Scrubbers

Flexible Solutions **for All Types of Merchant Vessels**

Select from our complete range of scrubber technology from Open-Loop, Closed Loop, Hybrid-ready, and Hybrid System Scrubbers.

U - line (Traditional Scrubbers)

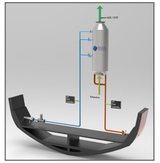
+ More energy efficient as require less spray water
+ Works in all sea areas
+ Can be bypassed
+ No risk to engine
+ Easy maintenance
- Larger footprint than inline solutions
- More expensive CAPEX for scrubber and installation

I-line (Inline Scrubbers)

+ Narrow and tall – small footprint, easier to install
+ Can be run hot
+ Lower CAPEX for scrubber and installation
+ Higher water pH out of the scrubber
- At least 20 % higher energy consumption and Opex than for an U-line scrubber
- Possible operation limitations at SECAs
- Maintenance issues with a single main engine

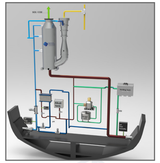
Scrubber Systems

Open Loop Scrubber



Hybrid Ready

Hybrid System



	Open Loop	Hybrid Ready	Seawater Flow Rate
Lowest CAPEX/OPEX	✓	✓	
Compliant in zero discharge area		✓☆	✓
Allowed in all waters		✓☆☆	✓
Advanced control system	✓	✓	✓
Easy to operate and maintain	✓	✓	✓
fast to design and install	✓	✓	✓

*Can be converted to be fully compliant
☆ *When switched over to compliant fuel in zero discharge areas

Comply with Kamelia Scrubbers, Save the Environment

IMO Regulation in brief

The International Maritime Organization (IMO) has decided to introduce a maritime law requiring vessels to reduce their Sulphur Oxides (SOx) emission in certain waters worldwide. A global 0.5% Sulphur cap in 2020 will have a positive effect on the air we breathe and the environment. (Corbett et al. 2007)

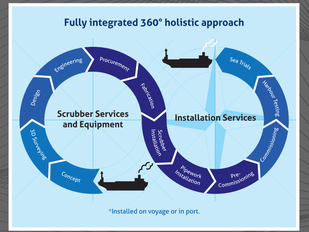
Kamelia Cleantech has successfully removed SOx from over 55 vessel exhausts to date and have a vast experience in retrofitting scrubbers from both technical and commercial perspectives. Applying our scrubber systems enable vessels to comply with current and future emission standards.

360º **Approach**

The confidence of our clients relies on our ability to take care of the complete process from first contact until the commissioning and post installation services of the scrubber.

Prior to giving a quote, we determine the most economical solution based on the vessel machinery, layout and operation route to provide the appropriate type of scrubber system.

Throughout the entire process, Kamelia Cleantech takes responsibility to deliver high quality solutions in time and within budget.



Kamelia Cleantech
A Unique Group Company

Marine Scrubbers
An Integrated Approach

A cleaner voyage starts here

About Kamelia Cleantech

Delivering the **right scrubber for every vessel**

Kamelia Cleantech offers bespoke intelligent scrubbers engineered in Finland by a team of highly skilled and experienced professionals.

We provide complete exhaust gas cleaning (EGC) scrubber systems that reduces Sulphur Oxide (SOx) emissions from ships.

Our scrubber systems are identified as:

- Fully future-ready and modular
- Comes with an option to be converted into hybrid operational mode
- Made from fit-for-purpose materials leading to a long operating life of the system
- State-of-the-art process control and software that ensure appropriate diagnostics for optimal system performance and lowest OPEX

Kamelia Cleantech's parent company, **Unique Group** is a leading specialist and integrated solutions provider across the **global marine**, oil and gas, renewables, subsea and defense industries.

Work **On-Voyage**

"A revolutionary approach for the shipping industry to reduce opportunity costs and vessel downtime."
– Sharad Kumar, COO

With combined experience in the Oil & Gas and Marine industries spanning the last 35 years, our experts have developed best in class scrubbers and control systems. Kamelia Cleantech designs and manufactures end-to-end fully integrated scrubber solutions that can be installed "on-voyage".

We ensure minimal opportunity cost to our clients with typically only 1 week of downtime when systems are installed on voyage. This can reduce opportunity costs by up to 70%. We utilize proven oil and gas industry technology for underwater penetrations. No drydocking or cofferdams are required for scrubber system installation.

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Kamelia Cleantech in brief
Kamelia Cleantech offers bespoke intelligent scrubbers engineered in Finland by a team of highly skilled and experienced professionals.

Talk to our Scrubber Experts!
Kamelia Cleantech FZ LLE
Suite 706, JLT Cluster C, Dubai, UAE
Contact No.: +971 50 392 7889
Email: info@kameliatech.com

Sales & Support offices in over 10 locations globally.
Manufacturing facilities in India, Mexico & UAE. ✲

Why **choose Kamelia?**

We provide an end-to-end fully integrated scrubber solution using a team with a proven track record who are experts in chemistry, process control, engine technology, flow engineering, material science, corrosion, paints, system delivery and emission software. The optimal holistic solution is delivered to our customers through consideration of all these factors.

On-voyage Installation

Fast Track Delivery

Product Quality

Compliant to All Regions and Ports

Six Hundred (600) Team Members

59 Vessels where SOx removed

70% Opportunity Cost Minimised

Kamelia Control Software

- **Manufactured based on Artificial Intelligence (AI) and one touch operations**
- **Optimizes the vessel operation by reducing Alkali usage by 40% and scrubber water consumption**
- **Enables 33% significant fuel savings**