



# WET SCRUBBER TECHNOLOGY FOR MARITIME APPLICATIONS

ANDRITZ SeaSOx<sub>wet</sub> – CLEANER AIR  
FOR A CLEANER ENVIRONMENT

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The beginning of 2020 has seen regulations on emissions in the shipping and maritime industries becoming tighter and tighter. Now is the right time to look for the most flexible options when ensuring your shipping fleet is compliant with new global regulations.

International technology group ANDRITZ has a long and successful history of supplying plants and equipment to many different industries, including major hydropower, pulp and paper, metalworking and steel production facilities all around the globe. One of ANDRITZ's special-

ist areas is the design and manufacturing of emission control technology, providing state-of-the-art systems in the area of exhaust gas cleaning solutions and air pollution control.

## ANDRITZ

ENGINEERED SUCCESS

# SeaSOx scrubbers – the flexible solution for exhaust gas cleaning

ANDRITZ supplies complete solutions for emission controls to the maritime industry, and its exhaust gas cleaning systems (EGCS) include scrubbers and all ancillary equipment. The scope contains pumps and filters, as well as instrumentation and electrical equipment, wash water treatment, integration engineering, emission monitoring, valves and dampers, engineering, supervision of installation, and after-sales service.

ANDRITZ is the only company that supplies two completely flexible system solutions for cleaning exhaust gas, SeaSOx<sub>wet</sub> (wet scrubbing) and SeaSOx<sub>dry</sub> (dry exhaust gas cleaning). Tailor-made solutions cover all possible options and combinations, including Open Loop – Hybrid Ready, Hybrid, Closed Loop, with square or round footprint, and for inline and bypass operations. The ANDRITZ systems also have the smallest scrubbers when it comes to inline solutions. Further, Closed Loop operation is possible with all types of caustic media, including NaOH, MgO, Mg(OH)<sub>2</sub>, Na<sub>2</sub>CO<sub>3</sub>, and NaHCO<sub>3</sub>.

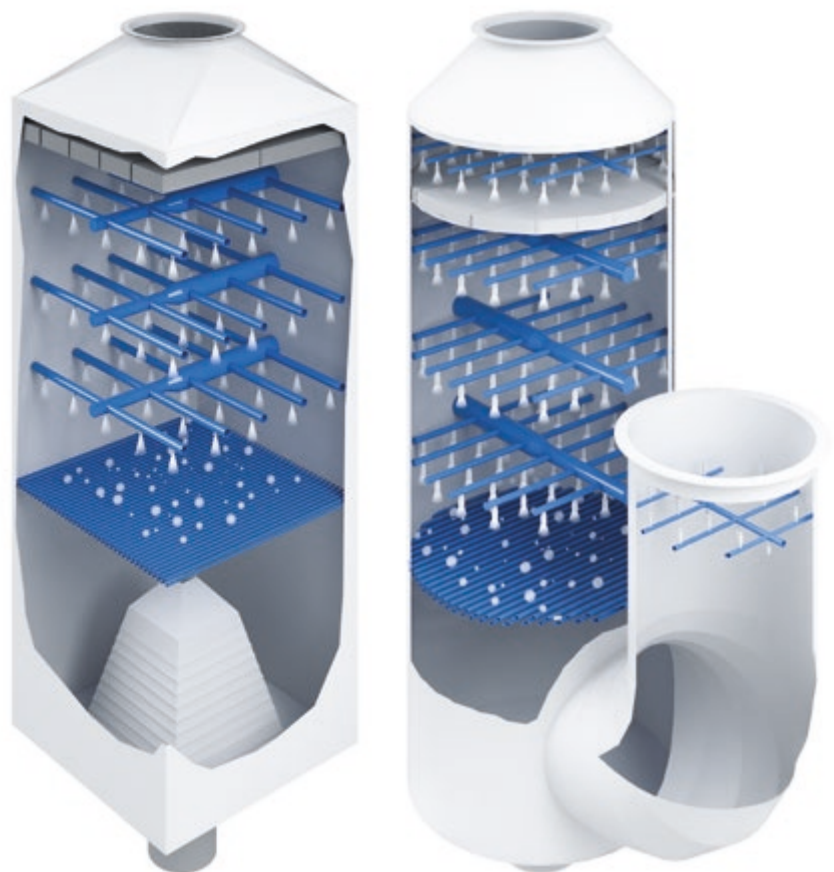
The EGCSs of ANDRITZ can be installed on all types of ships, including new-build of existing vessels by retrofitting.

## WET DESULPHURIZATION PROCESS

With over 25 years of experience in scrubber modelling within its own in-house Computational Fluid Dynamics (CFD) department, ANDRITZ is able to calculate the efficiency of its scrubbers when it comes to SO<sub>2</sub> removal using various tools. Its patented FGD+ layer generates additional gas cleaning and distributes exhaust gases evenly over the cross-section of the scrubber, resulting in an optimized footprint with moderate wash water flow rates and lower power consumption. This also results in the open spray tower having similar wash water consumption to a packed tower.

ANDRITZ can provide tailor-made, individual solutions using round, square, or rectangular designs according to the demands of specific vessels.

In the case of U-type (bypass) scrubbers, ANDRITZ has designed open spray towers without packing in view of the clear operating disadvantages presented by packed towers. Packing tends to attract algae, micro-organisms or particles from seawater that penetrates into the scrubber and subsequently the packing. As the fuel cannot burn off completely, some oil residue may reach the scrubber and attack the packing, resulting in possible clogging. This means downtime to replace or clean the packing, which is time-consuming and expensive. Additionally, a spray scrubber can operate with higher gas velocities at lower pressure drops, again resulting in a smaller, optimized footprint.





## ONLY THE BEST IN BUILD QUALITY – FLEXIBILITY IS KEY

In terms of equipment, ANDRITZ only uses the highest quality materials. If a certain specified material is not available, the ANDRITZ policy is always to use a higher grade.

Standardized, modular scrubber solutions are available from ANDRITZ. However, tailor-made and customized solutions for each individual vessel are also possible.

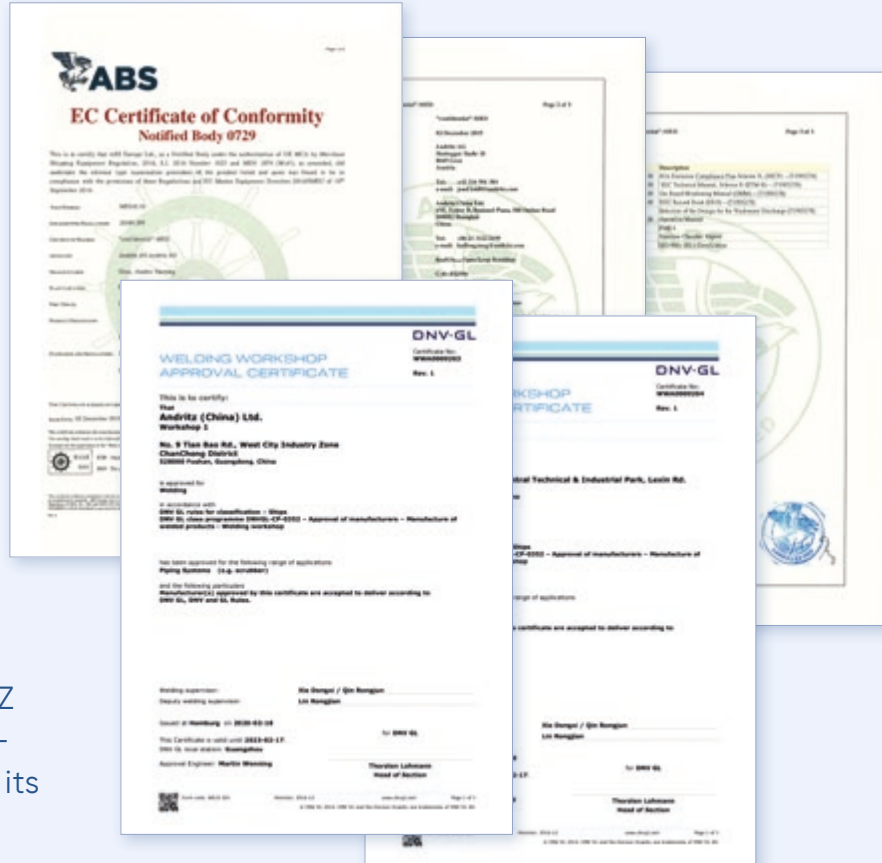
## ADVANTAGES OF ANDRITZ SeaSOx<sub>wet</sub> SCRUBBER TECHNOLOGY

- Simple and robust design suitable for inline (I-type) and bypass (U-type) installation
- Substantial noise reduction; silencer can be removed if operated in inline mode
- In the I-type scrubber, exhaust gas can pass through safely even when the absorber pumps are not operating (dry-run capability)
- Highest removal efficiencies with lowest operating costs combining ANDRITZ FGD+ technology and optimized spray bank design
- Multiple inlets possible
- Smallest footprint for I-type scrubber due to customized design
- Smallest footprint for U-type scrubbers thanks to open spray tower design design

ANDRITZ is a six billion Euro business with more than 28,000 employees worldwide and manufacturing facilities all around the world in countries including Austria, China, Slovakia, Finland, and Hungary. With more than 35 years' experience in the exhaust gas cleaning industry and hundreds of references in many industries globally, ANDRITZ's scrubber installations in the maritime industry are now operating successfully on vessels around the world.

ANDRITZ has in-house manufacturing capabilities globally in Finland, China, Slovakia, Hungary, and Austria and already has approval from DNV GL for the manufacturing workshops in Foshan and Sanshui (both in China).

In addition, ANDRITZ has received certification from ABS for its technology.





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