



Sailing with Technology Innovation

SOx Scrubbers for Marine Industries

Inline Installation

Open/Closed/Hybrid Operation

Compact & Light weight

Low Energy Consumption

Minimum Pressure Drop



Solution
provider for
Marine
- Safety
- Environment

SOx scrubber system for your fleet

PROVEN SYSTEM BROUGHT TO YOU WITH OPTIONS CUSTOMIZED FOR YOUR NEEDS

STI started the scrubber system development in 2006. Many years of research, development, sea trial, and commercial installations put STI in a position to offer clients with bespoke system options to any types of ships.

Our offering is In-Line scrubber system that can be installed as single inlet or multi-inlet options with minimum pressure drop.

Engineering team within STI is ready to offer you with customized solutions to your fleet. We offer technical solutions as per specific requirements by the sailing pattern of each vessel: Open/Closed/Hybrid system.

STI offers turn-key solutions from SOx scrubber system supply to the system installation planning and installation. Installation planning is usually a challenging task due to space constraints, electrical power limits, time limitations and limited budget.

STI is ready to discuss about project financing for fleet-wide project contracts.

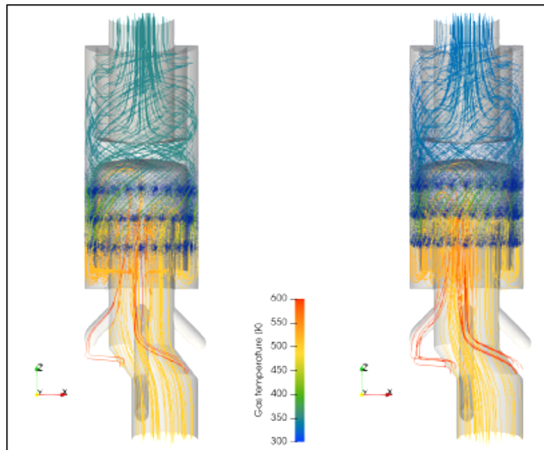


Total solution

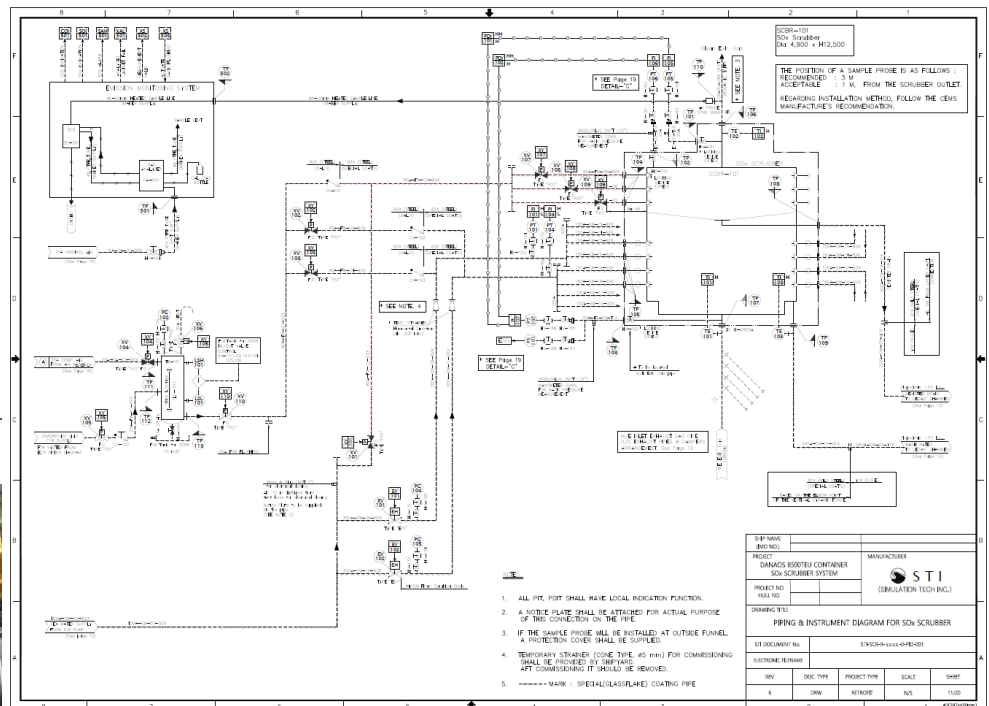
Total solution for SOx scrubber system

- System design
- System manufacturing (multiple locations to fabricate)
- System Installation
- Training
- Project Financing

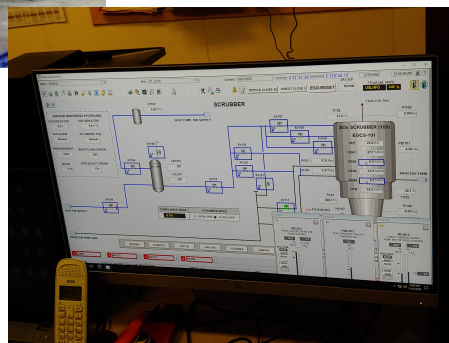
Scrubber System Design



Flow Analysis with CFD



Scrubber Delivery



Commissioning & Sea Trial

System maintenance/after sales service

STI and its technical service partners present in Asia, Europe, and North America. Our service is available for 24/7 all year round. We gained our experience about customer support from our products of VDR and ESD system since our establishment in 2001.

Technical services are divided into major technical partners to provide technical advice and local service agents to provide for technical services.

Major Components

SO_x SCRUBBER

- In-line installation
- Seawater spray
- Single inlet/Multi inlet
- Open/Closed/Hybrid

SEA WATER SUPPLY PUMP

- Automatic load control

DEGASIFICATION CHAMBER

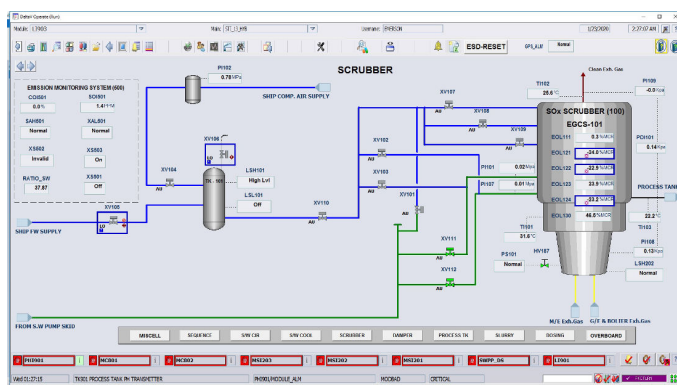
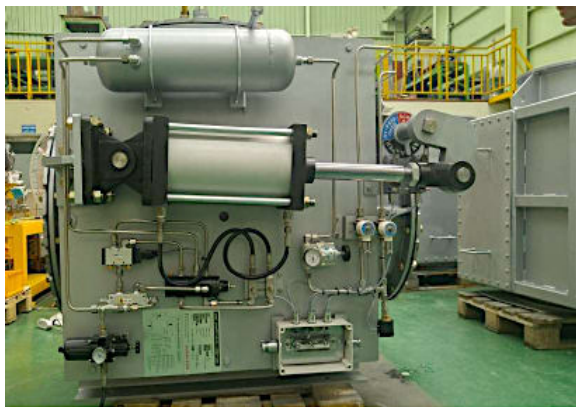
AIR RESERVOIR

FRESH WATER TANK

ISOLATION DAMPER WITH SEALING AIR FAN

CONTROL & MONITORING SYSTEM

- Scrubber system control & monitoring
- Emission monitoring system
- Historian server for reports
- Interface with ship's systems



Economic analysis

CLIENTS SHOULD UNDERSTAND ECONOMIC IMPLICATIONS OF SO_x SCRUBBER INSTALLATIONS.

No	Item	Description
1	Equipment cost	Cost of the SO _x scrubber system purchasing
2	Installation cost	Cost of the SO _x scrubber system installation including engineering
3	Maintenance cost	Cost of the SO _x scrubber system maintenance (not operation)
4	Engine model	Fuel oil consumption for each of the engines in g/kWh
5	Operation 1	Number of days for sailing, berthing, etc.
6	Operation 2	Number of days in SECA (No. of steaming days after 2020)
7	Fuel cost 1	Price of High sulfur fuel
8	Fuel cost 2	Price of Low sulfur fuel
9	Alkalyne material	Price of caustic soda solution (50% concentration)
10	Generator model	Model of gnerators or fuel consumption as per power output (kWh)

With the information for each of the parameters, the ROI estimation becomes possible. During the analysis, STI engineers can make initial ROI study report, and the client can review and advise to update the report. Alternatively, client may complete the ROI report internally.

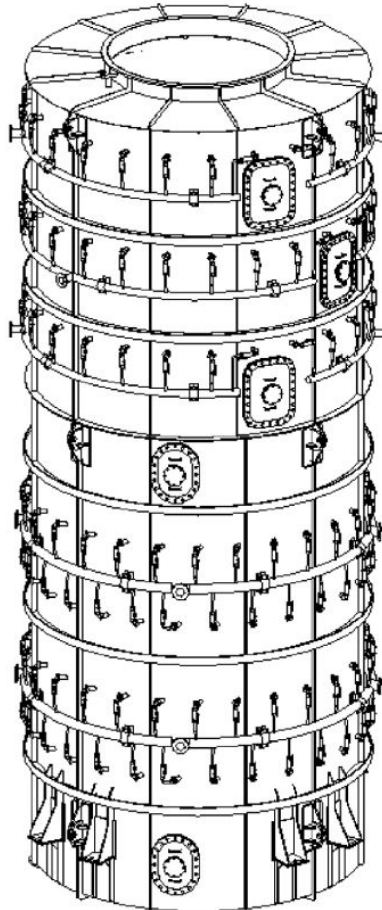
Our analysis indicates that clients can get the installation cost recovered in 1~3 years after installation.



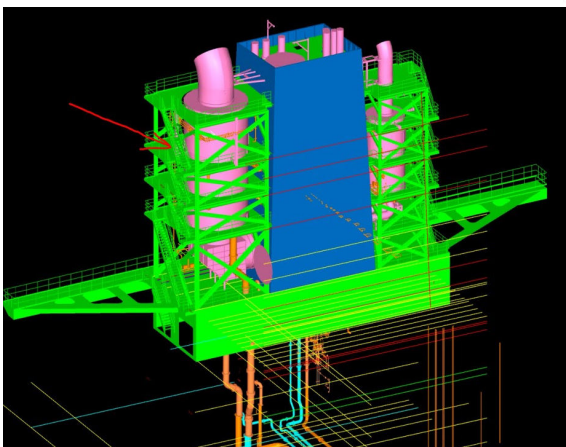
SOx scrubber models - Customized

SINGLE INLET & MULTI INLET OPTIONS
READY TO INSTALL WITHIN EXISTING FUNNEL CASING
MINIMUM EXTENSION OF FUNNEL, NO SACRIFICE IN THE CARGO/CONTAINER SPACE
INSULATED WITH CLADDING BEFORE SHIPMENT
MATERIAL: SCRUBBER (S31254)

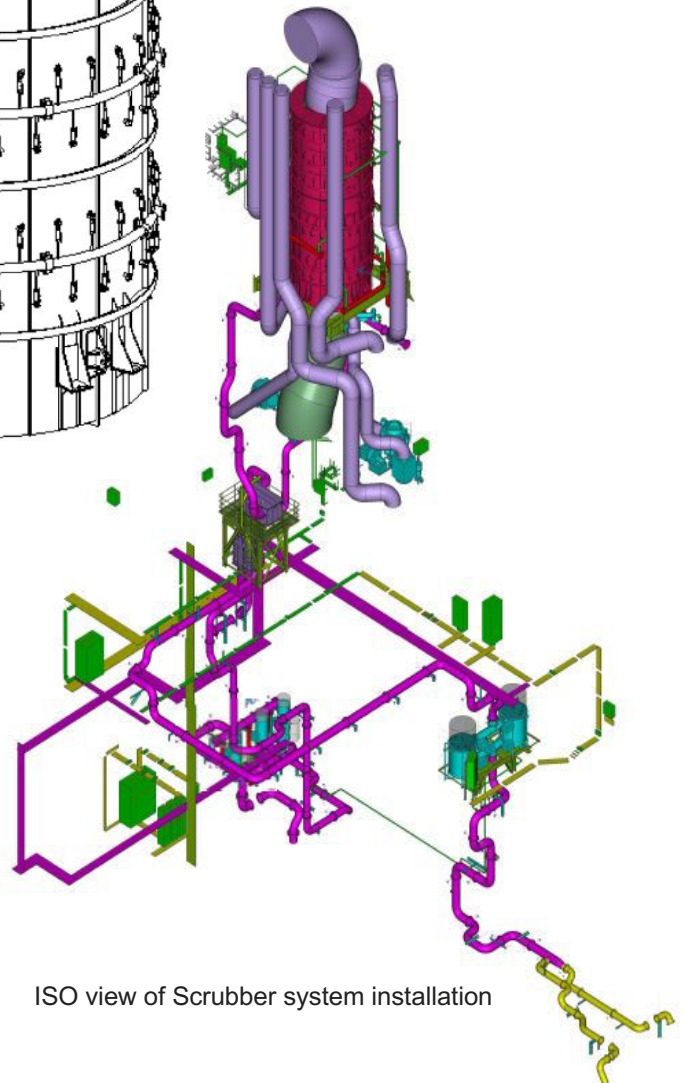
Scrubber system from STI is a bespoke system that is customized to incorporate all the specific needs from clients for each project. STI has a plenty of experience from previous projects and the designs will be used as the building blocks to customize new system design. System performance is guaranteed from the experience within STI.



Scrubber Body



Example of 2-tower installation



ISO view of Scrubber system installation



System configuration guide

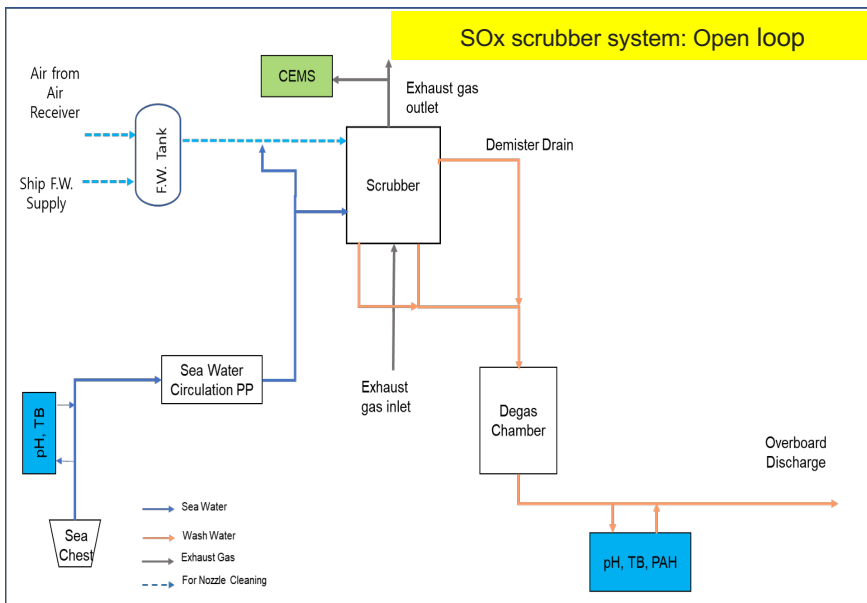
EVERY SHIP IS DIFFERENT
STI ADVISES THE BEST SYSTEM CONFIGURATION

TECHNICAL SALES TEAM FROM STI IS READY TO ADVISE

No	Item	Options	Selection
1	System type	Open/Hybrid/Closed	
2	How to combine	ME+GE+OFB/ME+GE/ME&GE separate/Others	
3	Needs for bypass	All engines/All GE/One GE	
4	Measurement options	Scheme-A/Scheme-B	
5	SW pump capacity	Redundancy capacity: 33%/50%/100%	
6	Alkaline agent	NaOH/MgO/Mg(OH) ₂	
7	Project type	System only/System+Engineering/Turnkey	
8	Project financing	Yes/No	

Clients can decide key issues to suit the requirements for each vessel.
Engineers in STI will do the rest of the configuration job, which will guarantee that the client will have a system customized and optimized to the ship.”

Pre-sales services
During our marketing and sales activities, STI provides clients with solutions that satisfy given project constraints. We try our best to provide optimum project options through discussion: Technical proposals, open discussion with client and ROI (Return of Investment) analysis reports are the examples that STI provides to clients

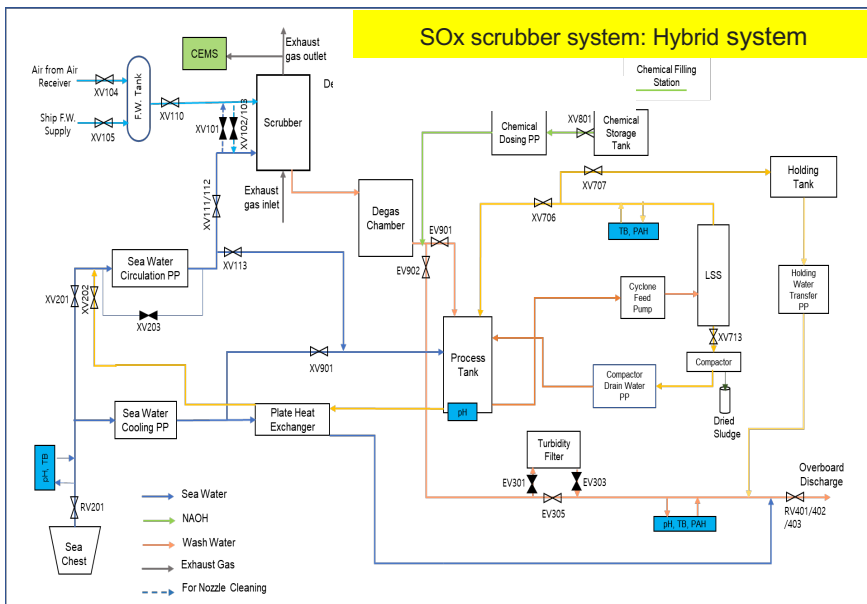


System supply and engineering services

STI always welcomes clients visit our premises in Korea to show the test bed.

Our manufacturing is according to industry quality standards and requirements from classification societies.

STI provides system installation engineering as required. For this, STI has a network with multiple design companies with capability and capacity.



After sales service

Our technical partners are ready to answer most of the technical questions that clients may have about our SOx scrubber system.

We keep some of the spare parts in Asia, Europe and North America with the technical partners.

Spare part installation, instrument calibration and system check are available by our local service agents.

Solution provider for

- Safety
- Environmental

systems for marine Industries since 2001.

STI has been focusing on providing solutions for marine industries by integrating technologies from multi-disciplinary sources.

Emergency shutdown (ESD) system for LNG carriers, Voyage data recorder (VDR), Fiber Bragg Grating (FBG) based temperature sensors are examples of our products related to marine safety.

SOx scrubber system, Grease extractor and DeOiler are environmental protection systems from STI.

Our endeavor to provide clients with systems to solve problems and provide ideas to increase their expectations will continue as we have been doing since our establishment in 2001.

Authorized Sales Agent



Sailing with Technology Innovation

A -103,
Environmental Industry Research Complex
410 JeongSeoJin-ro, Seo-gu,
Incheon, Korea (zip. 22689)
Tel. +82 2 3281 0960
Fax. +82 32 567 0961
Email scrubber@simulationtech.co.kr
Website www.simulationtech.co.kr