



PureSOx

Your proven route to  
competitive SOx compliance

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# **2020 is approaching and so is the Global Sulphur Cap**

Your choice to comply  
impacts your peace of mind



# IMO air emission regulation (SOx)

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SECA 1 January 2015  
0.1% sulphur in EU,  
Northern America  
and US Caribbean

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Global Sulphur Cap  
(0,5%) in 2020

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Will IMO delay the  
enforcement of the  
Global Sulphur Cap?



0.1% sulphur - ECA

0.5% sulphur

# Compliance options



## Switch to LNG

- + Always in compliance
- High investment cost
- Limited infrastructure
- Price uncertain



## Use low-sulphur fuel

- + Low investment cost
- Costs are higher than using HFO
- Fuel quality issues



## Install a Scrubber

- + Allows the continued use of HFO
- Payback time depends on fuel price delta

# Fuel availability and price development

	IFO380		MGO	
	\$/mt	+/-	\$/mt	+/-
Singapore	313.50	▾ 0.00	471.50	▾ 0.00
Rotterdam	299.50	▲ 1.00	464.00	▲ 1.50
Houston	293.00	▲ 2.50	489.00	▲ 1.50

*In the top 4 ports the price difference between HFO and MGO is \$160.00-\$200.00 /mt*

- › Low-sulphur fuel availability might be under pressure in 2020.
- › Fuel prices are difficult to predict as we have seen in 2016.

**Will the fuel price difference increase after 2020?**

“The economics for scrubbers are going to become very clear in January 2020 – and very compelling.”

Iain White, ExxonMobil



\*Based on global average per mt at shipandbunker.com

# Don't wait too long to choose your strategy



- › The time to choose your compliance strategy is now
- › Dry dock possibilities may be limited for retrofits.
- › Several scrubber suppliers worldwide, but few have proven solutions like Alfa Laval.

**Alfa Laval offers peace of mind**



# History



1967-2009

## Inert Gas

Over 4000 Inert Gas Systems sold with a scrubber section from Smit Ovens Nijmegen, The Netherlands.



2009

## First pilot

First Alfa Laval PureSOx pilot installed on board DFDS Ficaria Seaways.



2012

## Second pilot

Second Alfa Laval PureSOx pilot installed on board Spliethoff's M/V Plyca.



2013

## Lloyd's Approval

Approval by Lloyd's Register for PureSOx on board DFDS Ficaria Seaways: after extensive testing and improving the system, it meets MARPOL Annex VI and is allowed to sail on HFO.



2014

## Test Centre

Inauguration Alfa Laval Test & Training Centre, Aalborg Denmark.



2015

## ECA 0,1%S limit

Already 17 vessels on the proven route to competitive ECA compliance with PureSOx and 65 more systems on order.



2016

## U-design update

The PureSOx U-design is significantly reduced in size and backpressure.



2016

## PureSOx platform

PureSOx platform introduced with Global, Flex and ECA for Open Loop, Closed Loop and Hybrid configurations and I and U design.



2017

## 100 vessels

Milestone reached: PureSOx systems sold for over 100 vessels



# PureSOx platform



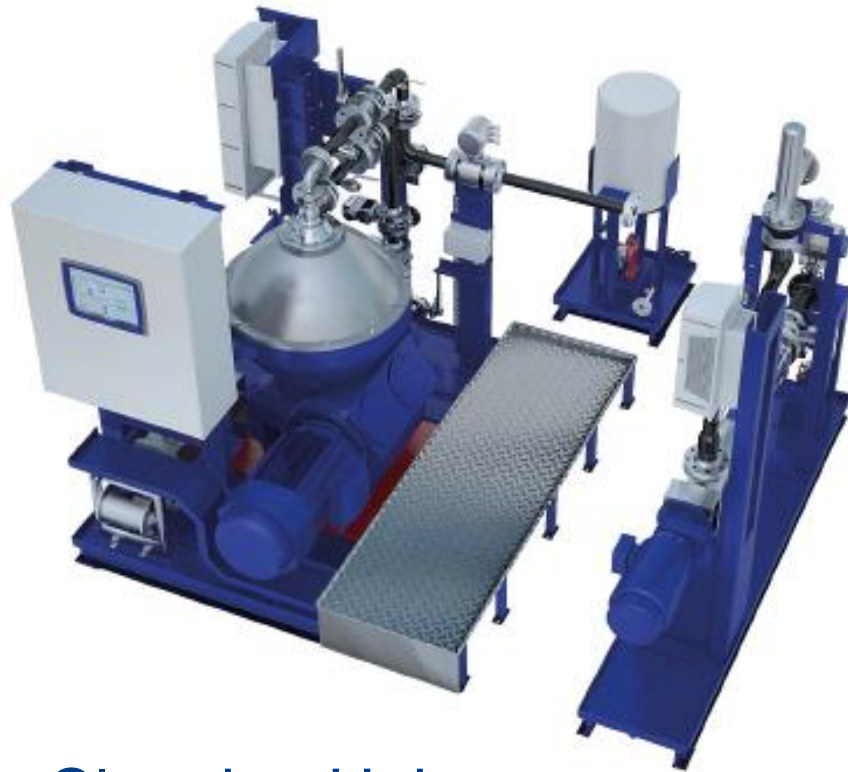
Alfa Laval PureSOx  
 1. Scrubber  
 2. WCU  
 3. Circulation pumps  
 4. Plate heat exchanger  
 5. Sludge tank  
 6. Seawater pumps

Technology	Compliance profile	Arrangement	Scrubber design
PureSOx platform	Global	Open-loop	U
	Flex	Hybrid	—
	ECA	Closed-loop	I
Configuration			

- > Boiler integration
- > Sea water in closed loop mode
- > Connectivity modules
  - MEPC reporting
  - Benchmarking
  - Predictive maintenance

# Core technology

Patented Alfa Laval WCU



## Water Cleaning Unit

Patented process for cleaning scrubber water with high-speed centrifugal separator technology

- › MEPC wash water criteria are met
- › Based on Alfa Laval core technology
- › Small footprint of 6 m<sup>2</sup>
- › Not influenced by ship's operation
- › Global service by Alfa Laval

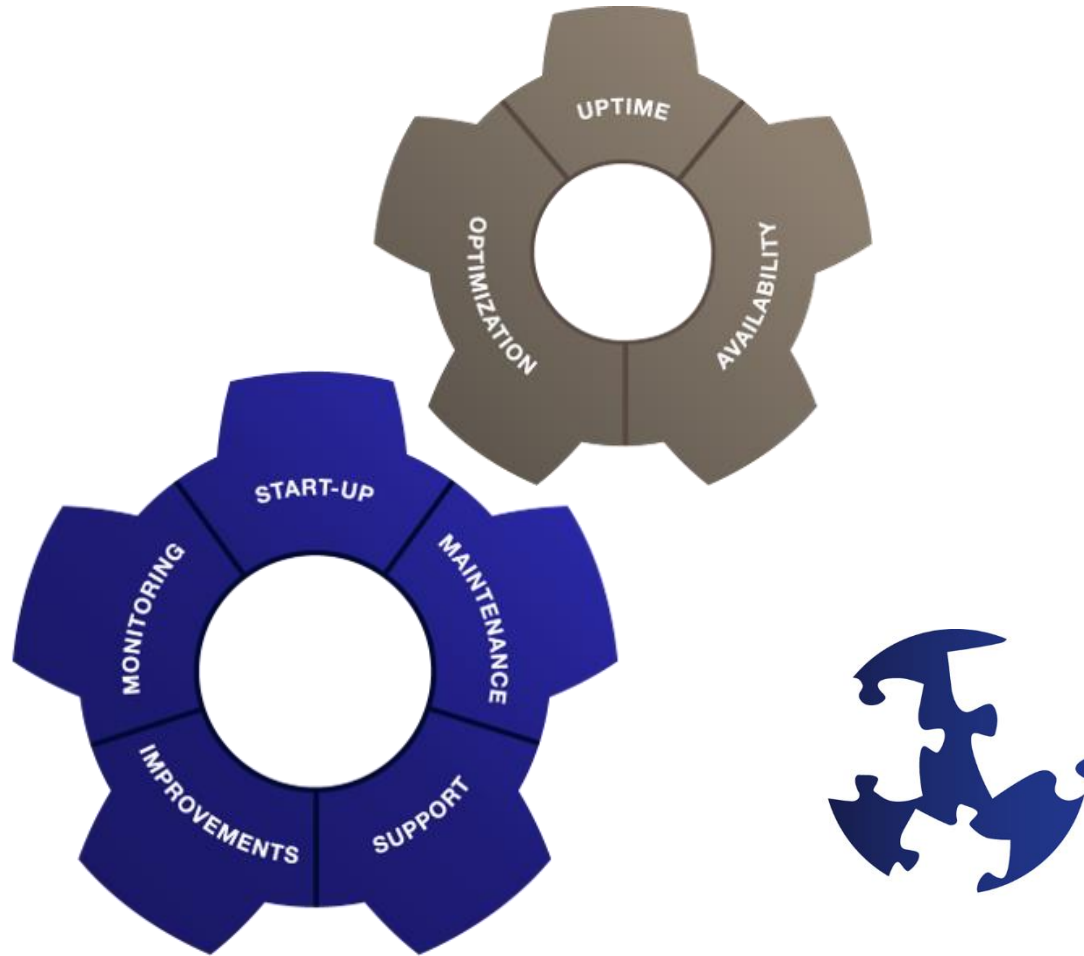
# Product development

In our Test & Training Centre



- › Test & Training Centre in Aalborg, Denmark.
- › Full-sized engine room on land.
- › Explore PureSOx' interaction with other technologies on board.

# Global Service



- › Service and support: Worldwide and 24/7.
- › Alfa Laval 360° Service Portfolio: All the services you need.
- › Alfa Laval Performance Agreement: Tailor-made service plans to match your specific needs.

# Service offering


Alfa Laval PureSOx Service portfolio

## › From service provider to partner

- Spare parts and stocks
- Condition and Performance audit
- Training
- Exchange programme
- Connectivity



# Scrubber supplier checklist

Does the supplier have...	
Global service and support?	✓
Proven solution?	✓
Core technology?	✓
Ensured compliance?	✓
Extensive experience with returning customers?	✓
Dedication from start to finish?	✓
In other words, is the supplier <b>Reliable</b> ?	✓



# Our customers say...

“Today, there are several suppliers in the maritime scrubber market and even more that are eager to enter. However, there are just a few that passed the tight criteria set for our selection process.”

Dario Bocchetti, Energy Saving Manager at Grimaldi Group.



**Don't lose your head**  
Make the right choice for  
2020





PureSOx

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Thank you



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