

# Automatic Filter F451

## Functional and Reliable

The F451 filter series from

Georg Schünemann GmbH delivers optimum,  
continuous filtration by using the Bernoulli principle

Quality - made in Germany! Stocked in USA & Canada!



# Self-Cleaning Automatic Filter F451

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 100  $\mu\text{m}$ , our filters protect downstream equipment from clogging, fouling and damage. Applications are widespread, from building technology (HVAC), across industrial production facilities, right up to the largest refineries and chemical plants. SAB's Self Cleaning Filter automatically cleans all low viscosity fluids at high output flow rates. The intelligent use of the Bernoulli principle for the automatic self-cleaning filter enables a vastly longer service life of the system. The new F451 automatic filter series impresses with a significantly more compact design and the first-time use of housing materials made of super austenitic steel. Our state of the art design saves 30 to 40% installation space in comparison with similar filter models. SAB's F451 filters can work with media like river water, process water, salt water and even chlorinated water. For each application, the right combination of austenitic stainless steel (1.4581 (316SS)), super austenitic stainless steel (1.4557) and ductile cast iron (GGG-40) can be provided. All F451 filters can be designed according to PED or with ASME U-Stamp. Schünemann warrants continuous filter operation from a flow rate of 22 (US) GPM, a filter mesh size of 100 $\mu\text{m}$  and an operating pressure of at least 10psi. SAB is setting a new standard in design and cost-effectiveness with the F451 series.



# Self-Cleaning Automatic Filter F451

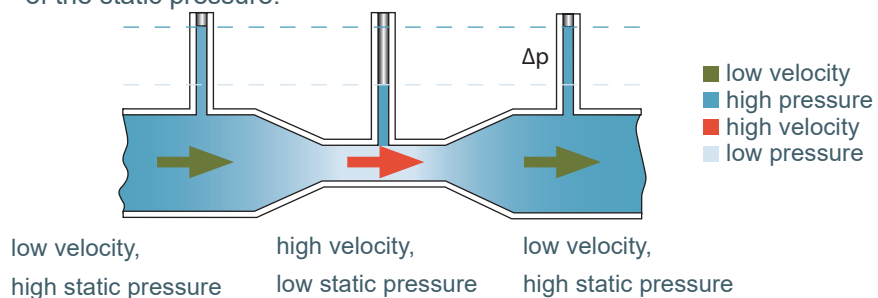
## BENEFITS



- Continuous filtration with automatic cleaning based on the Bernoulli principle
- Flow rates from 22 (US) GPM to 5200 (US) GPM
- Sizes from 1 1/4" to 12"
- Operation pressure from 10psi to 145psi
- GGG40, stainless steel, super austenitic stainless steel
- Screen finenesses from 100  $\mu\text{m}$  to 10 mm

### 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  $\Delta p$  of the static pressure.

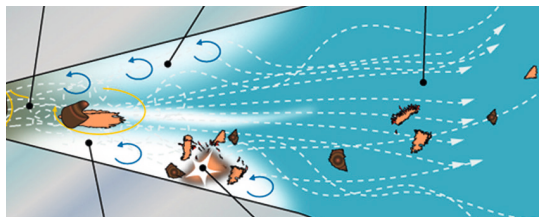


### Mussel and snail larvae:

Area of sudden pressure drop and acceleration

Cavitation-vacuum area with turbulence; greatest velocity

Operational pressure on clean side, with killed larvae



Destruction by hard impact

Damage and deformation by rotation and by sudden increase in velocity

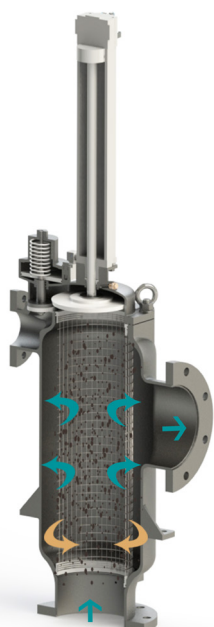
Destruction by vacuum





# The Bernoulli - Principle

1)

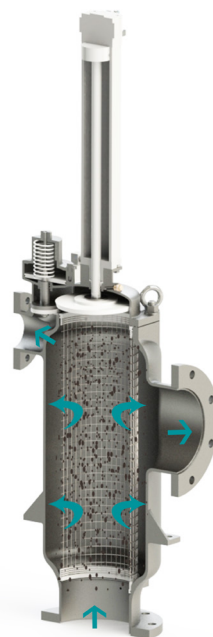


## Filtration

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.

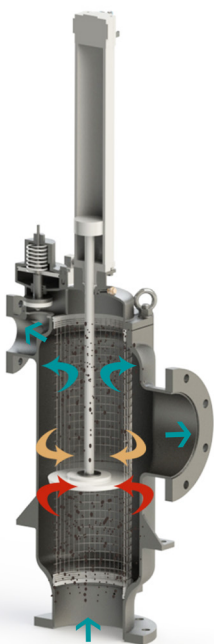
2)



## 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.

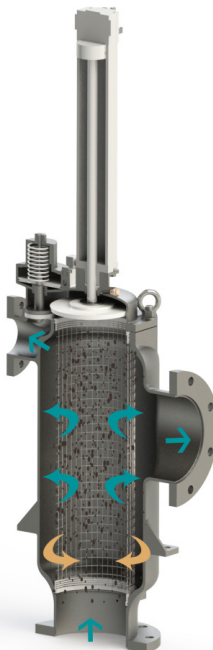
3)



## 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 discs 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.



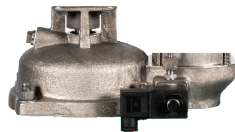


# Components F451

A new patented cover system guarantees easy maintenance of the filters in any position due to decreased weight, screw-in connection and user-friendly piping. A spring-closing backflush valve specially designed for this filter series, a cylinder with integrated solenoid valve and the standard use of slotted-hole screens with more than 50% free screen area... are just some of the many technical innovations of this filter series. A leakage protection system developed by Schünemann in the filter cover prevents water from entering the backflushing cylinder and corroding it in the event of wear. All filters of the F451 series are supplied with a standard **interference-insensitive** PCB controller with LED indicator. This is equipped with inputs/outputs for operation, flushing and error reporting. The filter can also be equipped with any other SAB controller. The cleaning cycle (or flushing) is triggered by a time sequence or a differential pressure signal. The amount of dirt collected on the inside of the screen is measured and shown on an optical display on the differential pressure switch. Filters in the F451 series guarantee reliable protection against clogging and fouling.

## COVER

- Integrated backflush valve, thus no malfunction in power and no chance of compressed air failure
- Integrated leakage safety system
- Simple screen replacement
- No additional height required for screen replacement



## CYLINDER

- Integrated valve/throttle
- Much more compact than other pneumatic cylinders
- Reduced air consumption
- Fewer connections, fewer hoses/pipes
- 316SS or Super Duplex



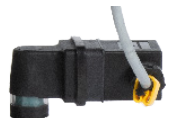
## STRAINER

- Helicoidal welding of strainer element
- No additional welding required
- Standard mesh sizes 100µm, 300µm
- 316SS or Super Duplex



## DIFFERENTIAL PRESSURE SWITCH

- SS or Monel
- Pipe-free mounting
- Differential pressure indication green/red
- Extremely compact



**F451 applications:** Sewage treatment plants – surface water filtration – mineral oil filtration – shipbuilding – ballast water filtration – marine applications



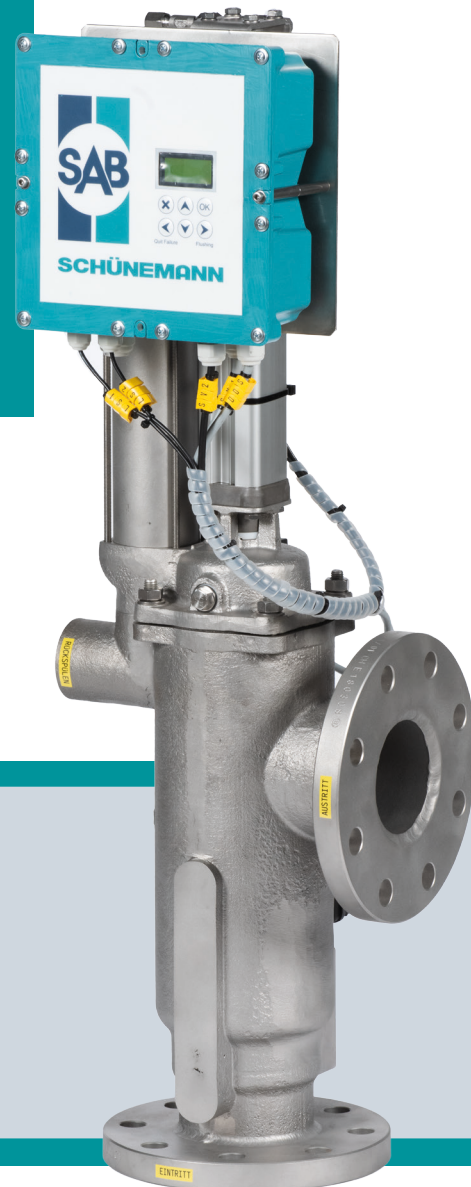
# Components F451 - Local control unit

The SAB Standard Controller regulates all functions of the F451 filters. Parameter entries are made using the keyboard or via the integrated port. It is equipped with a main On/Off button, LCD display and 6 navigation buttons. The filter control unit is installed inside an insulated plastic case with protection IP65. It can be supplied with 24VDC or 240VAC power.

Additionally to the inputs for the differential pressure switch and limit switches, the PLC integrates inputs for external flushing, error quitting and flushing lock - all signals coming from the main control panel. The outputs of the SAB Standard control unit control the solenoid valve and provide operation, flushing and error messages to the main control panel. A MODBUS interface is integrated.

## LOCAL CONTROL UNIT

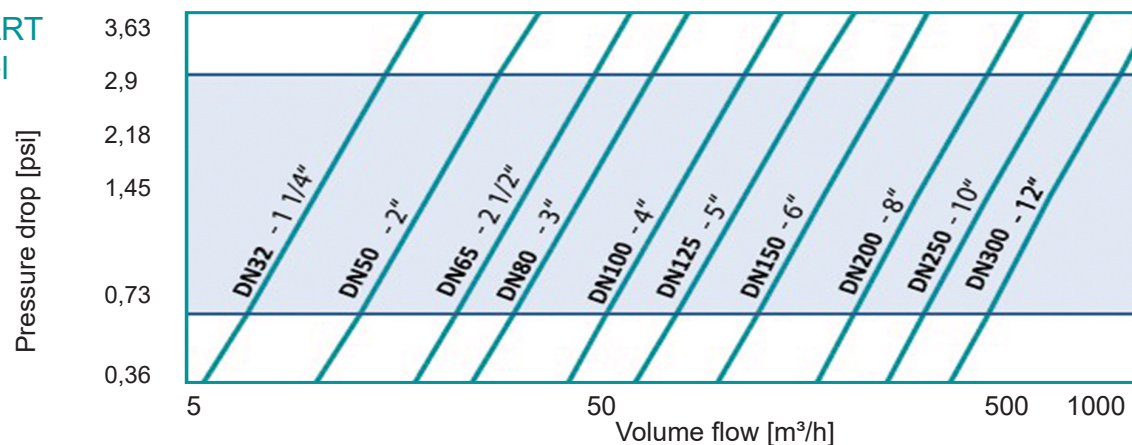
- Size 8" x 8" x 3,2"
- Plastic casting
- IP65
- Display and function buttons integrated
- Inputs: Flushing with pre-flushing, Error quitting, Flushing lock
- Outputs: Operation, Flushing with pre-flushing, Error
- Modus interface
- 24VDC or 240VAC



# Filter design

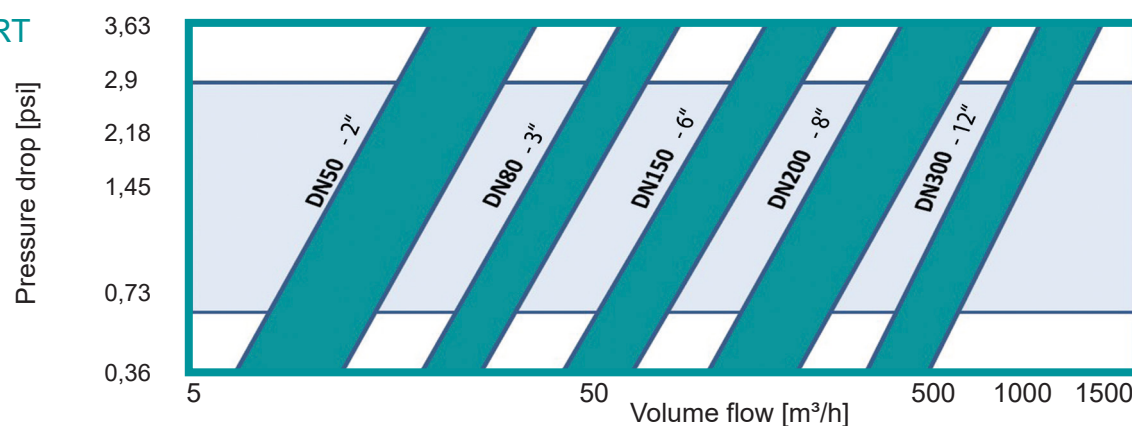
The stainless steel filters (1.4581/SS316) can be used for process water, river water or waste water whereas the super austenitic steel filters (1.4557) are most suited for sea water or chlorinated water. They can be supplied with all common flanges/threaded connections according to EN, ANSI, JIS or others. In addition to this, F451 filters are also offered with Victaulic®/Minimax® coupling connections. All F451 filters can be provided with a ASME U-Stamp or PED conformity certificate. SAB offers the F451 filters in cast iron in standard sizes – 2", 3", 6", 8" and 12"

## DESIGN CHART Stainless steel



SAB offers the F451 filters in cast iron in standardized sizes – 2", 3", 6", 8" and 12" – which cover the entire flow range from 5m³/h to 1200 m³/h, most available off stock. The flanges can be machined acc. to En, ANSI, JIS, etc.

## DESIGN CHART Cast iron



**F451 applications:** chemical industry – petrochemicals  
– automotive industry – power stations – cooling-water  
– industrial processes – desalination-plant protection

