all existing and anticipated standards.

We have developed an enviable reputation for reliable machinery, backed up by an efficient spares and service capability.

Wartsila Water Systems Ltd (formerly Hamworthy Water Systems) is an innovative, market leading company providing technically advanced waste treatment systems in response to environmental needs and marine legislation. Wärtsilä are committed to supporting owners and operators providing design, products, turnkey installation and a global support network.

In an active programme pursuing Maritime Environmental Protection, the NATO Naval Armaments Group developed a common vision and technical programme to respond to

the obligation for naval ships to be increasingly compliant with stringent environmental regulations. An objective for the group is to be a leader in this field, so that navies are at the forefront in the battle against pollution.

In this technology arena Wartsila Water Systems continue to set the global standards in waste management by being the world's leading manufacturer of marine sewage treatment plants and fresh water generation, ensuring naval ships can operate world-wide with minimal potential for regulatory constraints. ■ ■ ■

THE EFFICIENT, HYGIENIC END TO WASTE FOR NAVAL APPLICATION



Wärtsilä Hamworthy MBR technology for naval application



MEMBRANE BIOREACTORS (MBR)

Wärtsilä Hamworthy's innovative MBR technology is based on biological degradation and membrane separation and allows for the treatment of grey and black water to satisfy the most stringent standards. The process produces the highest quality discharge without requiring any addition or generation of chemicals that are hazardous to the environment or ship operation. Effluent quality tests conducted by the US National Sanitary Foundation on Wärtsilä Hamworthy's MBR produced results exceeding the most stringent future legislative pollutant standards envisaged.

The technology also achieved outstanding performance in Alaska under the scrutiny of the local authority, USCG and USEPA studies over the past seasons. The membrane permeate quality exceeds the most stringent coliform standards even without additional UV or chemical disinfection. The latest system optimisation has achieved over 25% savings on energy consumption and consumables, and over 50% reduction in operational man-hours. Satellite communication allows the MBR systems to be remotely monitored by specialists as part of our fleet support program.

MBR PRINCIPLES OF OPERATION

Black and grey water pass through the automatic screen press into the first stage bioreactor where the active biomass degrades organic material. The active biomass is pumped through an interstage filter fitted with fine mesh. The filtered biomass, free of any fibrous materials, is returned into the second stage bioreactor. Biomass is circulated through membrane modules to produce a trans-membrane pressure and scouring velocity. Clean permeate is taken from the membrane modules. The concentrated biomass is returned to the second stage bioreactor for discharge. The system is automated.



THERMAL DESALINATION PLANTS

Wärtsilä Serck Como's well-proven, multi-stage flash (MSF) principle is the most reliable thermal seawater desalination process in the world and is the only evaporation principle where heat transfer and evaporation are strictly separated.

Wärtsilä Serck Como designs and manufactures multi-stage flash desalination plants which are employed for producing fresh water from sea water, well water or industrial water. A special advantage of the multi-stage flash technology is that the specific heat consumption (or thermal efficiency) can be continuously adapted

to the individual requirements of each cruise vessel.

We also offer multiple effect evaporators which are individually designed to the customer's specific requirements, plate type evaporators which utilise the waste heat from the main diesel engine jacket water, and rising film evaporators which are shell and tube type, single-stage units.



OILY WATER SEPARATORS

With the aid of Wärtsilä Oily Water Separator (OWS), the environmental aspects regarding bilge water issues are easily handled with minimum impact for the operation staff and with results that easily surpass legislative requirements.

The Wärtsilä OWS units are IMO and US Coast Guard approved and give the operator effective control over all bilge media as well as over any discharges made into the sea. The system guarantees a maximum oil content in the effluent of 5 ppm (parts per million) during continuous operation. The units are designed to conform to the highest safety standards, an essential factor for their competitiveness but also a substantial value in itself.

A complete Wärtsilä OWS consists of:

- Wärtsilä Oily Water Separator
- Solidpac solids dewatering unit (optional)
- Onsys feed pump system (standard on OWS 500 and OWS 2500)
- Bilge discharge monitoring system (optional)



VACUUM TOILET SYSTEMS

The Wärtsilä vacuum flush toilet has been designed to be mechanically simple, operationally reliable, and stylish in appearance.

Wärtsilä vacuum toilets use air to drive waste from the toilet to the treatment tank or intermediate collection tank. This contemporarily styled toilet has a built-in vacuum breaker and flush memory, is simple

to install, and is supplied ready to connect. The control mechanism can be accessed without removing the bowl. By using only approximately 1 litre of water, the amount of wastewater is dramatically reduced.

We offer the following designs for Naval applications;

- AVT 13B – Bulkhead Mount
- AVT 13D – Deck Mount



PROVEN CAPABILITIES

At Wärtsilä we have strong military references for waste water management:

Wärtsilä Hamworthy won a contract from the Ministry of Defence for five MBRs. One MBR will be installed on HMS Ocean, the Royal Navy's largest active vessel and flagship of the fleet which was moored at Greenwich during the London Olympic and Paralympic Games. The MBR will replace a previous Hamworthy sewage treatment plant. Four MBRs will be installed on Type 23 Frigates which currently have holding tanks to hold and discharge

waste. Wartsila Hamworthy previously supplied MBRs to Type 45 Anti Air Warfare destroyers, whose primary role is the protection of ships, carriers, auxiliaries and merchant vessels from air, surface and subsurface threats.

Specific MoD requirements for the work cover shock resistance, special safety obligations, reduced noise levels and Electromagnetic Compatibility (EMC) testing for electronics.

Recent military references include:

- HMS Daring
- HMS Dauntless
- HMS Diamond
- HMS Dragon
- HMS Defender
- HMS Duncan
- HMS Queen Elizabeth
- HMS Prince of Wales
- HMS Ocean

AFTERSALES

Wärtsilä supports its customers throughout the lifecycle of their installations by optimizing efficiency and performance. We offer expertise, proximity and responsiveness for all our customers in the most environmentally sound way.

Our Services & Support solutions range from basic support, installation

and commissioning, performance optimization, upgrades and conversions to service projects and agreements focusing on overall equipment performance and asset management.

We deliver aftersales support through our network of service centres in over 70 countries worldwide.



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