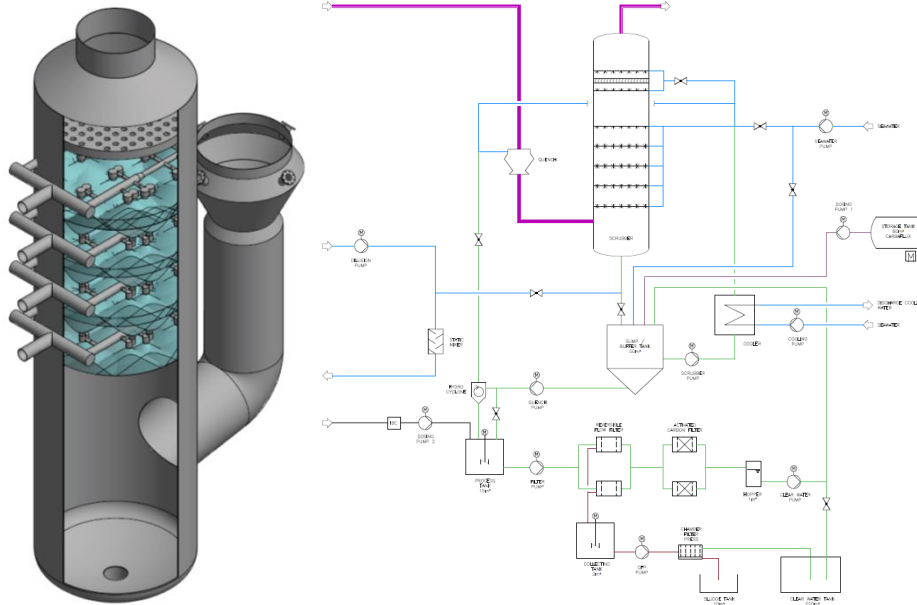


**Client: ERC Technik GmbH**  
**Project: Scrubber for ships**  
**Services: Basic engineering**



### General

As part of a basic engineering contract in support of a product development, spray scrubbers were designed for a range of standard engines and sizes, for the desulphurization of ship exhaust gases.

### Planning work

The scrubber system using seawater was rated for both open and closed loop operation. The open loop system uses only seawater without any further additives. The scrubbing water can still be treated if necessary, before being discharged into the sea. With the closed loop system, no wastewater may be discharged into the fairway, apart from cooling water. To achieve the required pH value for optimum SO<sub>2</sub> removal, the addition of an alkaline solution, such as sodium hydroxide, is imperative. For treatment of the wastewater, T&N designed a multi-stage process where the pollutants are discharged from the cycle in the form of concentrated sludge which is then stored temporarily for up to 2 weeks until it can be disposed on shore. The cleaned water is then recycled.

The planning work involved dimensioning of all the necessary components, such as saturators, scrubbers, heat exchangers, pumps, vessels and cleaning apparatus.

Process diagrams and equipment drawings were drawn up, in particular for the saturator and scrubber.

### Scope of services provided by T&N

The scope of services provided by T&N were essentially:

- Process engineering design of the scrubbers including the spray nozzles
- Dimensioning of all components required for operation
- Preparation of P&I diagrams as well as lists of sensors and consumers
- Preparation of 3D drawings for the main components
- Calculation of exhaust gas pressure losses.

In the future it is planned to form a joint venture to offer a modular concept for the scrubbers including the wastewater treatment systems and peripheral equipment.