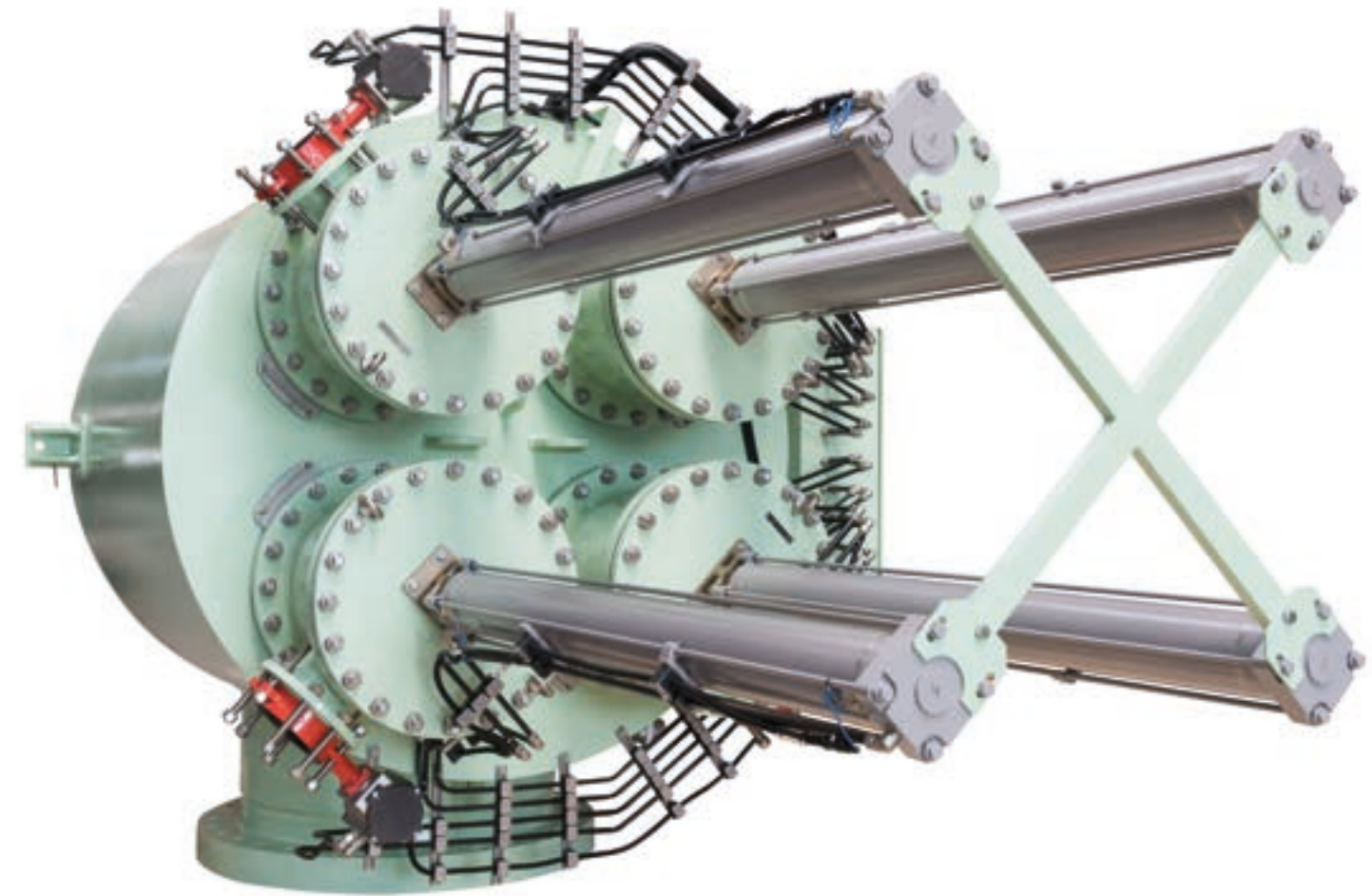


# AUTOMATIC FILTER F480

Made in Germany - AT HOME ALL OVER THE WORLD

The compact giant

Reliable filtration using the Bernoulli principle



# EXECUTIVE SUMMARY

For more than 80 years SAB Georg Schünemann has been a reliable partner supplying innovative filtration solutions for industrial and navy applications. SAB's Automatic Self-cleaning Filters are ideally suited for the pre-treatment of water and low-viscosity fluids. No matter the application – whether filtering particles from seawater, process water or cooling water, SAB's Automatic Filters are designed to particularly meet the specific customer requirements.

## AUTOMATIC FILTER F480

The self-cleaning Automatic Filter F480 is pneumatically operated and used for the separation of solids in various different media like seawater, river water or process water. The Filter ensures reliable and continuous filtration in a variety of applications like cooling water cycles or water treatment plants. The filter can operate at very low pressures of only  $\geq 0,7$  bar and is characterized by an unmatched low backflush rate, a compact design and near maintenance-free operation. The F480 utilizes the advanced Multi-Bernoulli cleaning technology. This technology was invented by Georg Schünemann and combines multiple strainers in one filter housing.



# FEATURES AND ANDVANTAGES

## The compact GIANT



The patented F480 series presents innovative technical advantages with maximum modular flexibility:

### FLOW RANGE

The multi-strainer design allows exceptionally high volume flows of up to 40.000 m3/h with a single and compact filter. Furthermore, the Multi-Bernoulli cleaning technology reduces the backflush significantly. While maximizing the clean water flow the waste water flow is reduced to a minimum. Possible costs for the storage or disposal of the backflush can be reduced significantly.

### EFFICIENT CLEAINING

The F480 ensures the safe protection of our customer's applications with a consistently high filtration quality down to 40 µm. The proven Multi-Bernoulli technology warrants a continues and effective filtration even at low operating pressures starting from only 0.7 bar.

### CUSTOMIZED DESIGNS

The F480 can be adopted to all customer requirements and offers a broad range of materials suitable for almost every application. The design allows flexible nozzle positions which ensures a simple integration into the piping. Furthermore, the F480 can be designed according to many national and international codes and regulations, among others, EN13455, ASME, AD2000, EAC and ATEX.

| DESIGN              |                                                        |
|---------------------|--------------------------------------------------------|
| Connections         | DN 400 - DN1200                                        |
| Volume flow         | 2.000 m³/h - 40.000 m³/h                               |
| Grade of filtration | 40 µm - 10 mm                                          |
| Operating pressure  | 0,7 - 10 bar                                           |
| Codes & Standards   | EN 13445 / AD2000 / ASME VIII Div.1 / PED 17/23 / ATEX |
| MATERIALS           |                                                        |
| Housing:            | Stainless steel, GRP, CSRL                             |
| Internals:          | Stainless steel / Duplex / Super Duplex / Titanium     |



Bernoulli's principle states that an increase in the speed of a fluid occurs simultaneously with a decrease in static pressure:

$$\frac{1}{2}\rho v^2 + \rho gh + P = \text{constant}$$

## » FILTRATION CYCLE

Operating pressure of only  $\geq 0,7$  bar

- 1 During normal filtration, particles accumulate from top to bottom on the inside of the strainer.
- 2 Cleaning begins automatically according to a timed cycle, or after a high differential pressure signal.
- 3 During the pre-flushing phase, the flushing valve opens and particularly larger particles are flushed out.
- 4 The flow velocity increases locally around the flushing disc within the gap between the disc and the strainer. Simultaneously the static pressure is reduced in accordance with the Bernoulli principle and the direction of the flow is reversed which releases the particles from the surface of the strainer basket.
- 5 The released particles are flushed out from the filter via the flushing outlet. Finally the flushing valve is closed.
- 6 The filtration will not be interrupted during the entire cleaning cycle.

### MUSSEL AND SNAIL LARVAE

Due to the high flow speed and the simultaneous rotational movement, strong acceleration forces act on the microorganisms. Combined with the organisms "hitting" the wire of the profiles, this ultimately leads to the death of the larvae.



# INNOVATIVE DESIGN

## F480 DESIGN

The F480 protects your equipment from clogging, contamination and damage. Precisely controlled and fully automated, the F480 operates continuously without unplanned shutdowns. The F480 multiple Bernoulli type strainers are operated parallel in one casing, every strainer will backflush individually. This enables these filters to run at extremely low backflush rates and at mesh size down to 40 micron.

SAB offers you top quality German engineering with the accuracy and reliability of a Swiss clock - all thanks to the principle discovered by the Dutch engineer Daniel Bernoulli.

The improved electronic control unit supplied with the F480 is both easy to use and easy to monitor with an integrated touch screen that can be integrated into a distribution control system.

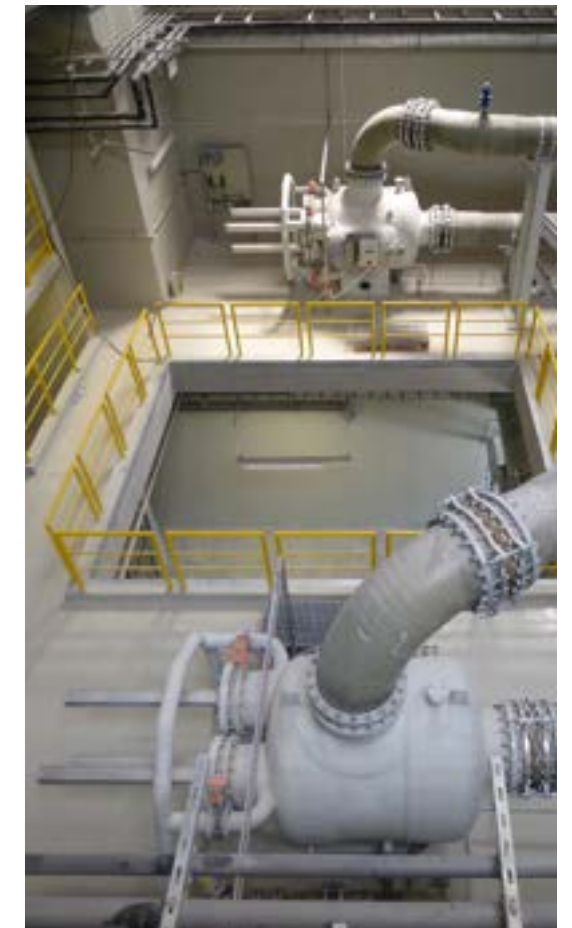


# COMPONENTS AND FEATURES

## BENEFITS

- extremely high flow rates up to 40,000 m³/h
- very low backflush rates
- operational as low as 0,7 bar
- extremely low pressure drop
- easily serviceable
- fully automatic with continuous monitoring of the operation

## MULTIPLE STRAINER DESIGN



# MARKETS

Water and Wastewater Treatment



Desalination



Power Generation



Shipbuilding



Chemical & Petrochemical Industry



HVAC



Irrigation



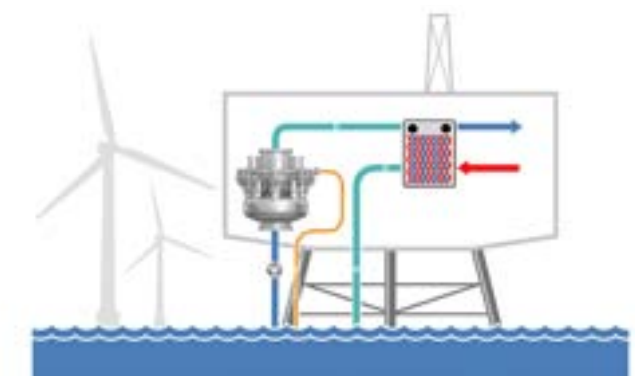
Offshore

# SELECTED APPLICATIONS

Offshore



Regasification

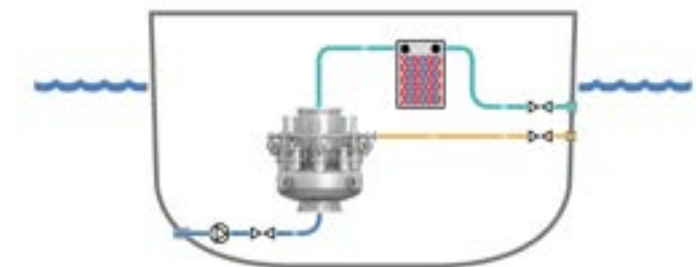


Offshore applications like oil/gas rigs or power converter platforms usually require cooling, process or drinking water. With our comprehensive range of products, SAB delivers customized and optimized filter solutions for numerous different types of applications. One application example is the usage of seawater for cooling purposes. Here, the SAB filters are installed to secure the protection of downstream heat exchangers and to ensure a high efficiency performance of heat exchangers.

Maritime Industry



Protection of Heat Exchangers

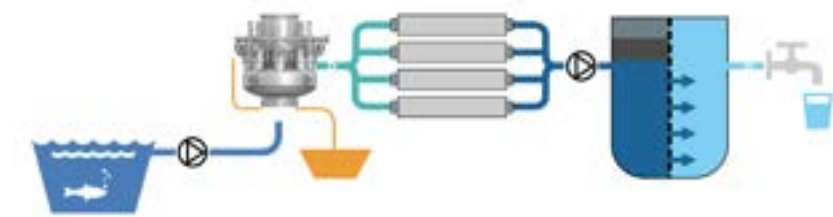


Heat exchangers are frequently used on ships for cooling or heating purposes using sea water. Typical applications are the cooling of engines, special equipment, or heating during the re-gasification of Liquid Natural Gas within the unloading process from an LNG carrier to an FSRU vessel. Here, the SAB filter reliably removes solids upstream of the heat exchangers.

Desalination



Protection of RO units



Rising water demands and diminishing water supplies are exacerbating water scarcity in most world regions. Unconventional water resources, such as desalinated water, are expected to play a key role in narrowing the water demand-supply gap. In this process the SAB filter reliably removes solids upstream of the reverse osmosis system which takes out the salt and other minerals.

# AUTOMATIC FILTER F490

## Multi X – Our cast iron multi-Bernoulli filter

» The patented **MULTI X** series presents innovative technical advantages with maximum modular flexibility. SAB invented the Multi-Bernoulli filter in 2010 to meet the increasing market demand for finer filtration and higher volume flows. This design utilizes the advantages of the proven Bernoulli based cleaning principle, such as low flushing pressure and unmatched cleaning efficiency, integrating multiple strainers in one filter housing.

The revolutionary **MULTI X** design combines the advanced Multi-Bernoulli filter technology with a smart and modular cast design offering unique technical advantages and short delivery times.

### Grade of Filtration

The **MULTI X** ensures the safe protection of our customer's applications with a consistently high filtration quality down to 40 µm. The proven Multi-Bernoulli technology warrants a continues and effective filtration even at low operating pressures starting from only 0.7 bar.

### Backflush Rate

Exceptionally low backflush rates of less than 1% of the total volume flow are possible and underline the unmatched efficiency of the **MULTI X**. While maximizing the clean water flow the waste water flow is reduced to a minimum.

### Compact Design

With its smart and modular design, the **MULTI X** offers a considerably smaller footprint saving up to 40% of space compared to conventional filter solutions. This compact design based on smaller and standardized components, reduces the required maintenance space and efforts significantly. The flanges are arranged in-line to ensure an easy piping integration without any height offset.

### Technical Summary

| DESIGN              |                                                        |
|---------------------|--------------------------------------------------------|
| Connections         | DN 100 / DN 250 / DN 400 / DN 600 / DN 800             |
| Volume flow         | 50 m³/h - 8000 m³/h                                    |
| Grade of filtration | 40 µm - 10 mm                                          |
| Operating pressure  | 0,7 - 10 bar                                           |
| Codes & Standards   | EN 13445 / AD2000 / PED 17/23 / ASME VIII Div.1 / ATEX |
| MATERIALS           |                                                        |
| Housing:            | GGG40 / 1.4557 / 1.4581                                |
| Internals:          | Stainless steel / Duplex / Super Duplex                |

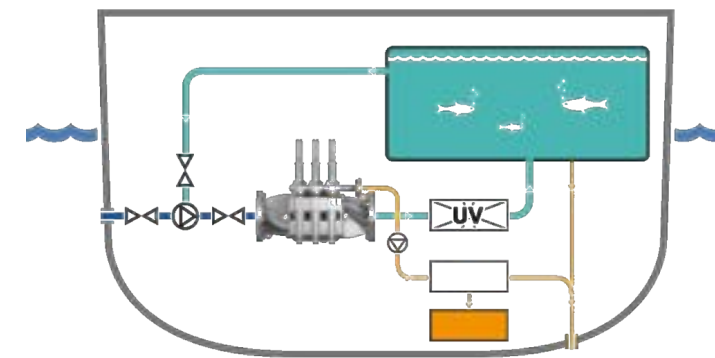


# SELECTED APPLICATIONS

## Marine



## Aquaculture

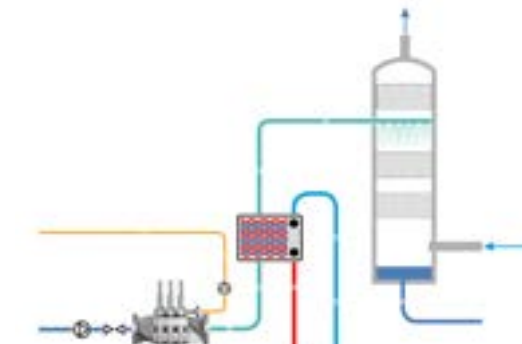


Environmentally friendly technologies are crucial to improve fish welfare and biosafety in the aquaculture industry. Here, SAB filters play a key role by removing particles and contamination in the water as well as sea lice and lice eggs when performing delousing in a well boat.

## Chemical & Petrochemical Industry



## Protection of Quench Tower

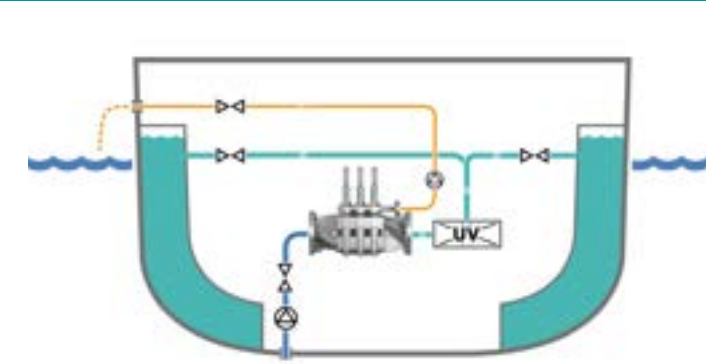


In many different industrial application quench towers are used to condition or clean gases. A high filter availability and performance are key to ensure the productivity of the overall plant. The SAB product portfolio covers many innovative and proven filter solutions which reliably remove solids out of the quench water in order to protect heat exchangers or quench internals, for example the demister. Furthermore, the exceptionally low backflush flow minimizes the fluid losses.

## Marine



## Ballast Water



Invasive aquatic species in ship's ballast water is one of the biggest problems faced by the shipping industry. Posing a great threat to the marine ecosystem, these aquatic species have led to an increase in bio-invasion at an alarming rate. The implementation of ballast water treatment systems on ships has thus become increasingly important. The SAB filter represents the first process stage, removing organic particles and sediments from the ballast water.