

**BOLLFILTER Automatic
Type 6.18.3**



***Backflushing pre-filtration unit
perfectly adapted to BWT-Systems***

Pre-filtration for BWT-Systems

Due to national and international regulations, equipping seagoing vessels with BWT-Systems is mandatory for ship owners and ship operators. To guarantee the trouble-free function of the BWT-System, a fine filter is installed between the seawater intake screens and the disinfection unit.

The IMO recommendation is to remove organic matters and sediments larger than 50 µm from the ballast water.

The requirements for ballast water filters are diverse and demanding. The filters have to:

- guarantee the required degree of separation with absolute reliability,
- combine the required filter fineness with high flow rates and long service lives,
- resist clogging of filter mesh despite the high occurrence of organisms in ballast water
 - at least 250,000 organisms per cubic metre,
- resist the corrosive nature of seawater,
- be easy to install, retrofit, operate and maintain,
- have a small footprint,
- contribute to keep operating costs of the plant as low as possible,
- have a low height and there be adapted to retrofit
- be capable to handle TSS up to 1,000 mg/l depending on the volume flow.

As stipulated both by the IMO and the USCG, ballast water treatment is mandatory



Organic matters, which are pre-filtered by the BOLLFILTER Automatic Type 6.18.3



Cost-efficient advanced technology for new buildings and retrofits

Between the conflicting priorities of strict legal requirements, tough technical demands and high economic pressure, the BOLLFILTER Automatic Type 6.18.3 constitutes the ideal solution for ballast water filtration.

The BOLLFILTER Automatic Type 6.18.3 is a part of the BOLLFILTER automatic water filter series with operational experience in various industrial applications for more than 40 years.

The housing

The compact filter is manufactured in three parts (inlet, outlet and drain), which allows a perfect adaptation to the different possible installation options.

The variability of the technology and the flange orientation allow an optimized configuration of the ballast water filter for the specific requirements and conditions of the individual application.

A wide series with different housing sizes and nominal diameters of DN 200 to DN 900 means that the filter dimensions can be adapted to a large range of operating requirements. As such, significant cost benefits can be achieved.

Nodular cast iron is used for nominal diameters up to DN 400 and welded carbon steel for larger housings. The housing is internally coated with a seawater resistant lining.

The filter has a very small footprint making it especially suitable for retrofits and new buildings.

Its simple and robust design makes it extremely durable and easy to maintain.

The elements

Filter candle / fine sieve cylinder

The core of the filter is the filter element. According to application and requirements, a filter candle or a fine sieve cylinder can be used, which are made of Super Duplex mesh. The fine sieve filter cylinder element used in cast housings up to DN 400 is a result out of application and market requirements driven by technical Research & Development. The BOLLFILTER Ballast Water concept is a step forward by responding to the market requirements of getting finer filtration.



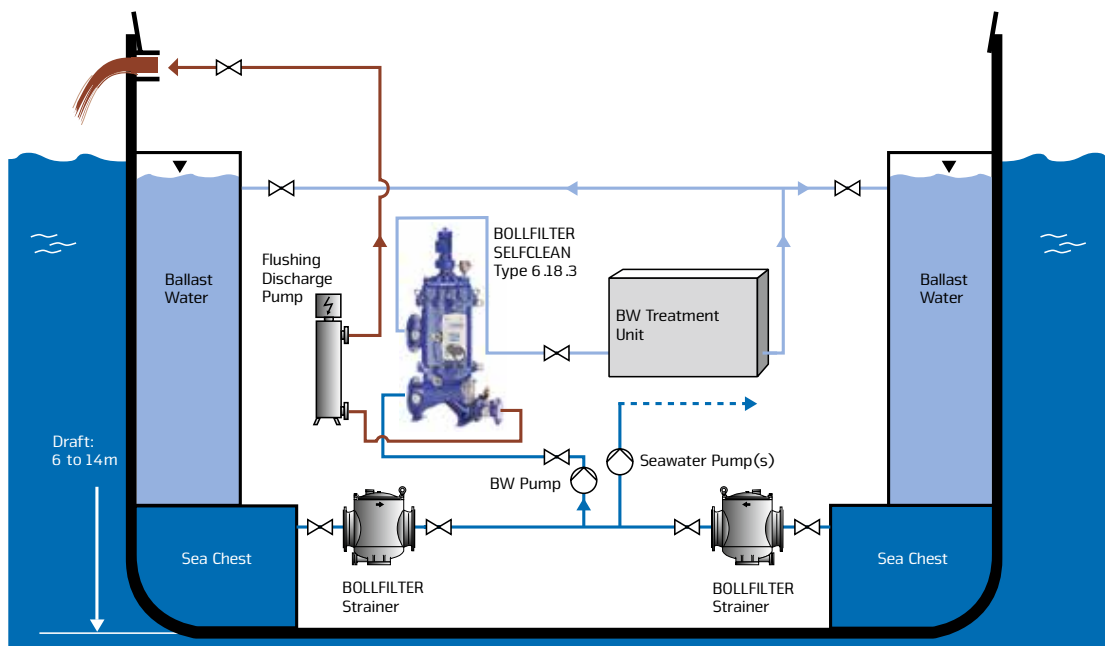
The housing

Filter candle open at both ends



Fine sieve cylinder

Protecting the BWT-System through pre-filtration



Independent lab testimonials

Since 2012, BOLL & KIRCH have been operating its own test bench for Ballast Water filtration at the Flensburg University of Applied Sciences. Thereby, a continuous development is self-evident. Two independent institutes, NIOZ and DHI, were assigned, to test the BOLLFILTER Automatic 6.18.3 concerning TSS-load and biological efficacy performance. Both institutes are approved to certify that the BWT-Systems are in accordance with the US Coast Guard rules and the G8 guideline (IMO).

"Of course, there are physical limits regarding the fine mesh filtration, in particular in the ballast water application. TSS-load, seasonal variation of organic matter, which can vary by a factor of 1000 and water temperature influence the performance of the filter with regards to max. throughput and back flush performance. Although the filter can easily cope with the limits of G8 guideline (IMO 2008) with max. TSS concentration of 50 mg/L, it can struggle when the system is operated in challenging water like Yangtze River. To cope with current high dirt load, throughput should be reduced to help the filter to remain operational."

Karsten Cartarius – Head of R & D



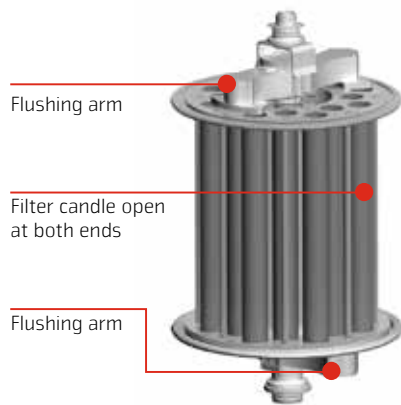
Test rig with two filters installed in parallel and operating with sea water for long-term test series in collaboration with the Nautical and Maritime Technology Institute (INMT) at the Flensburg University of Applied Sciences.



Filtration and backflushing with filter candles

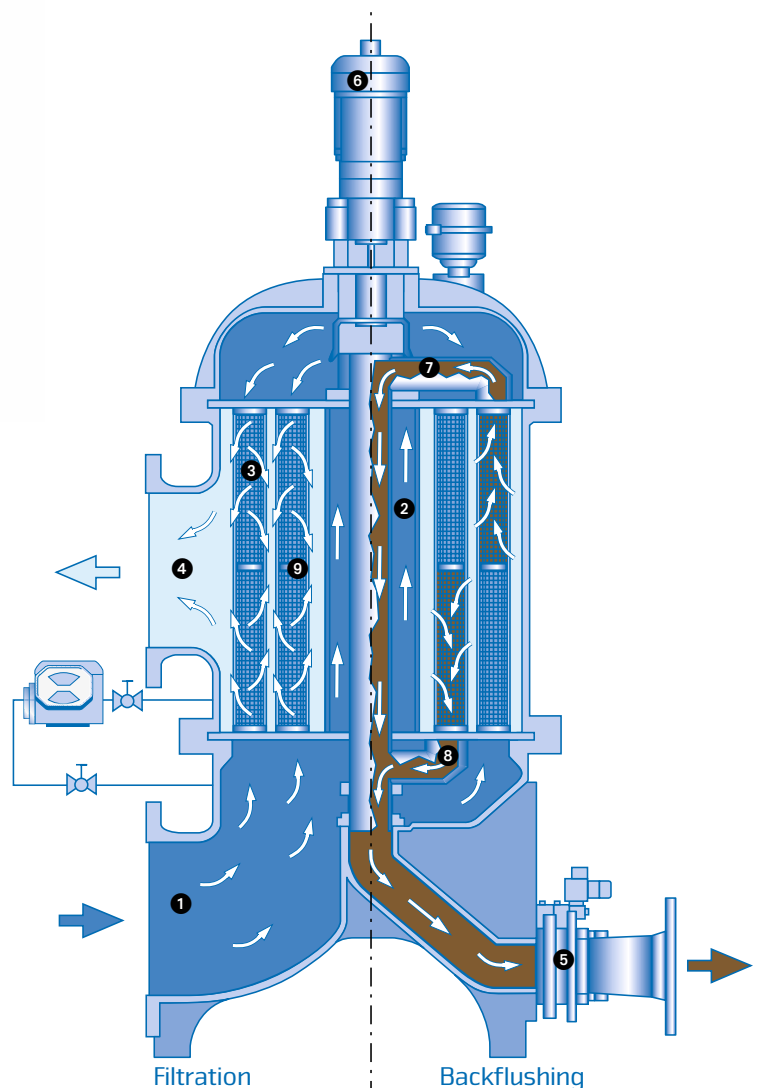
In filtering mode, the seawater to be filtered flows through the inlet flange ① into the housing. A partial flow ② reaches the upper part of the housing via the distance tube and enters the candles from the top whilst the remainder enters the candles from the bottom.

It passes through the two open ends into the filter candles ③ and flows through the filter candles from the inside to the outside. The particles in the seawater are retained on the mesh of the filter candles. The cleaned water ④ reaches the filter outlet. The flushing valve ⑥ is closed. The gear motor is switched off. The particles retained at the filter candles generate an increasing differential pressure between filter inlet and filter outlet. When the differential pressure reaches a certain value, the control box initiates a backflushing cycle.



6.18.3 with filter candles: Fineness 40 and 50 µm			
Filter Type	Nominal Diameter	BWT Pump Capacity in m³/h	Vessel
casted filter	DN 200	370	12000 DWT
	DN 250	500	RoRo
	DN 300	750	38000 DWT
			4800 TEU
	DN 400	1,400	64000 DWT
welded filter			82000 DWT
			10000 TEU
	DN 500	2,100	135000 TEU
	DN 600	2,500	158000 DWT
	DN 700	3,800	180000 DWT
	DN 800	4,600	208000 DWT
	DN 900	5,400	250000 DWT
			and larger

During the backflushing phase, the filter candles are cleaned one after the other via the upper ⑦ and lower flushing arm ⑧. The gear motor turns the flushing arms. At the same time, the flushing valve is opened. This causes a high axial flow within the filter candle and the retained dirt particles are washed off. The seawater flowing over the full length of the filter candles (cross-flow backflushing) transports the dirt particles out of the filter. The Hydrodynamic Element ⑨ placed in the middle of the filter candles causes an increase of the flow velocity. The dimensioning of the internal parts and the additional cross-flow result in highly effective backflushing that guarantees a perfect regeneration of the filter surface. After a preset time and a full rotation of the flushing arms the control switches off the gear motor. The flushing valve ⑤ is closed and the filter is returned to clean condition. Throughout the regeneration phase the full throughput is guaranteed.





Maximum customer focus for maximum satisfaction

BOLL & KIRCH continues to prove its strengths as a manufacturer and supplier longtime after the product has been delivered. As a leading international supplier of marine and industrial filters for filtering fuels, lubricants, coolants and water with a global network of sales and service centres, BOLL & KIRCH has at its fingertips the ideal logistical basis for providing perfect customer support. Naturally, users of the BOLLFILTER Automatic Type 6.18.3 also benefit from the advantages this worldwide network provides – swift delivery, faster availability of technical support and a trouble-free supply of BOLLFILTER Genuine Parts.

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