

## Product information

Exhaust gas cleaning system (EGCS)

**SAACKE MARINE SYSTEMS**



UPDATED  
CAPACITY RANGE  
UP TO  
**30 MW**



Exhaust gas  
connection to  
EGCS

## Using the challenge of emissions reduction as an opportunity

*Reduce sulfur emissions, increase financial savings with the SAACKE scrubber system*

**Multistreaming (U-type tower)**

**0.1% and 0.5% sulfur compliance**

**Boiler connection**

**Advanced monitoring**

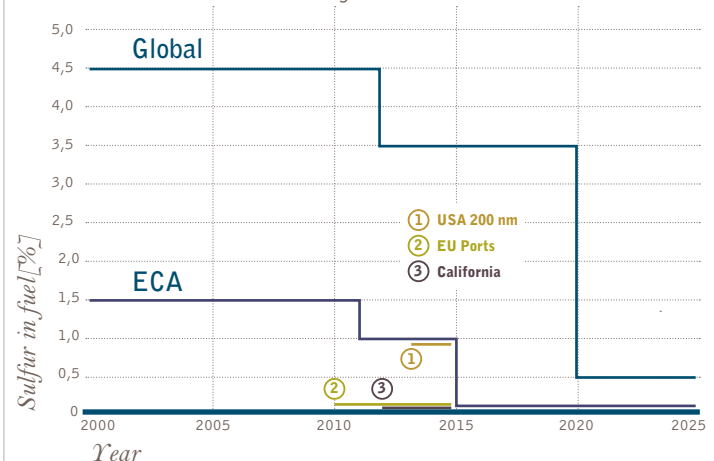
Around the world, the overwhelming majority of ships run on engines and boilers powered by heavy fuel oil. The resulting combustion exhaust gases that are emitted contain soot and sulfur oxides that pollute the environment. The gradual reduction of limit values is now creating a need for action amongst shipping and charter companies. For new buildings, gas-powered or dual fuel solutions are playing an increasingly important role – but a gas-based propulsion system is expensive and the fuel is subject to significant price fluctuations. Ports around the world also currently lack the necessary infrastructure to bunker fuel gas. There is also the question of usability over long distances and, ultimately, conversion to dual fuel is also a complex and expensive challenge.

### Efficient and sustainable – the SAACKE EGCS

The SAACKE EGCS is a more efficient and sustainable alternative for retrofits as well as the construction of new ships. This exhaust gas cleaning system ensures the continued use of heavy fuel oil while safely complying with the required emission limit values and enabling a lower-cost operation.

## Marpol Annex VI SO<sub>x</sub> Emission Limits

The International Maritime Organization (IMO) has agreed on the gradual reduction of the sulfur content in exhaust gases. Accordingly, these limit values have been reduced to 0.1 percent in the emission control areas (ECA), including the North and Baltic Seas, since the start of 2015. This upper limit has already applied in ports in the EU since 2010. Around the world, the limit outside the ECAs will be reduced to 0.5 percent from the year 2020. To achieve these goals, an exhaust gas wash tower can be installed instead of using low-sulfur fuel.

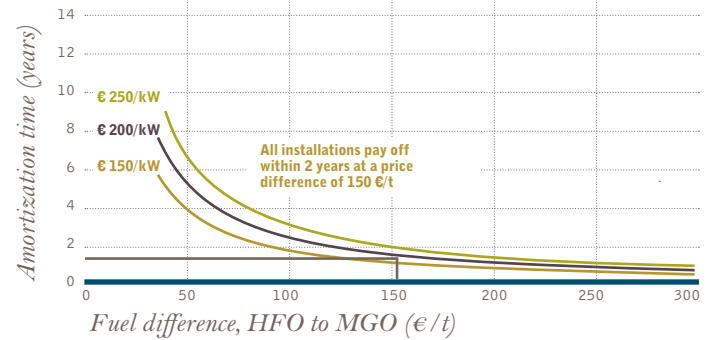


## Overview of the exhaust gas connection to the EGCS

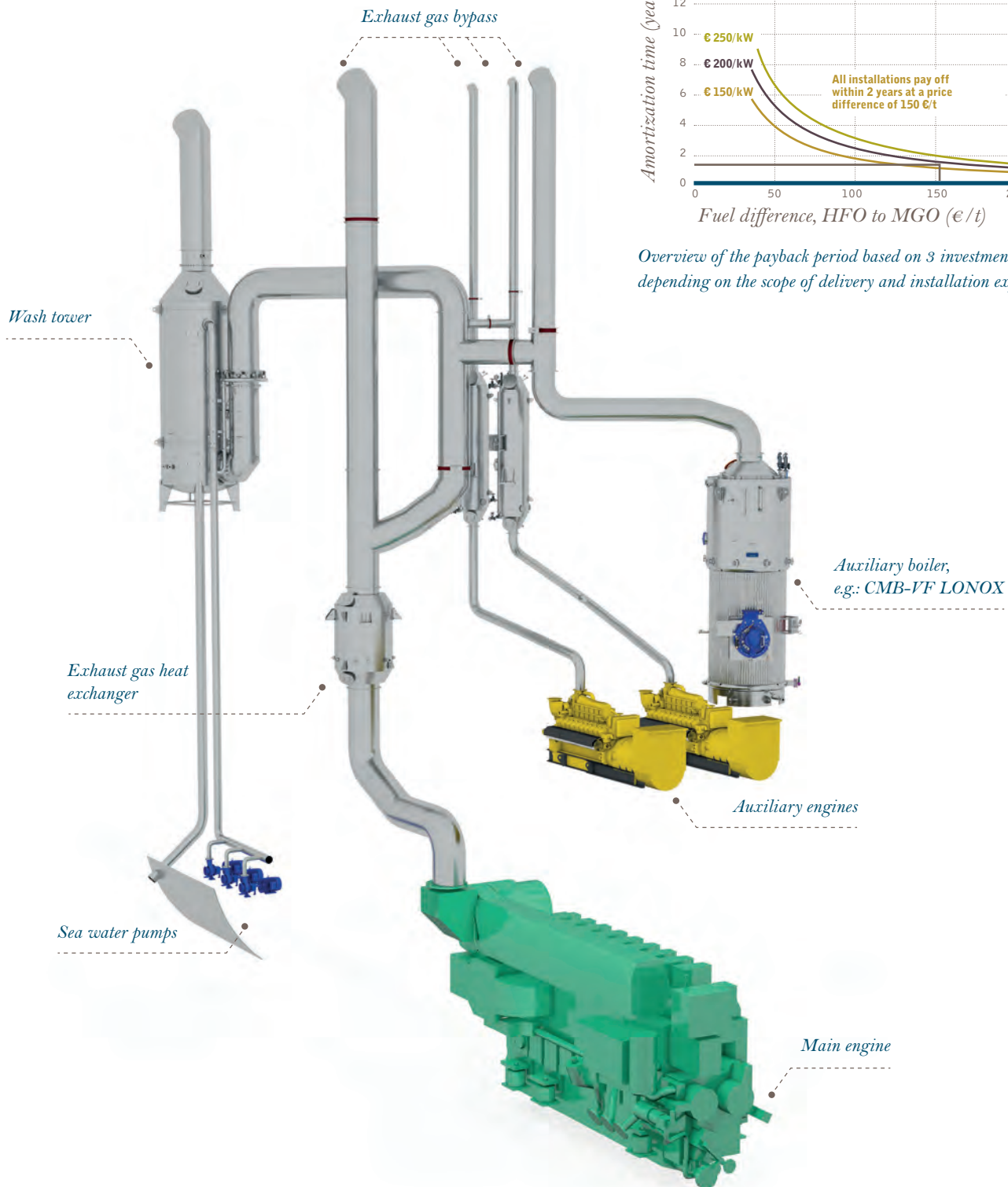
### Payback period of the SAACKE EGCS – Example

The investment in a SAACKE scrubber quickly pays for itself, often within about 2 years, depending on the shipping route, equipment, operating situation and fuel price difference.

**Operating profile:** 55 % travel operation (200 days a year)  
45 % port operation (165 days a year)



Overview of the payback period based on 3 investment curves, depending on the scope of delivery and installation expense.



## The SAACKE solution in detail

The SAACKE multistream exhaust gas cleaning system can be connected to boilers as well as auxiliary and main engines. Optional fans can be integrated to overcome back pressure of the EGCS in case of retrofit projects.



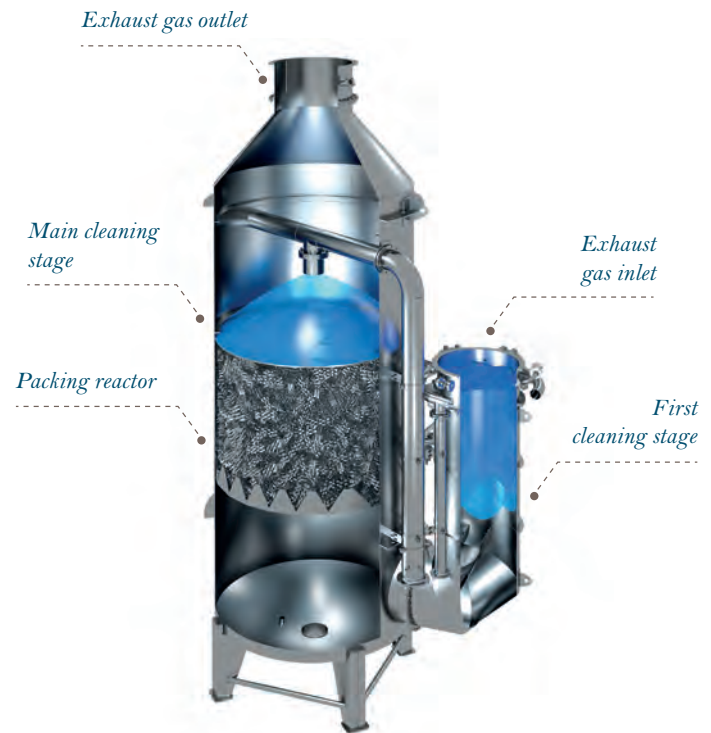
*EGCS-Monitor*

## Live data monitoring on-board and onshore

The EGCS management rounds off the SAACKE exhaust gas cleaning system. This system enables easy control using a touchscreen and records all relevant measurement data. The SAACKE EGCS complies with both the IMO regulations as well as the requirements of the classification societies.

In addition to displaying the data on-site via EGCS management, emission data is also available for the operator onshore thanks to SAACKE's innovative EGCS monitor. All relevant measured values can be analyzed live and are stored for the entire operating period. The monitoring also provides savings potential across the ship's entire operation, which applies to the EGC system itself as well as for the optimized use of all energy producers. The program also creates an emission report with just a few clicks, which not only shows emissions data but combines it with geodata and periods of time that can be configured individually. Besides on-board storage, the data can also be transmitted using a mobile data connection (mobile communications or satellite) so that it is always available for the ship-owner worldwide. A special protocol transfers the data in a compressed, tamper-proof way, resulting in minimum costs for data traffic. The data is then saved on access-protected servers.

## Wash Tower (sectional view)



## Sulfur removal rates of more than 99 %

After the combustion process the exhaust gases are routed to the wash tower inlet which routes the exhaust gas to the lower part of the wash tower. Wash water spray nozzles lower the temperature of the entering exhaust gases and form the first stage of  $\text{SO}_x$  removal (quench). From here the exhaust gases flow upwards through the main tower body passing a packed bed reactor which is sprinkled with sea water from the top. In this second stage of  $\text{SO}_x$  removal the desulfurization process is completed.

In Open-Loop operation the sea water used for the desulfurization process is pumped from the ship's sea chest to the wash tower. After the  $\text{SO}_x$  removal process it is discharged back to the sea. Alternatively, a hybrid system, in a so-called zero-discharge mode, provides the option of temporarily operating the system without any discharge. This enables ports with corresponding regulations to be approached, e.g. Belgian ports or ports on German rivers (Bremen, Hamburg).

The EGCS is operated as a U-type tower in which different performance capacities can be combined. This means that it can be flexibly adjusted to individual operating conditions.



## Conclusion

Currently, more and more ships are equipped with EGCS. Intelligent solutions relating to the purification of exhaust gases gain importance in the shipping industry and have enormous potential. The SAACKE EGCS meets the strictest emission regulations using a unique combination of efficiency and sustainability – for retrofitting or for newly constructed ships. The system is ideal for nearly all ship applications.

## Technical data: EGCS

Fields of application	Nearly all ship types and applications
Capacity range	Up to 30 MW (engine equivalent)
SO <sub>x</sub> reduction	> 99 %
Modes of operation	Open loop and hybrid system
Water flow rate	50 m <sup>3</sup> of water per hour for every MW of main engine power when using heavy oil with a sulfur content of 3.5 %

## All benefits at a glance

- EGCS fully satisfies IMO regulation MEPC.259(68)
- Satisfies 0.1% and 0.5% sulfur discharge criteria
- U-type single tower systems for optimal and safe operation of the system
- Open loop and hybrid system
- Emission control system for live data monitoring, including from onshore
- Suitable for newbuildings and retrofits
- Short payback period
- High quality materials
- German expertise and engineering
- Renowned German equipment sub-suppliers are used

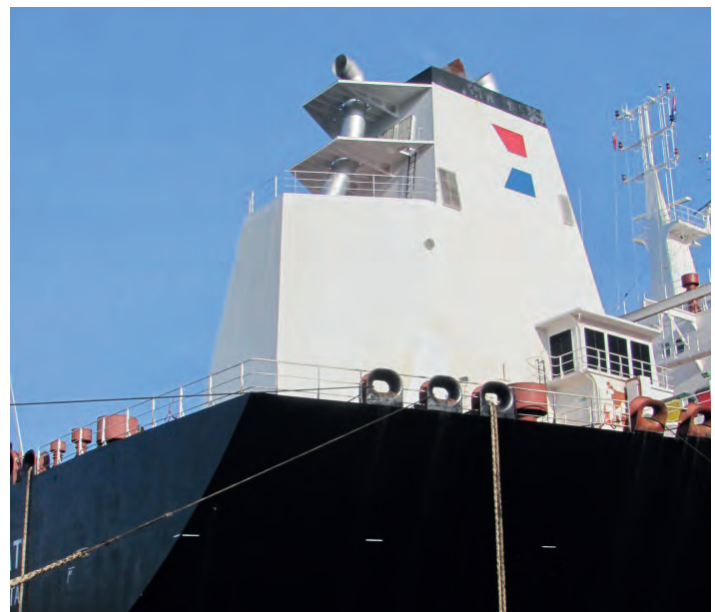
### SAACKE scrubber retrofit on Aframax tanker MT Kornati



**Before:** The Aframax MT Kornati crude oil tanker, built in 2000, before a wash tower system was installed.



**Conversion:** The SAACKE wash tower was installed directly behind the stack.



**After:** Cladding ensures that the wash tower visually matches the stack.

