

Wärtsilä I-SOx scrubber system

PRODUCT LEAFLET



Wärtsilä exhaust gas cleaning technology is an economical and environmentally friendly solution that meets the highest standards of emission compliance. Wärtsilä's SOx scrubber system solutions are suitable for both newbuildings and retrofitting of existing vessels having either 2-stroke or 4-stroke engines and are designed to provide flexibility and reliable operations wherever you operate.

Where there are space restrictions that prove a challenge for scrubber system operations, Wärtsilä's innovative I-SOx scrubber system overcomes these issues and eases the installation process.

Wärtsilä's I-SOx scrubber system operates as a conventional Wärtsilä V-SOx scrubber with the exception that the exhaust gas flow enters directly from the bottom.

The Wärtsilä I-SOx system is designed to provide operational flexibility and save space. The fact that the system has a reduced footprint and no external venturi means that installation is made easier, which consequently reduces the time the vessel is out of service.

Wärtsilä has an unrivalled reference list, and data from operational exhaust gas cleaning units confirm sulphur

oxide gas removal in excess of 98%. This means that with a Wärtsilä SOx scrubber system installed, vessels are ECA compliant and the systems provide unparalleled reductions in harmful ship emissions.

ENVIRONMENTAL COMPLIANCE



I-SOx scrubber system design

The I-SOx scrubber system unit is longer and slimmer than the traditional design. The reduced size is enabled by having an open spray solution. Scrubbing water is divided into six spray layers to ensure a good mix between gas and water. A water trap in the scrubber inlet prevents scrubbing water from entering the engine. Due to the hot running possibility there is no need for a bypass system and hence, the footprint of the system is considerably smaller than when using the traditional design. From the

scrubber materials point of view it is beneficial to have an exhaust gas boiler in the exhaust gas line before the scrubber.

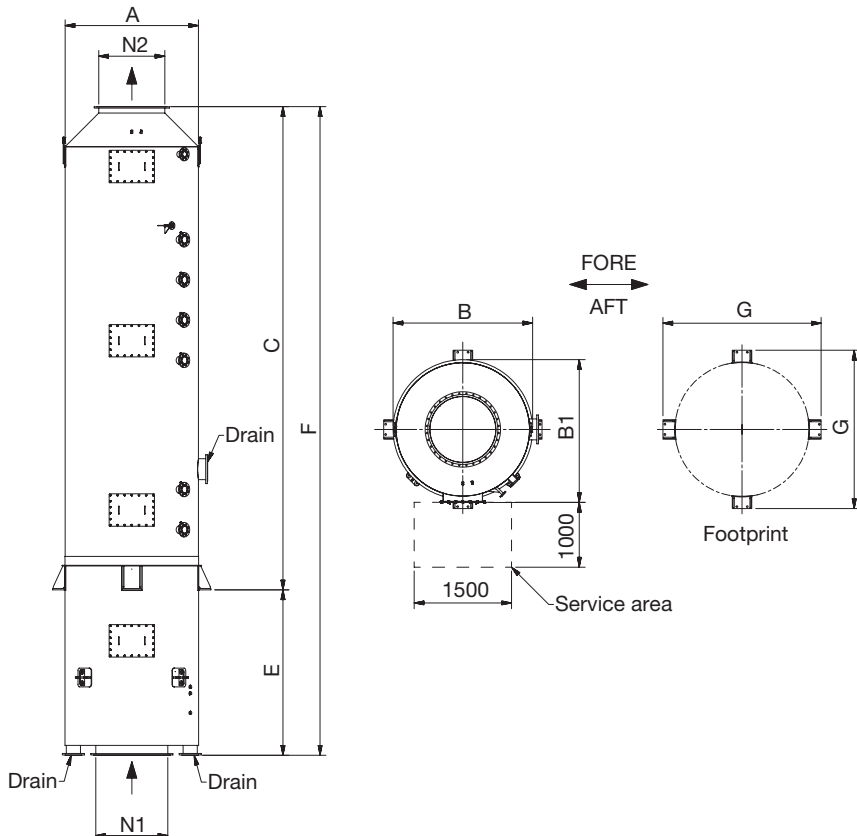
Due to its design an I-SOx scrubber requires higher water flow than a conventional scrubber.

Pressure drop of the I-SOx scrubber is similar to that of the traditional V-SOx design, i.e., maximum 150 mm H₂O (ca. 15 mbar). Current product size range is for engines between ca. 6 and 20 MW.

WEIGHTS & DIMENSIONS - STANDARD I-SOx SCRUBBER SIZES

Dim.	Description (Diameter A)	Ø850	Ø1050	Ø1250	Ø1450	Ø1650	Ø1850	Ø2050	Ø2250	Ø2450	Ø2650	Ø2850	Ø3050	Ø3250
	MW	1.2	1.9	2.7	3.6	4.7	5.9	7.2	8.7	10.3	12.0	13.9	15.9	18.1
	Gas flow (kg/S)	2.7	4.1	5.8	7.7	10.0	12.6	15.5	18.6	22.1	25.9	29.9	34.3	38.9
F	Total height (mm)	8,100	8,300	8,500	8,800	9,200	10,000	10,000	10,500	11,000	11,500	11,500	12,500	13,500
B	Overall length (mm)	950	1,150	1,350	1,550	1,750	1,950	2,150	2,350	2,550	2,750	2,950	3,150	3,350
B1	Overall width (mm)	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400
C	Outlet height (mm)	6,100	6,300	6,500	6,800	7,200	7,450	7,450	7,950	8,450	8,950	8,950	9,450	9,450
G	Footprint (mm)	1,240	1,440	1,640	1,840	2,040	2,240	2,440	2,660	2,900	3,120	3,380	3,600	3,850
E	Drain below base (mm)	2,000	2,000	2,000	2,000	2,000	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,250
N1	Inlet nominal bore	DN400	DN500	DN600	DN700	DN800	DN900	DN1000	DN1100	DN1200	DN1300	DN1400	DN1500	DN1500
N2	outlet nominal bore	DN400	DN500	DN600	DN700	DN800	DN900	DN900	DN1000	DN1100	DN1200	DN1300	DN1400	DN1400
W1	Approx. dry weight (kg)	1,600	1,900	2,200	2,600	3,000	4,200	4,600	5,000	5,900	7,500	8,100	9,000	10,800
W2	Approx. operational weight (kg)	1,800	2,100	2,500	2,900	3,600	5,100	5,600	6,200	7,900	9,700	10,600	11,700	13,800

Above 20 MW requires customized solution.



Reference 1 Superspeed II



SUPERSPEED II

Wärtsilä was contracted to retrofit its I-SOx scrubber system to ensure the ship's full compliance with the International Maritime Organization's (IMO) MARPOL SOx emission regulations, and with EU Directive 2015/33/EC. It was the first vessel to feature the Wärtsilä I-SOx system. The ferry also has installed 4 x 9.45MW Wärtsilä engines running at 2.3%S. Following the installation Color Line selected Wärtsilä scrubber systems for three additional vessels – the 'Superspeed I', 'Color Magic' and 'Color Fantasy'.

Installation onboard Superspeed II



Hybrid I-SOx scrubbers are an attractive alternative for cruise vessels with multiple engines – especially for retrofits.

The advantages are:

- Minimum space impact on board, possibly fit into the funnel replacing the existing silencer.
- Hot running possibility, i.e., no alternate arrangement is required.
- No need for exhaust gas fans.
- Fewer equipment means lower total equipment and installation costs (when comparing I-SOx main stream vs. 'traditional design' main stream scrubbers).
- In the unlikely event of a major malfunction in one of the scrubbers forcing shutdown, the modularity of the scrubber system setup would enable continuing use of HFO in other engines and still continue being SOx emissions compliant.

Aftersales, service & support

Wärtsilä's service network reaches almost all corners of the world. This extensive coverage ensures that plant operators receive fast and effective response to their maintenance needs.

Our services & support solutions range from basic support, installation and commissioning, performance optimization, upgrades and conversions to service projects and agreements focusing on overall equipment performance and asset management.

Wärtsilä can also support plant owners with O&M agreements that offer the following benefits:

- **Ensured productivity** throughout the lifecycle of the asset
- **High availability** with minimized unplanned downtime
- **Predictability** of maintenance costs over the medium to long term
- **Attention to safety** and environmental aspects

**SUPPORT THROUGHOUT
THE ENTIRE LIFECYCLE**



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