

Wash Water Filtration

 Air and Water Treatment

Wash Water Filtration system (WWF)

Improve the EGCS environmental footprint

Even if wash water from our open-loop EGCS exceeds all IMO requirements for wash water discharges, the WWF pushes filtering performance beyond compliance and removes more pollutants from the wash water.

Pollutants, including soot, are always generated during diesel engine combustion process, and their amount depends on several factors. At engine start-up, maneuvering, and during operations at low loads an engine operates in its least effective conditions and it is likely to produce black smoke, which can contain ashes, metals, and unburned fuel such as elementary carbon covered by hydrocarbons (all known collectively as soot).

With the Wash Water Filtration:

- Soot, ashes, metals and unburned fuels are removed from the EGCS wash water.
- Surface effects are minimized such as (milky discoloration, sea foam, surface film).

Benefits

Why choose Ecospray Wash Water Filtration system?

Our **advanced Wash Water Filtration technology** provides improved performances, thanks to new components. We consider this a key milestone considering the regulation trend, which prescribes technically performing solutions, but also requires clear water in discharge.



Applied to the EGCS wash water, WWF removes the majority of ashes and soot washed out by the DeSOx tower (typically combining in compounds bigger than 20 μm).



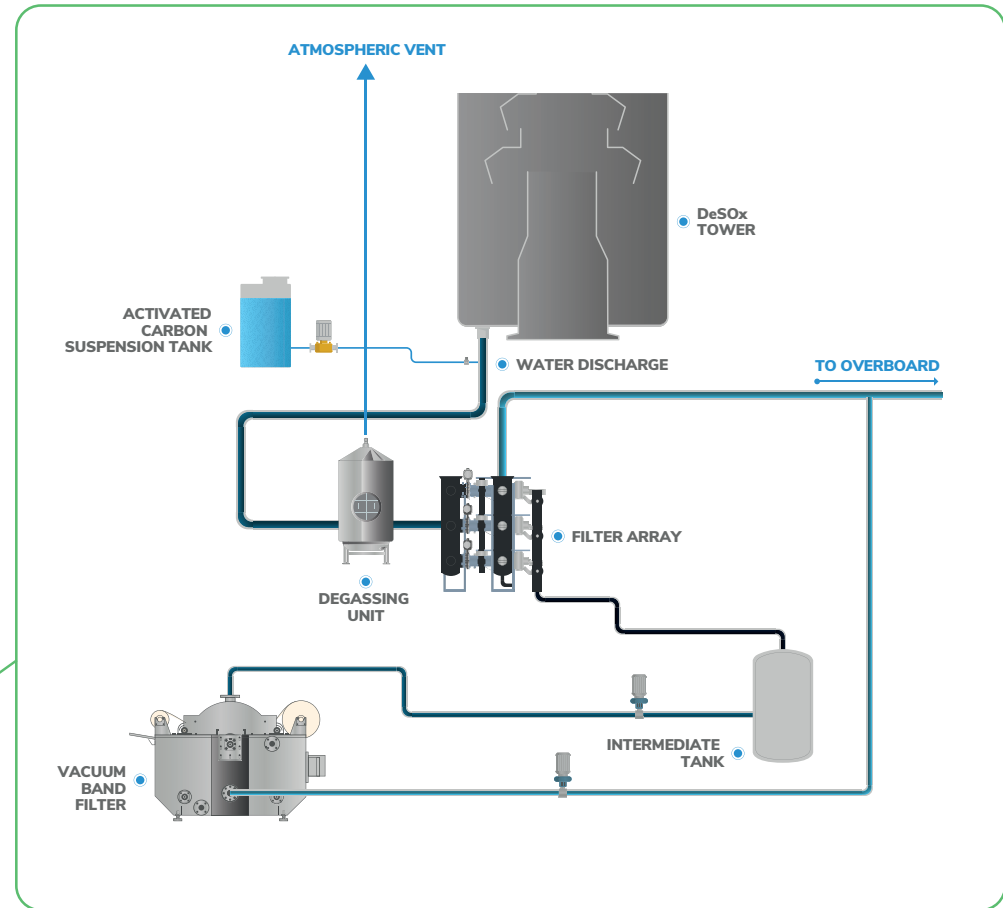
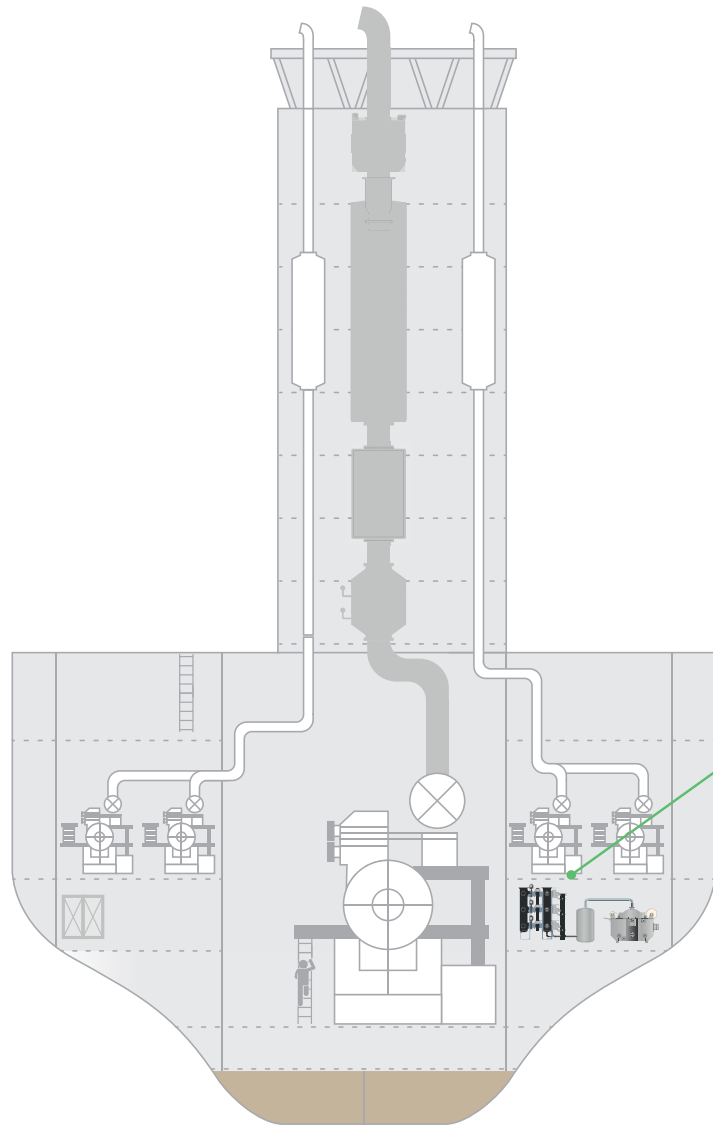
WWF is capable of achieving a significant reduction of suspended solids in the EGCS effluent (up to 70-80% for some compounds), keeping the turbidity levels of the wash water comparable with the inlet seawater.



Notably, there is a significant reduction of other pollutants (such as heavy metals, hydrocarbons, and PAH); which are the main constituents of the solid particles filtered by the system.

How It Works

WWF relies on several key components - a **degassing unit**, **filter array** and **vacuum band filter** - for an effective baseline treatment, and some optional features which can help further improve performances and refine results.



Degassing Unit



What is it for?

The **degassing unit** removes air bubbles from the wash water stream coming from the DeSOx tower, to minimize surface effects at the overboard and to improve the filtration efficiency of the filtering devices.

Main features

1. Customizable in size, dimensions and shape to be adapted according to the existing constrains.
2. Proved internal geometry for an effective gas removal.
3. Corrosion resistant made, available in different materials such as metal alloys or GRE.

Filter Array



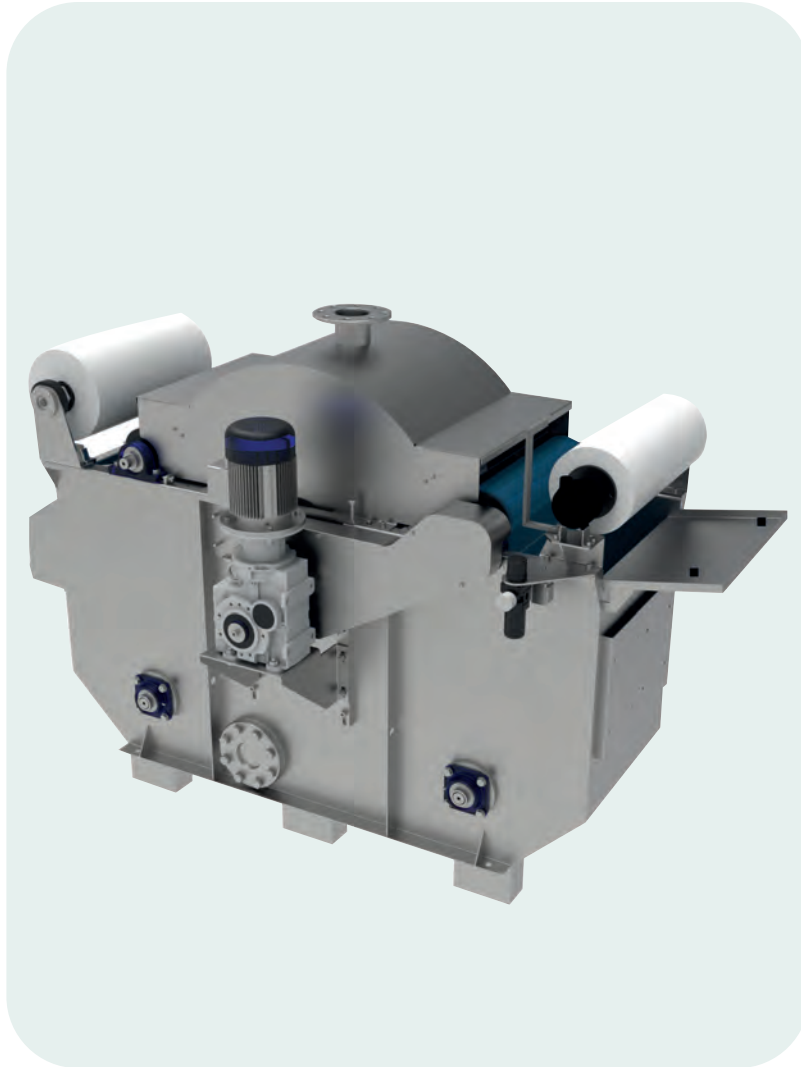
What is it for?

Thanks to an array of automatic self-cleaning filter modules, which are alternatively isolated and automatically cleaned, this device is capable to filter the entire wash water flowrate, removing hash, soot and particle from the wash water stream. Filtering and self-cleaning capability are granted by the pressurizing feature, with no constrains in the system positioning onboard.

Main features

1. Self-cleaning.
2. Self-pressurized (working with low inlet pressure to grant maximum filtration and self-cleaning in every operating profile).
3. Flowrate from 60 to 2,000 m³/h depending on the filters selection and arrangements.
4. Low maintenance.
5. Customizable filtering rate (100 µm to 10 µm).
Body material – corrosion resistant (Duplex or GRP).

Band Filter



What is it for?

The **band filter** acts as a dewatering device to treat the back-wash flow from the filter array. The pollutants removed from the filter array are then dried as much as possible by the band filter reducing the volume to be disposed.

The operational costs due to the consumable use are reduced by 75%, thanks to the efficiency of the vacuum technology, compared to similar dewatering technologies (such as bag filters).

Main features

1. Disposable band roll.
2. Vacuum technology to maximize filtration efficiency.
3. Filtering rate (50 to 5 μ m).
4. Body material – corrosion resistant.

Optional Components

Bag Filter

What is it for?

To further improve the performances of the band filter, maximizing the pollutant filtration, bag filters can be installed on the clean side of the band filter, with a finer filtering element, to drastically improve the filtered water quality.

Main features

1. Disposable bag filter.
2. Filtering rate (200 to 1 μm).
3. Body material – corrosion resistant.



Activated Carbons Injection

What is it for?

Some of the lighter compounds of polycyclic aromatic hydrocarbons, such as Phenanthrene, Anthracene and Naphthalene, as well as heavy metals, are lightly soluble in water. Activated Carbons can be injected in the wash water to improve the filtration process: these carbons can adsorb the pollutants and then be separated from the wash water by the filter array.

Main features

1. Negligible dosed quantity (typically 2 ppm) - low OPEX.
2. Easy to implement in the wash water stream.
3. Good adsorption for soluble PAH and heavy metals.



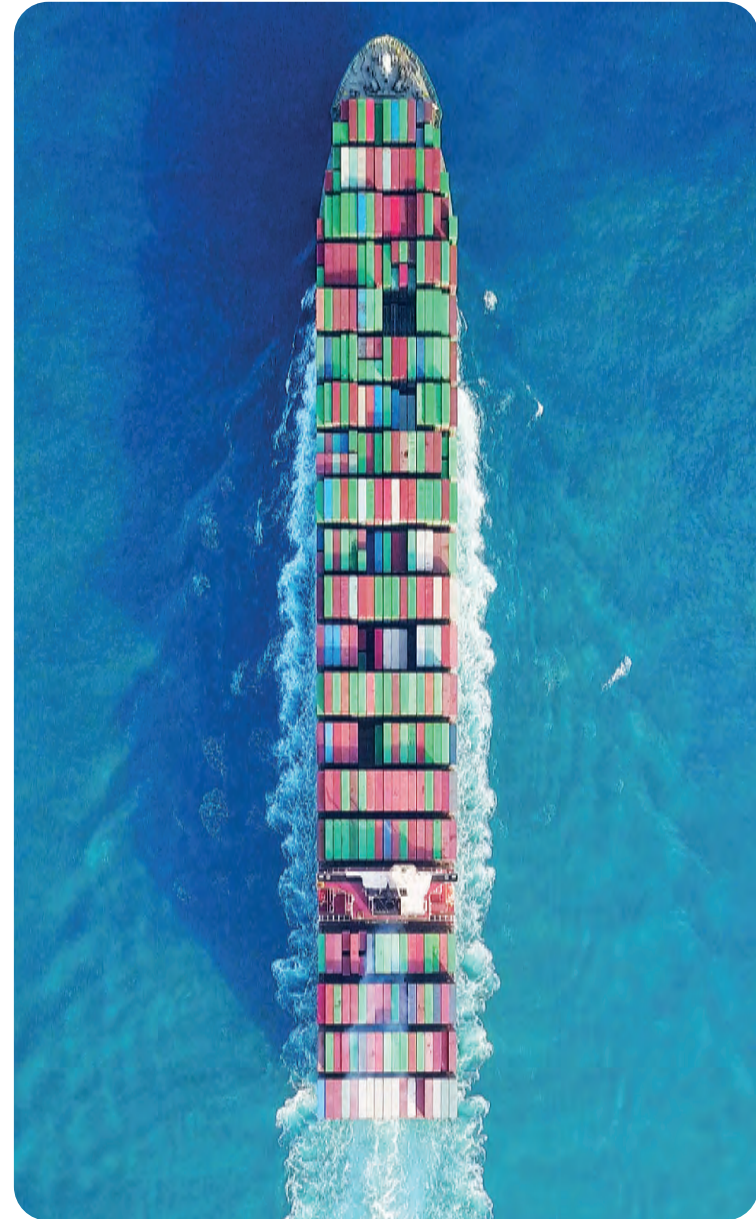
Case Study

An extensive testing campaign has been carried out on a cargo vessel, equipped with an advanced Wash Water Filtration system, to treat the EGCS wash water.

Samples have been taken in several operating scenarios, at anchorage and at open sea; the subsequent lab analysis carried out by accredited laboratories confirmed the notable filtration results.

System characteristic

1. Cargo Vessel, 19 MW main engine.
2. 3,000 mm diameter DeSOx tower.
3. 1,400 m³/h maximum wash water flowrate.
4. Filter array equipped with 25 µm, oil repellent, filtering elements.
5. Band filter equipped with 10 µm disposable band rolls.

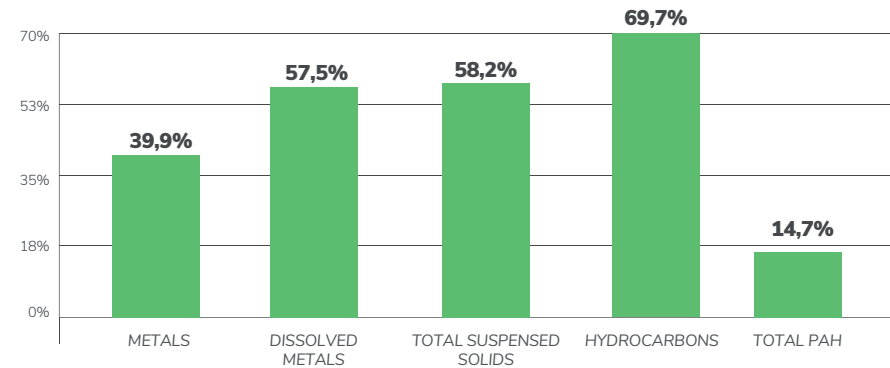


Conclusion

1. The advanced WWF **effectively removes** and collects a **large portion of the pollutants** washed-out by the EGCS.
2. WWF is capable of capturing, on average:
 - More than 40% of heavy metals;
 - 58% of the TSS;
 - 70% of Hydrocarbons \geq C10;
 - 15% of 16 EPA PAHs.
3. The Under-vacuum Band Filter processes the total volume of the backwash water with the following results:
 - **99.9% reduction** of the handled **volume** is achieved;
 - Only the **dry waste** is collected by the disposable paper roll;
 - **No liquid waste** to be handled and disposed.
4. The WWF process produces a **negligible amount** (compared to the amount of processed water) of **dried residuals** (<0.000002%).

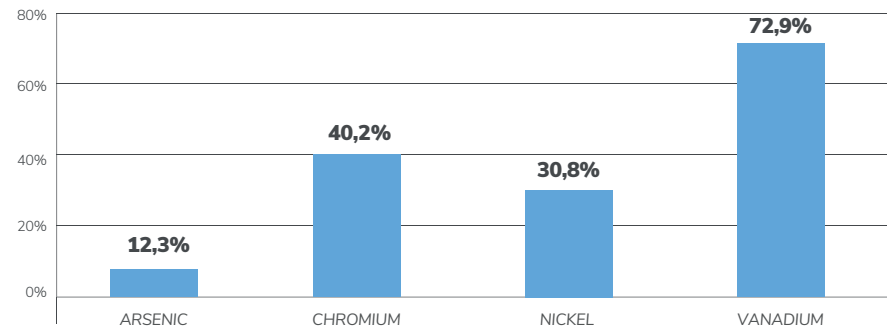
Tab.1

WWF Pollutant abatement efficiency



Tab.2

Key heavy metals filtration efficiency



Technology Map



Exhaust Gas Cleaning

Advanced DeSOx

Exhaust Gas Cleaning Systems
Smart Scrubber
Wet Technology
Dry and Semi-Dry Technology

Catalytic Abatement

DeNOx SCR
Diesel Oxidation Catalyst
Methane Slip Reduction
Water Fuel Emulsion

Filtration

Wet Electrostatic Precipitator
Diesel Particle Filtration
Baghouse Filters
Filter Cassettes



Clean Fuel

Pre-Treatment and Upgrading

Pre-Treatment
Smart Blending
Biogas Upgrading
Nitrogen Rejection Unit

Liquefaction

Methane and Biomethane
Liquefaction



Green Power Generation

Lean Gas To Power

Lean Gas To Power

Decarbonization

Carbon Capture Utilization
& Sequestration

Fuel Cell

Carbon Friendly Fuel Cells



Air and Water Treatment

Advanced Water Filtration

Wash Water Filtration

Sanitization

Air and Surface Sanitization

Fogging

Fogging

Gas Cooling

Gas Cooling



Get in Touch. Book a Meeting.

Our experts are available to schedule a web call to explain any detail around our technology and solutions.

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