

An aerial photograph of a large white cruise ship sailing through a deep blue fjord. The ship is positioned in the lower right quadrant of the frame. The water is a vibrant blue, reflecting the sky. In the background, a small town is nestled at the base of steep, green mountains. The mountains are partially covered in snow, and the sky is filled with soft, white clouds. The overall scene is serene and scenic.

# MARINE SCRUBBER WASTEWATER TREATMENT CASE

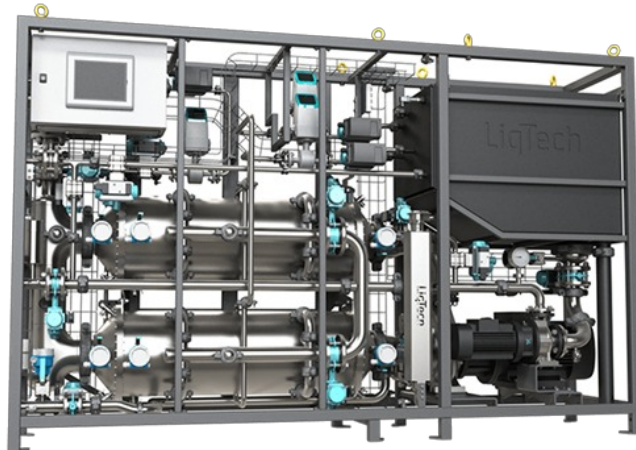


## **The water treatment solution from LiqTech secures compliance with environmental requirements and reduces handling costs of scrubber sludge**

### **The Case**

Ships trading in designated emission control areas will have to either use fuel oil with a sulfur content of less than 0.10% (MGO) or to comply with the SO<sub>x</sub> requirements by using an exhaust gas cleaning system, or "scrubber." There is a significant cost difference between low sulfur fuel and the cheaper conventional fuel (heavy fuel). By installing scrubber systems, vessel owners can comply with the new IMO requirements and at the same time benefit from the cost advantage of using conventional heavy fuel.

LiqTech has delivered numerous scrubber wastewater treatment systems to be integrated with scrubber towers. The combined scrubber and wastewater treatment solution reduces sulfur emissions in the exhaust gas and turbidity together with polyaromatic hydrocarbons (PAH) in the discharged wastewater.



## System Design

LiqTech SiC membrane system for 6 m<sup>3</sup>/h or 26 GPM scrubber wastewater.

# LiqTech System Design

## **The advantages of a LiqTech wastewater treatment solution**

The scrubber wastewater is treated by mechanical separation - size exclusion, which results in an improved and consistent quality compared to gravity separation based on density differences. In addition to improved quality of the discharge water, the combination of membrane technology with filter press dewatering greatly reduces the volume of scrubber sludge compared to gravity-based separation solutions.

## **The wastewater treatment package**

LiqTech offers complete wastewater treatment solutions consisting of:

1. Coarse pre-filtration
2. Fully automated SiC membrane system
3. Module for dewatering of membrane reject

Wastewater from the scrubber process tank is pumped to the membrane system, which removes soot particles, heavy metals, and unburned fuel residues. The treated water is discharged while monitoring selected parameters. The concentrate of particles from the membrane system is dewatered by a filter press in order to reduce the final volume of scrubber sludge. The solution is monitored and controlled by PLC.

## **Materials and Components**

The SiC ceramic membranes from LiqTech have proven to be extremely robust and offer high capacity with a very small footprint. Further, the membranes are chemically inert and very temperature resistant. Membrane housings are made of glass fiber reinforced plastics (GRP) and polypropylene piping, or duplex steel. The modular design and material selection are based on marine requirements and standards.

**We are here to help you**