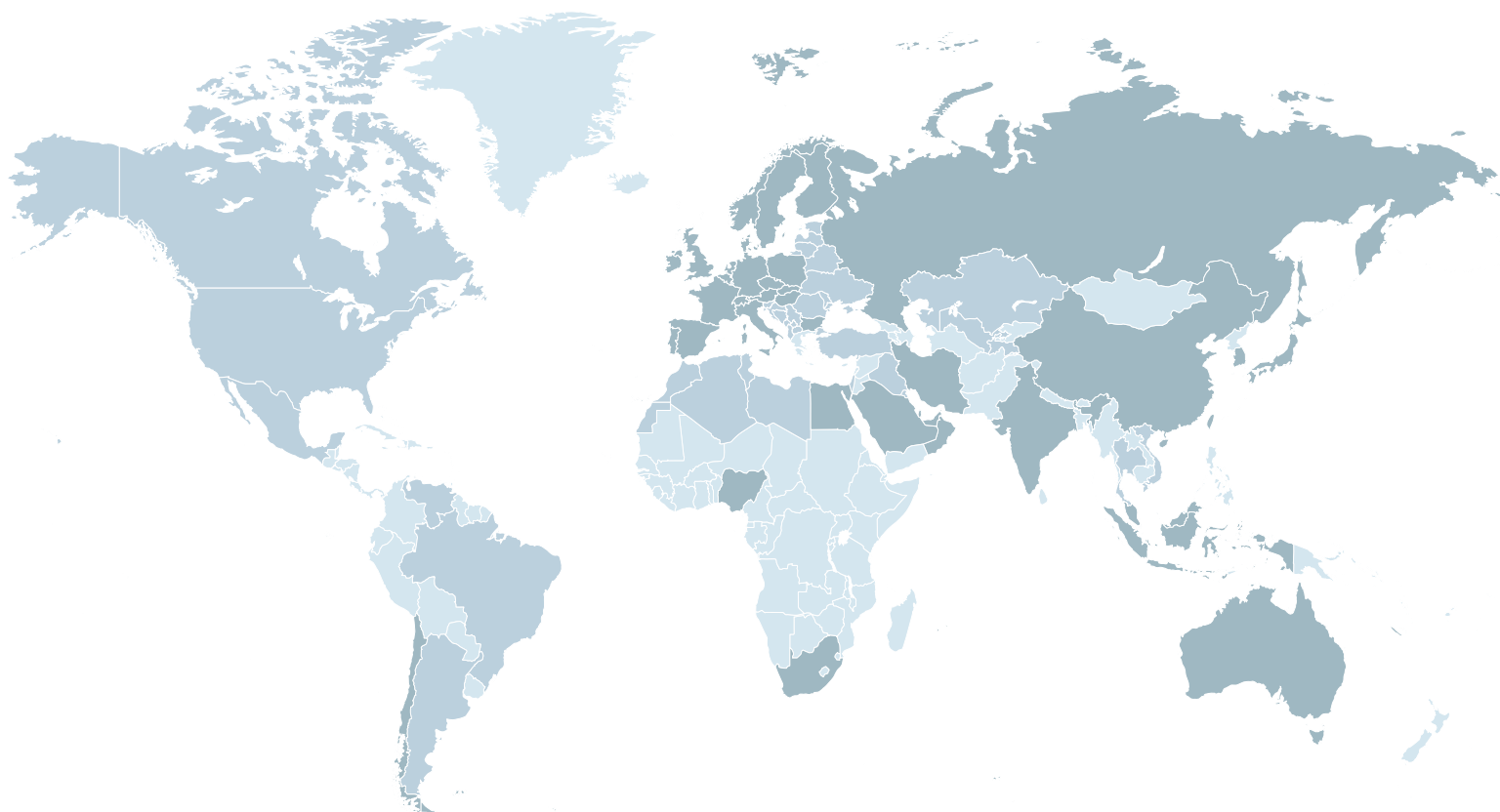


Made in Germany - AT HOME ALL OVER THE WORLD



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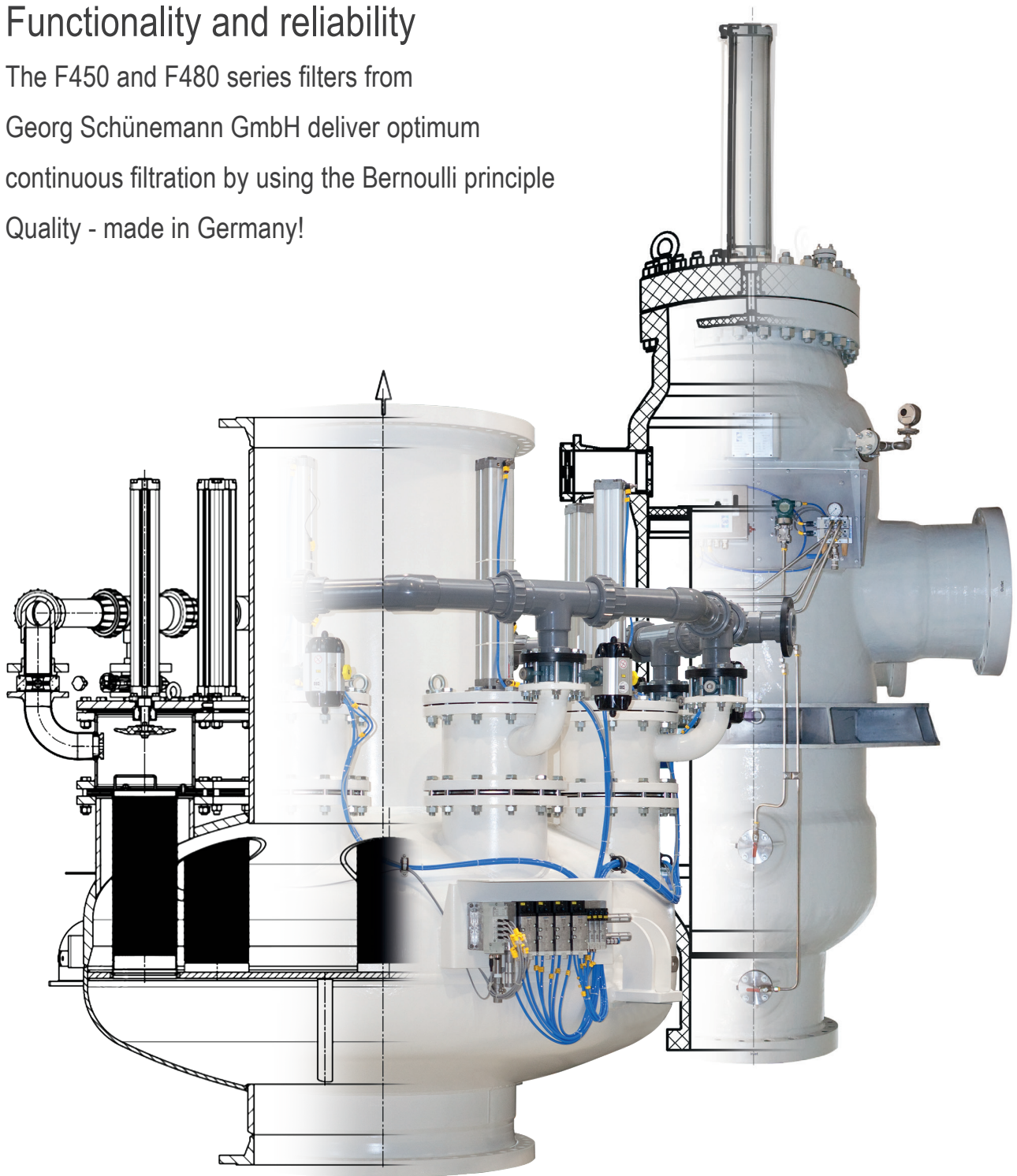


GEORG SCHÜNEMANN GMBH
Buntentorsdeich 1 · 28201 Bremen · Germany
Tel. +49 (0)421-5 59 09 - 0 · Fax +49 (0)421-5 59 09 - 40
info@sab-bremen.de · www.sab-bremen.de

F450/F480 Automatic Filter

Functionality and reliability

The F450 and F480 series filters from Georg Schünemann GmbH deliver optimum continuous filtration by using the Bernoulli principle
Quality - made in Germany!



80 years of experience

Georg Schünemann GmbH - SAB filtration

Simplex Filter



For more than 80 years SAB has been a leading filter design manufacturing company providing a full range of industrial and navy filters.

Offering filtration down to low μm , our filters protect downstream equipment from clogging, fouling and damage. Applications are wide spread from building technology (HVAC), across industrial production facilities, right up to the largest refineries and chemical plants.

Thanks to their high efficiency, SAB filters have become established over many years as the market leading filtration solution.

Progressive development of environmental specifications and legislation, as well as greater expectations from industry for higher efficiency rates from ever more compact filtration systems, are the incentive for SAB to continually develop smarter unique solutions.

Simplex filters are built in different basic formats and are used onboard submarines and surface navy ships where they are manufacture in bronze and designed to meet the most stringent military safety standards. Our naval simplex filter F105 or F125 are used to perform effectively under tough conditions.

The F118 and F119 range are manufactured in high quality cast and used in many industrial applications.

The SAB welded steel range can be customised to meet the special requirements for applications in both the chemical and petrochemical industries.



Petrochemical Industry

Reliable filtration of sand, algae and crustaceans from river, lake and seawater.



Chemical Industry

Protection of heat exchangers, pumps and other process equipment.



Power Plants

Continuous cooling water filtration for increased efficiency and reliability.

SAB filter

Duplex Filter

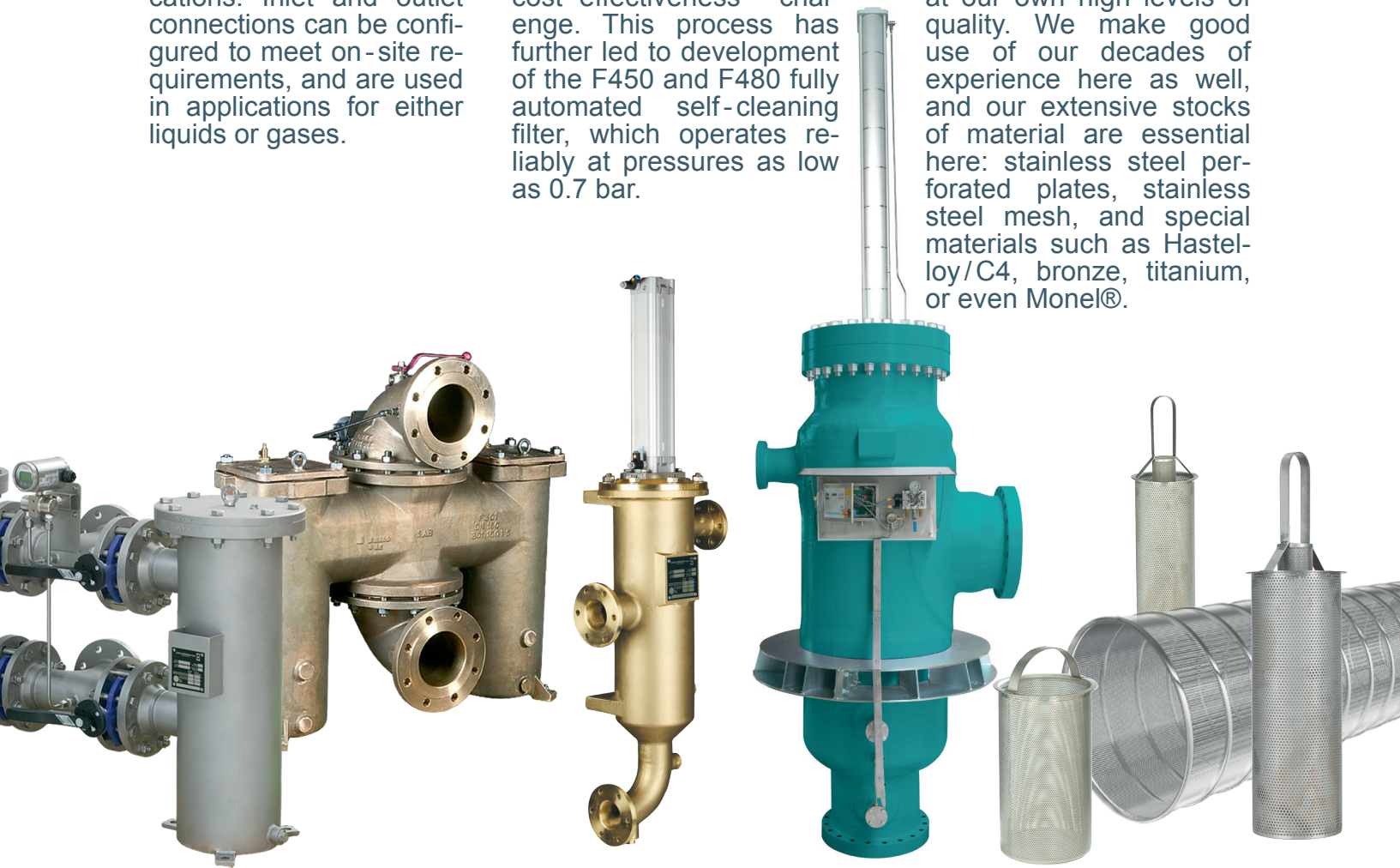
The SAB range of duplex filters include F101 and F311 cast filters as well as F605, F625, F705 and F725 welded versions. These filters are used for special industrial applications. Inlet and outlet connections can be configured to meet on-site requirements, and are used in applications for either liquids or gases.

Self-Cleaning Filter

From the early 1960s, SAB has been in the forefront of automatic self-cleaning filter solutions. With F400/F440 filters and its scraper-type F430 models, SAB has met the cost-effectiveness challenge. This process has further led to development of the F450 and F480 fully automated self-cleaning filter, which operates reliably at pressures as low as 0.7 bar.

Sieves

In our sieve shop, we manufacture every sieve precisely according to the pertinent drawings. We therefore enable applications with virtually all third-party equipment at our own high levels of quality. We make good use of our decades of experience here as well, and our extensive stocks of material are essential here: stainless steel perforated plates, stainless steel mesh, and special materials such as Hastelloy/C4, bronze, titanium, or even Monel®.



Desalination Plants

Our filters are designed to handle the most aggressive fluids. They are proven at desalination plants around the world.



Offshore Rigs

Precise filtration, high flow and small footprint ensures that the F480 is THE filter for offshore use.



FPSO/FLNG

Reliability and efficiency – Ideal for treatment of seawater, grey water and ballast water on board.

Self-Cleaning Automatic Filter F450

SAB's F450 Self-Cleaning Filter automatically cleans all low viscosity fluids at high output flow rates. No matter if it is during filtration of aggressive fluids, desalination, industrial process or power station cooling, the F450 will meet the need. This system reliably protects heat exchangers and other downstream components from clogging and fouling. The intelligent use of the Bernoulli principle for the automatic self-cleaning filter enables significantly longer service life of the system. Made to order solutions.

SAB's F450 filter can be purpose built using various materials for the housing and internal wet parts which serve the basis behind SAB's solutions. Nominal diameters up to DN 600 are possible, and the positioning and number of connections are possible in accordance with the particular facility. Special design of installation size allows continuous filtration without process interruption with a flow rate up to 4,400 m³/h, the filter mesh size begins at 150 micron. The customer can select between pneumatic or electrical drives, also with ATEX approval. Schünemann offers control units that are exactly matched to the parameters of the filter, and that can be simply integrated into higher-level control and monitoring systems operated by the customer (DLCs). This prevents unexpected down times.



Self-Cleaning Automatic Filter F450

BENEFITS

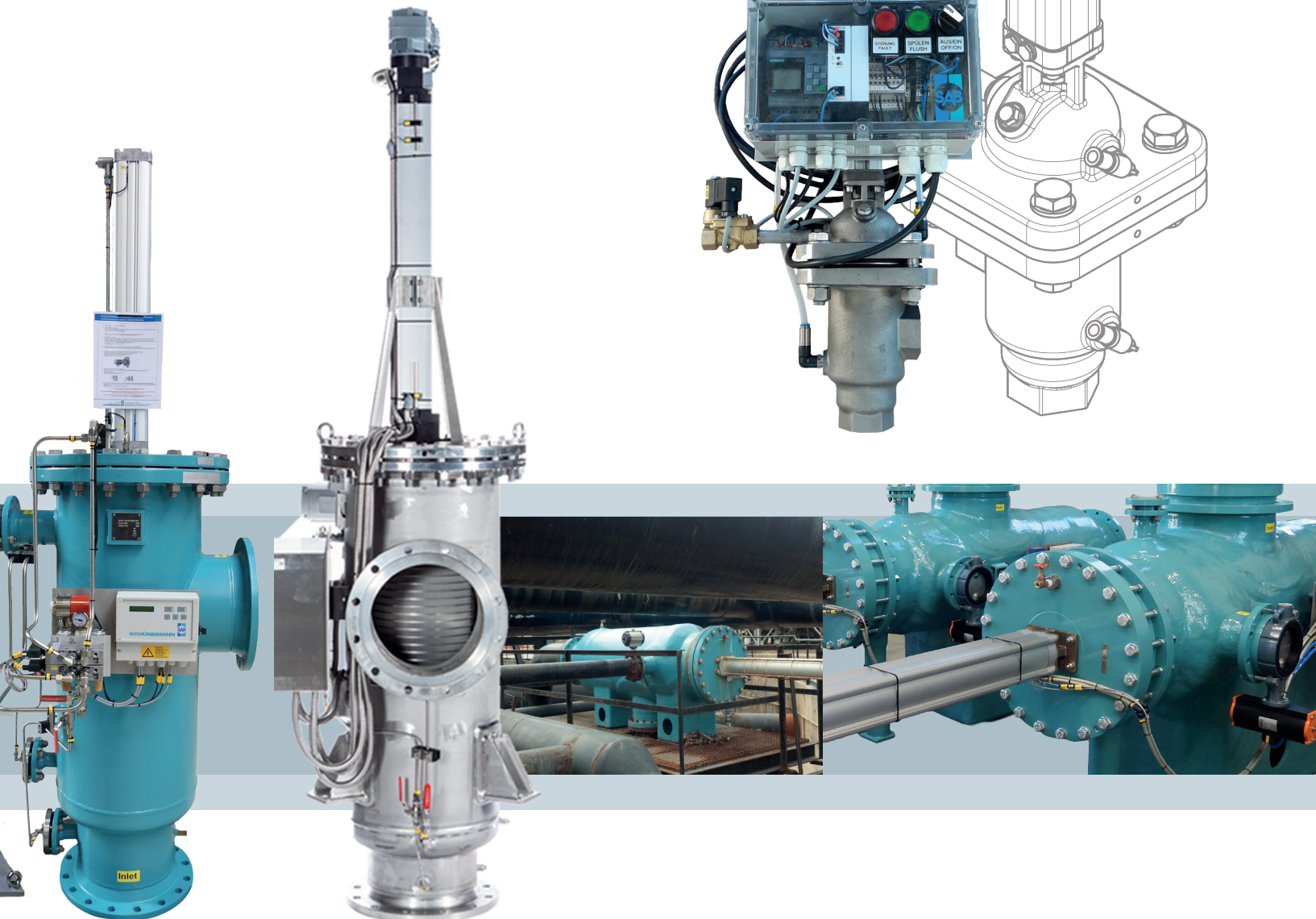
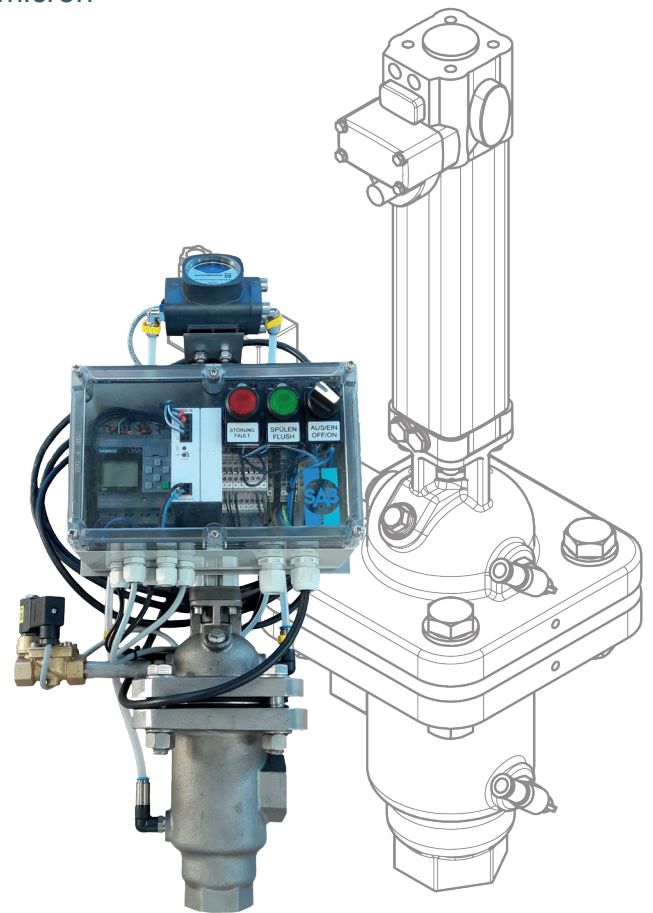


- fully automatic with continuous monitoring of the operation
- time or pressure differential controlled cleaning process
- cleaning of big particles and large pollution loads
- protection against clogging and fouling
- energy cost savings through low pressure drop
- filtration degree as low as 150 micron
- operational as low as 0,7 bar
- pneumatic and electric drives



F450 MINI

- extremely compact design
- flowrates down to 5 m³/h



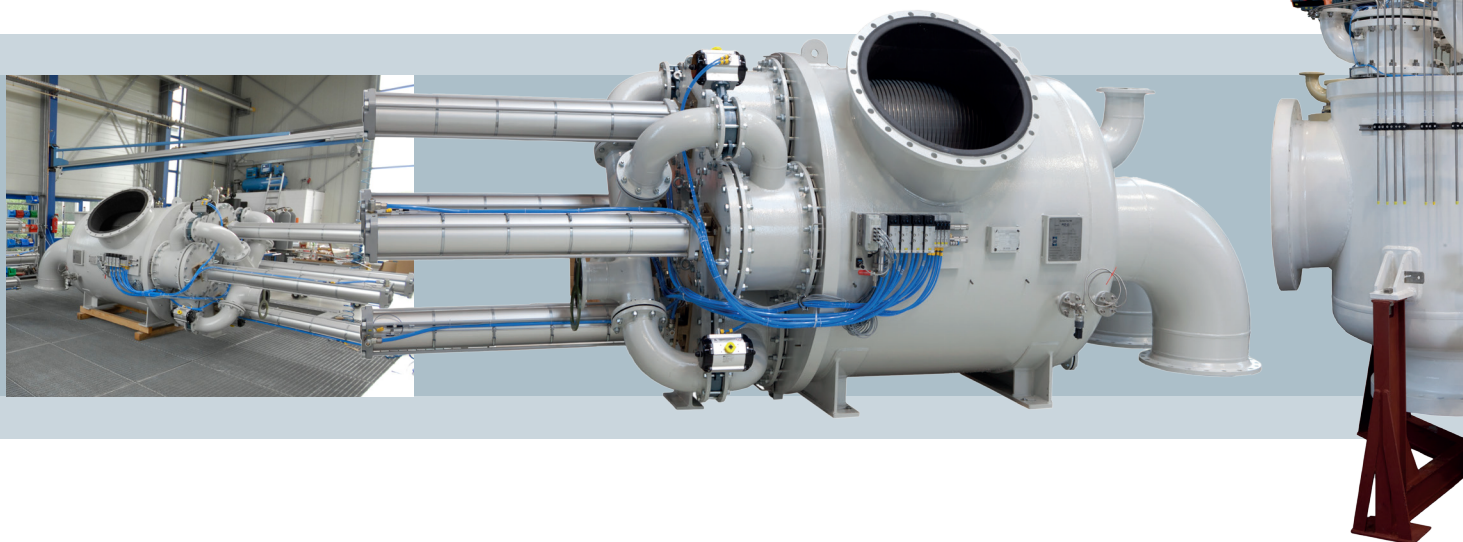
Self-Cleaning Automatic Filter F480

All industry is currently experiencing increasing needs for cooling and processing water. As a result, requirements have grown for greater efficiency in filtration and for protection of downstream plant equipment in general. This success of the F450 filters along with our continual product development has resulted in the patent protected F480 series which truly pushes the boundaries of liquid filtration. The state-of-the-art design delivers the highest available output rates up to 45,000 m³/h and connection series up to DN2000 (80") from a single compact filter.

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.



Self-Cleaning Automatic Filter F480

BENEFITS

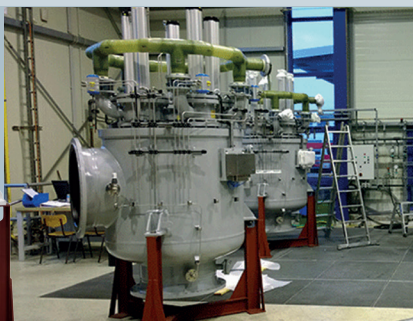


- fully automatic with continuous monitoring of the operation
- cleaning of big particles and large pollution loads
- extremely high flow rates up to 45,000 m³/h
- protection against clogging and fouling
- filtration degree as low as 40 micron
- operational as low as 0,7 bar
- extremely low pressure drop
- higher pressure ratings
- less height, less footprint
- very low backflush rates
- less installation space
- lower piping costs
- easily serviceable



F480 CAST IRON

- first Bernoulli type filter for ballast water treatment
- down to 40 micron



Certification & Documentation

SAB has delivered filters to all industrial sectors. Due to our continued dedication in research and development, we are able to cover a tremendous range of applications. We have gained a good reputation for offering complete solutions to customer problems – regardless of their size.

Our business is built on quality and safety, and our work is governed by the use of the correct materials and monitored control of the manufacturing process. SAB is certified according to DIN EN ISO 9001; ISO 2014:2015 and holds membership in many national and international professional organisations.

PROVEN QUALITY



Pressure
directive
2014/68/EU

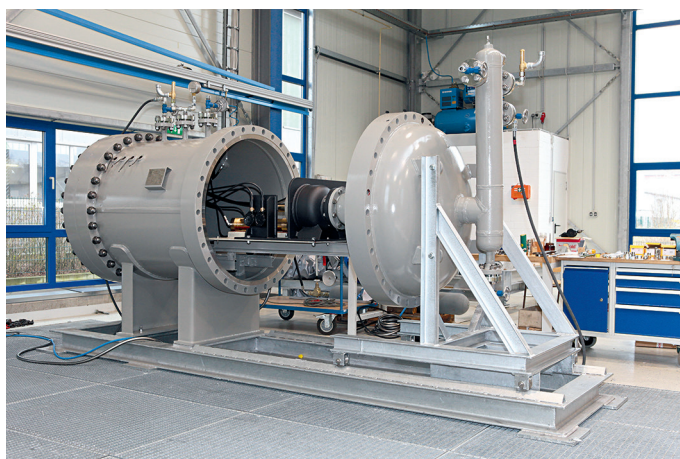


AD 2000
HP-0-Certification



SCC**

INHOUSE RESEARCH & DEVELOPMENT

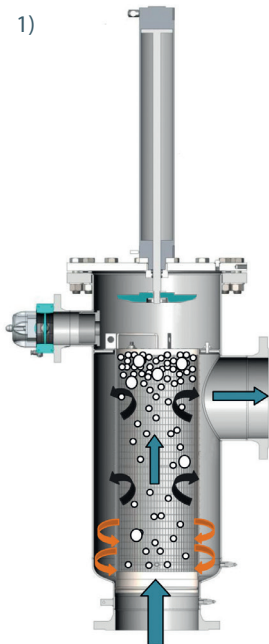


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The Bernoulli - Principle

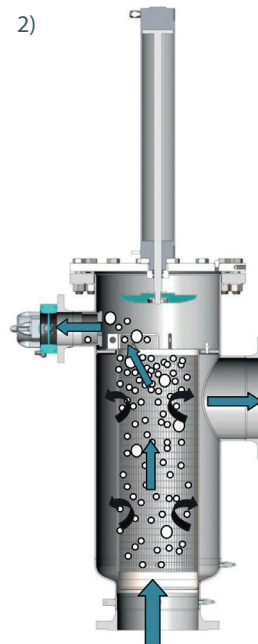
1)



Filtration

As the fluid flows continually through the filter, particulate is trapped against the inner surface of the screen, from top to bottom. The duration of the filtration phase depends on the level of suspended solids in the fluid, the particle distribution and the flow.

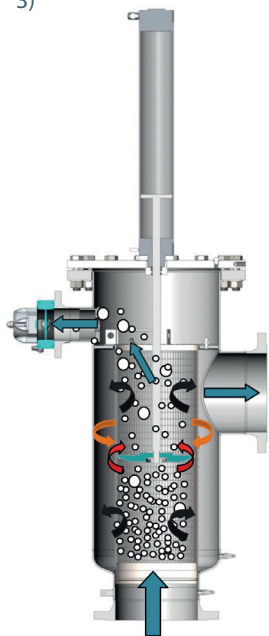
2)



First back flush phase

Cleaning begins automatically according to a timed cycle, or after a high differential pressure signal, by the opening of the back flush valve. Flow is maintained through the filter which continues to clean the fluid, whilst at the same time a % of the fluid loosens larger and easy to remove debris from the surface of the screen and flushes this out of the filter through the back flush port.

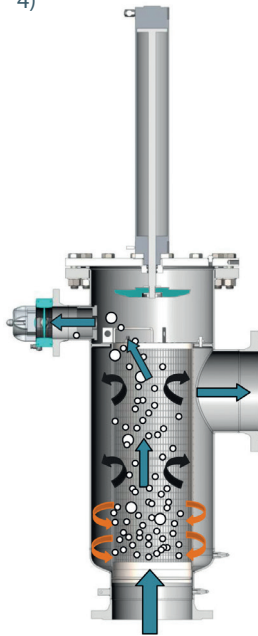
3)



Second back flush phase

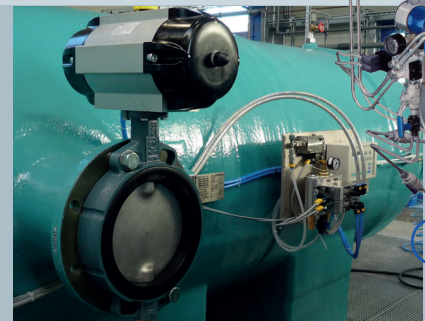
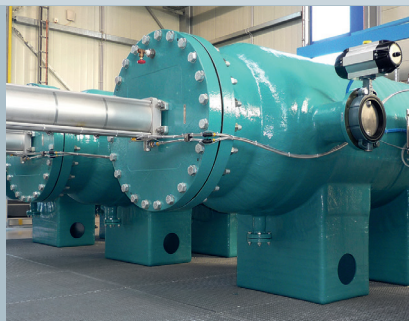
After the initial flush, the concentrated cleaning cycle begins when the flushing disc starts its travel down the inside of the filter screen. As the process fluid is forced to pass in the reduced gap between the inside of the screen and the edge of the disc, the velocity of the fluid increases (Bernoulli's principle). This increased velocity, as well as the reduced pressure drop caused by the back flush valve being open, results in a focused cleaning action as the debris is lifted off the screen and then flushed out of the filter.

4)



Last back flush phase

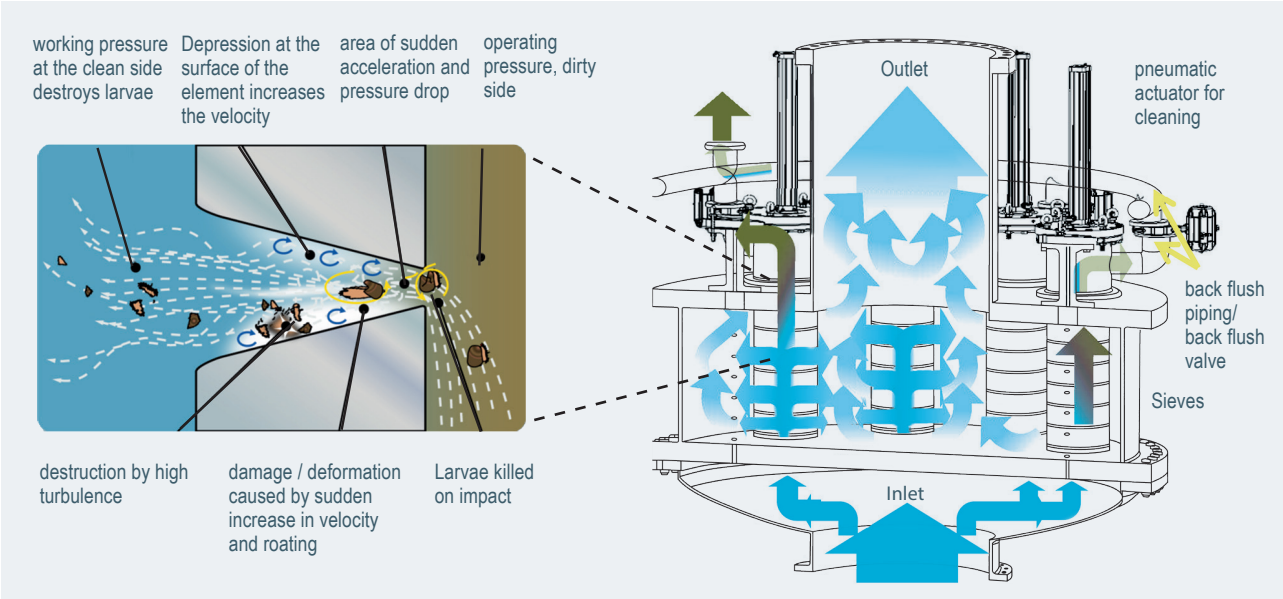
The last third of the screen is cleaned as the flushing disc begins its travel back up the filter. The disc creates a turbulence in the filter and an eddy flow as it travels back which removes any remaining debris. The flow through the filter and the filtration of particulate is maintained at all times and throughout the duration of each cleaning cycle.



F450 automatic filters for a 3 phase desalination/drinking water process

The Bernoulli - Principle

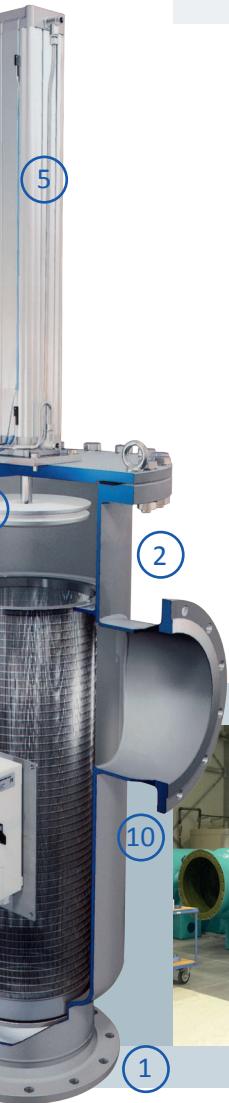
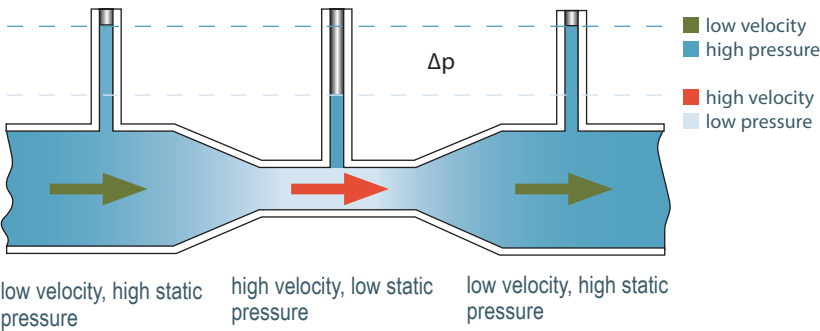
Destruction of mussels and larvae



The Bernoulli Principle:

states that for an inviscid flow, an increase in the speed of the fluid occurs simultaneously with a decrease in pressure or a decrease in the fluid's potential energy. The vertical capillary tube showing the difference Δp of the static pressure.

- 1 Inlet
- 2 Outlet
- 3 Local control panel
- 4 Back flush Valve
- 5 Pneumatic cylinder
- 6 Flushing disc
- 7 Differential pressure transmitter
- 8 Solenoid valve
- 9 Strainer
- 10 Housing



Customised solutions are our expertise

Our F450 and F480 filters can be adopted to your needs by our skilled engineers. We provide different materials for casings, customised control units, flange connections and mesh sizes. With the F480 customisation can be driven to the limit. You can choose pressure drop, backflush rate, orientation of flanges and even the sophisticated control options.



Desalination plants

SAB supplies protection for desalination plants throughout the world.



Offshore rigs

Minimum footprints make the F480 Filter the optimal solution for use on offshore rigs.



Shipbuilding

Filter systems in use for cleaning of sea and river water for onboard equipment – as well for exhausts.



Chemical industry

Protection of plate heat exchangers and in-line equipment against sand, algae, snails and mussels.



Power plants

Continuous cleaning of river and sea water for protection of plants and machinery.



Petrochemical industry

Filtration of sand, algae, snails, and mussels in all kind of waters.



Fishfarming & Ballast water

Due to their small footprint and backflush rate F480 filters are in use on many ships.



Water treatment

The F450 is an extremely reliable filter designed for the harshest environmental conditions.



Refinery

F480 to supply cooling water into the refinery. Reliable, continuous, cost efficient, on smallest footprint.

Service

To keep pace with the increasing number of requests for support with health and safety aspects, as well as ever more stringent environmental controls, all of our service technicians are SCC** approved. We will be pleased to support all of our customers during site evaluations, commissioning and start up activities, as well as with on-the-job training and technical briefings.

Even after successful start-up, at SAB we stand by our customers. Throughout the lifetime of your filter system, you can rely on the support of our worldwide service network whether it be for planned maintenance activities or those unexpected events.



QUALITY • SERVICE • SOLUTION 24/7



F450 & F480 automatic filters *Summary*

- 5,000 m³/h - 45,000m³/h
- nozzle sizes from DN32 (1 1/4") to DN2000 (80")
- pressure rating from 0.7 up to 16 bar
- standard filter levels: 40 µm to 10 mm (finer on request)

MATERIAL ACCORDING ASME / DIN ISO / BS / ATEX

- steel rubber lined and coated
- stainless steel
- Titanium
- GRP
- high corrosion resistance alloys with PREN>42 such as Super Duplex, Uranus and Hastelloy®
- special solutions by customer specification
- flanges according DIN / ANSI / JIS/ etc.

SCREENS

- slotted (Wedge wire) $\leq 1,000 \mu\text{m}$
- perforated and mesh $>1,000 \mu\text{m}$

CONTROL PANEL

- fully automatic
- intuitive handling
- network compatible with remote control option
- several years' data storage capacity

SAB VALUE

- can be used against aggressive media
- reliable protection against blockage and fouling
- destruction of mussels and larvae
- long life cycle thanks to fully automatic operation
- low installation space
- high ease of maintenance

YOUR OPPORTUNITIES

- bespoke design
- customised documentation
- through-life service
- third party certification & inspection