WÄRTSILÄ **Inert Gas**

ENERGY
ENVIRONMENT
ECONOMY

# MOSS FLUE GAS SYSTEM & TOPPING UP GENERATOR


Wärtsilä is a market leader in the development, design, manufacture and servicing of advanced inert gas and nitrogen solutions for marine and offshore oil and gas applications.

Our leading-edge, customised solutions ensure high quality and advanced levels of safety for vessels operating in regulated areas. We are certified by ISO 9001:2000, ISO 14001:2004 and OHSAS 18001:2007.

Our strong reputation in inert gas solutions is based on over 50 years experience and unique full-scale R&D facilities located in Moss, Norway. Our references include over 2500 vessels installed with our inert gas equipment.

Performance testing of inert gas systems can be executed in the company's own test hall in Moss, the only facility tailor-made for this purpose in the world today.

Wärtsilä Moss flue gas scrubber unit

Wärtsilä Moss flue gas systems are vital systems to ensure a high level of safety for the vessels where they are installed. Consequently, product quality is always the number one priority.

They are tailor made for use on board crude oil carriers and are designed based on compact modules, offering important savings in space and installation cost both for newbuildings and for retrofit on existing vessels.

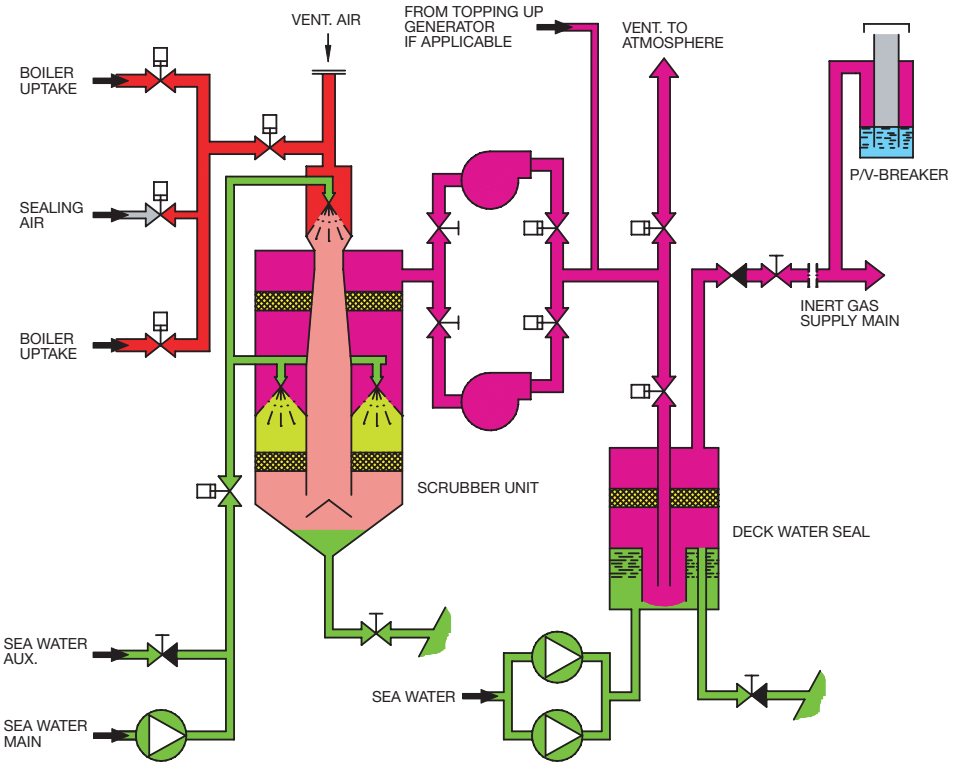
**BENEFITS OF THE MOSS DESIGN:**

- Unique concentric venturi scrubber design based on more than 50 years experience
- Minimum space requirement
- High efficiency
- Low maintenance costs
- Safe and easy operation

Hamworthy
a Wärtsilä company

WÄRTSILÄ

Typical schematic of Wärtsilä Moss flue gas system




The Wärtsilä Moss topping up generator is used in conjunction with the Wärtsilä Moss flue gas system, making high inert gas quality possible by a purposeful designed combustion chamber.

A Wärtsilä Moss Flue Gas System may be configured as follows:

- Moss Flue Gas System
- Moss Flue Gas System + Topping up Generator

## SPECIAL FEATURES OF THE WÄRTSILÄ MOSS FLUE GAS SYSTEM

### SCRUBBER UNIT

- Combining three scrubbing principles for high efficiency calling and cleaning
  - Venturi scrubbing
  - Wet filter
  - Spray section
- Concentric arrangement independent of ships pitching and rolling.
- Internally coated with GRE and venturi tube in corrosion and heat resistant steel.

### BLOWER UNITS

- Blower units are arranged on a rigid steel base frame equipped with resilient mountings.
- Blower house is internally GRP coated and the impeller is made of corrosion resistant steel.

### DECK WATER SEAL

The deck water seal is of displacement semi-dry type internally GRE coated. Upon loss of positive flow, the water will immediately close the seal. The mesh demister is effectively preventing carry-over of water droplets under all flow conditions.

### PRESSURE/VACUUM BREAKER

The Pressure/Vacuum Breaker is another device of importance for the ship's safety, releasing excessive pressure or vacuum from the cargo tanks. The unit is internally coated with epoxy.

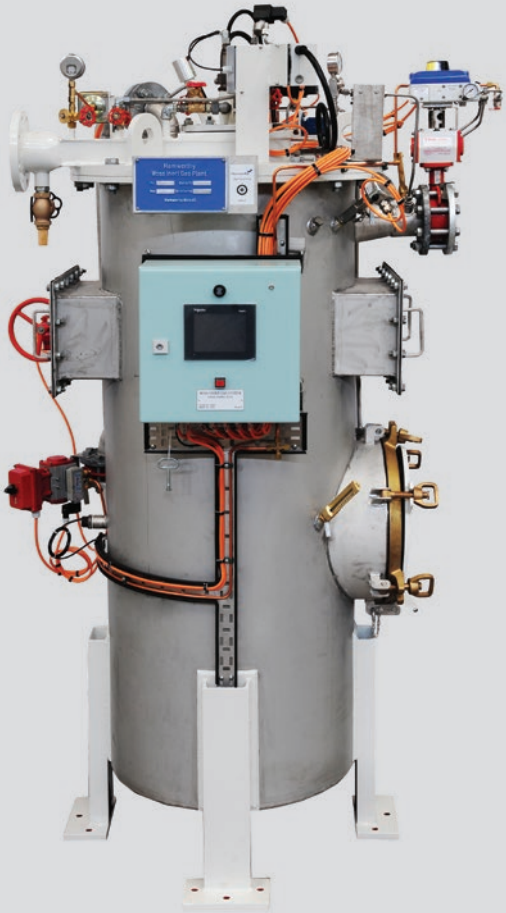
### CONTROL SYSTEM

- The control system is fully automatic.
- All control panel of touch screen type.
- Flow diagrams and controls for safe and easy operation with a minimum of operator supervision.

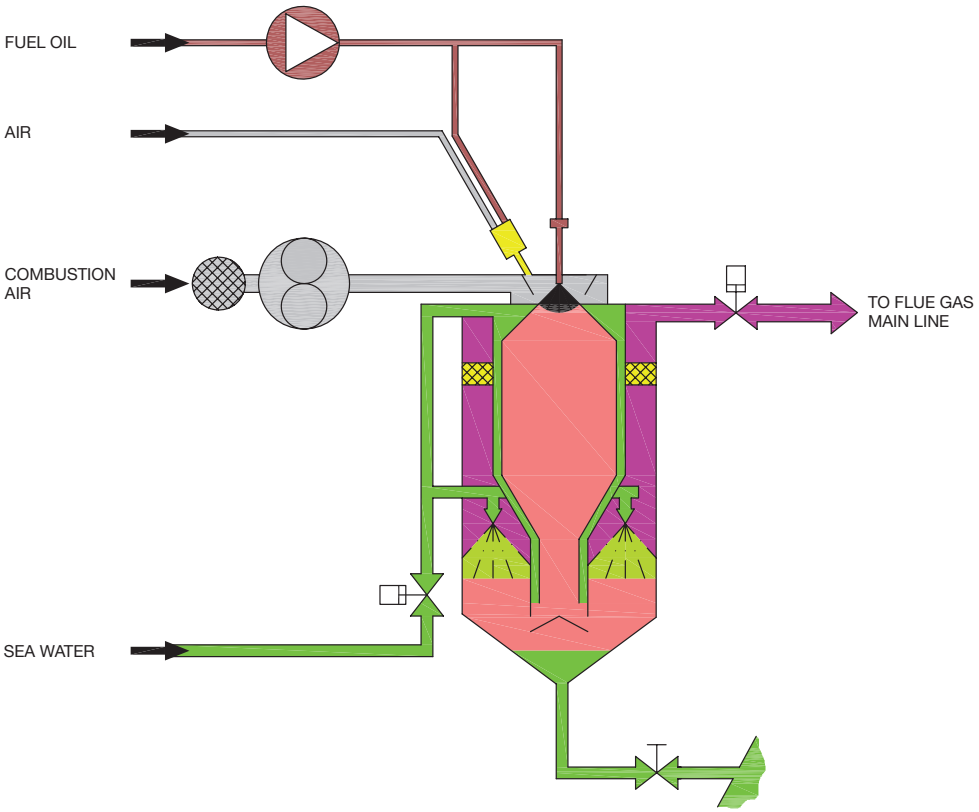

The oil products tanker 'Konstantin Jacob' is installed with a Wärtsilä Moss flue gas system

The crude oil tanker 'Carmel' is installed with a Wärtsilä Moss flue gas system

Wärtsilä Moss scrubber unit



Typical schematic of Wärtsilä Moss topping up generator




# PERFORMANCE DATA

**FLUE GAS SYSTEM**
Capacity: up to 30.000 $Nm^3/h$

Basic flue gas composition:
$O_2$ - content: Approx. 5% by vol.
$CO_2$ - content: Approx. 13% by vol.
$SO_2$ - content: Approx. 3000 ppm.
$N_2$ - content: Balance

Inert gas composition:
$O_2$ - content: No change
$CO_2$ - content: No change
$SO_2$ - content: Less than 100 ppm
$N_2$ - content: Balance

Efficiency of soot extraction equal to or higher than 99% of particles above 1 micron.

Gas outlet temperature:
Max. 5°C above sea water temperature.

Relative humidity: 100%

Carry over of water droplets:
Less than 1 g/kg dry gas.

Nominal sea water consumption:
0,015 $m^3/Nm^3$ gas (sea water temp. 32°C).

Nominal el. power consumption:
0,008 $kW/Nm^3/h$ gas (excluding sea water pumps).

**TOPPING UP GENERATOR**
Capacity: 500 $/Nm^3/h$

Discharge pressure:
0,12 bar g (other pressures upon request).
Inert gas composition at 3% by volume of oxygen (based on marine distillate fuel).

| | |
|---|---|
| CO | = Max. 100 ppm |
| $NO_X$ | = Max. 150 ppm |
| $SO_2$ | = Max. 1 ppm |
| $CO_2$ | = Approx. 14% |
| $N_2$ + Ar | = Balance |

Oxygen content adjustable down to approx. 1%.

Gas outlet temperature:
Max. 5°C above sea water temperature.

Relative humidity: 100%.

Carry over of water droplets:
Less than 1 g/kg dry gas.

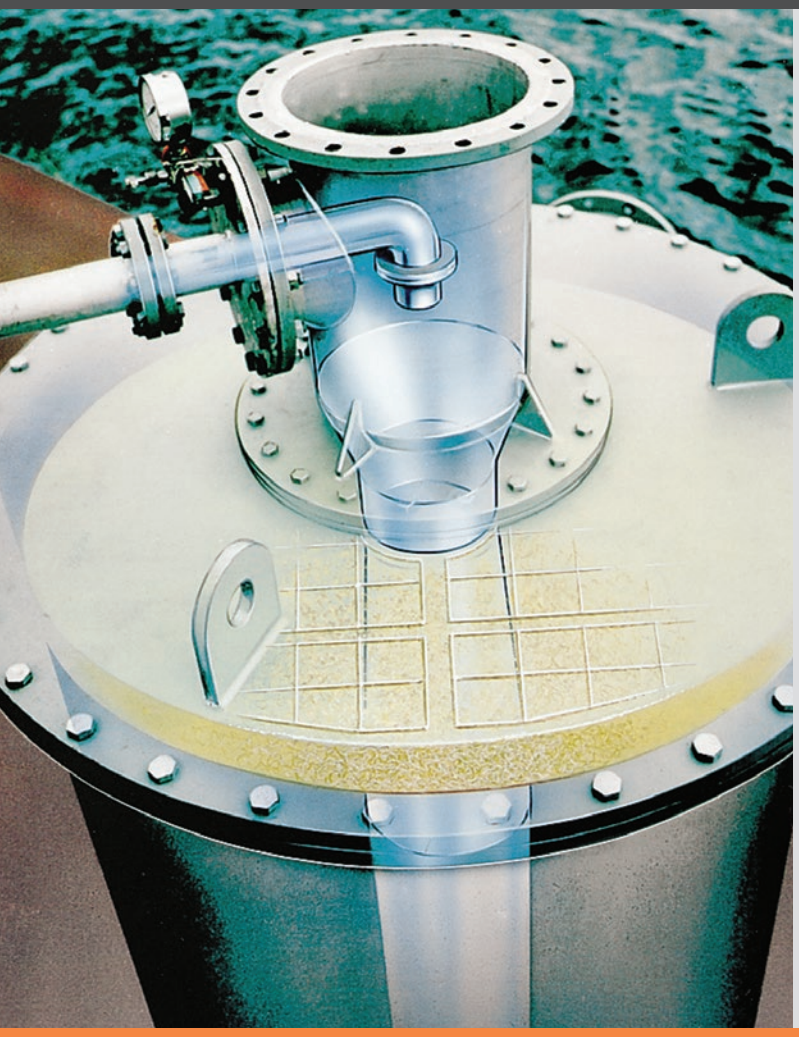
Fuel: Marine distillate according to ISO 8217.

Nominal Fuel consumption: 40 kg/h.

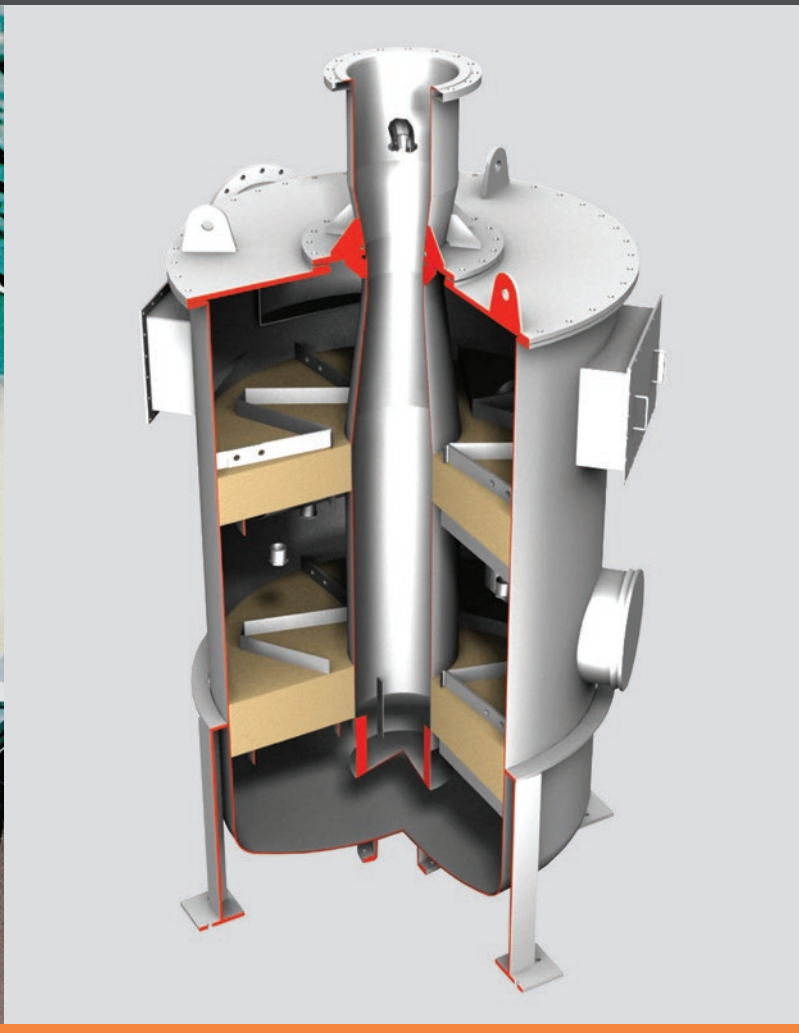
Nominal Sea water consumption:
35 m3/h (sea water temp. 32°C).

Nominal El. power consumption:
7,0 kW/h (excluding sea water pumps).

Venturi type scrubber



Moss flue type scrubber



## AFTERSALES SERVICE AND SUPPORT

Wärtsilä supports its customers throughout the lifecycle of their installations by optimizing efficiency and performance. We offer expertise, proximity and responsiveness for all customers in the most environmentally sound way and to secure uninterrupted operation.

Our Services & Support solutions range from basic support, installation and commissioning, performance optimization, upgrades, conversions and environmental solutions to service projects, agreements and product training focusing on overall equipment performance and asset management. Our service department in Moss will also provide anticipated spares on short notice for our full range of inert gas solutions.

We deliver our services through our service stations, workshops and ship repair centres that form our service network in 70 countries worldwide.



**Wärtsilä Moss AS**

WÄRTSILÄ

WARTSILA.COM

Printed 05/2013