HiFlux Filtration A/S

Bernoulli Automatic Coarse Filters

0, 2 - 2 mm

The Bernoulli filter is an automatic self-cleaning filter specially designed with a view to filtering water at cooling system inlets or in closed processes. This involves quite specific requirements with regard to choice of materials, strength and structure, as the filter often is installed in very contaminated environments.

The filter is made in such a way that it can remain in continuous operation – the flow is not interrupted during the cleaning process, which is why it is not necessary to install a secondary filter in the circuit. The filter also has a very low pressure requirement for operation (from 0.3 bar).

The unique use of the Bernoulli principle means that the filter shows a practically constant pressure loss during operation. Other filters will typically have an increasing pressure loss between cleaning processes. As this is not the case for the Bernoulli filter, the flow through the cooling system will be more even, resulting in better energy conditions and simpler control.

The filter is designed with good anti-corrosive properties. The filter housing is made from stainless acid-proof EN 1.4404 steel, PVC or fibreglass. The filter strainer is made from EN 1.4404 or titanium. This makes the filter particularly suited for filtration of even sea water or brackish water at high temperatures and for installations in such environments.

At the same time the Bernoulli filter is compact and can be installed directly on the pipeline. Horizontal or vertical installation of any type is also possible.

The filter is used wherever there is a need for filtration in connection with cooling water intake from the sea, lakes, rivers or ports. The filter can also be fitted on recirculating cooling systems with advantage, in order for heat exchangers, pumps, valves and other equipment to be protected against destructive or blocking particles and dirt.

See also **Heco Autoline**, **Heco AKS** and **Heco KS** filters for automatic self-cleaning filters.

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The cleaning process is initiated when a pressure drop which is measured locally in the filter exceeds the reference value. Monitoring is carried out by a controller on the basis of the philosophy that the filter should be automatic as far as possible. This means, among other things, that an automatic engagement of the filter is initiated when the power returns after a power failure. The filter can therefore be left unattended, as it will provide an alarm signal when inspection is required.

The cleaning process is also controlled by a timer function, which, in case the internal pressure drop has not given a signal for cleaning, activates a flushing process. This prevents dirt particles from having the opportunity to stick into the filter and makes continuous operation possible.

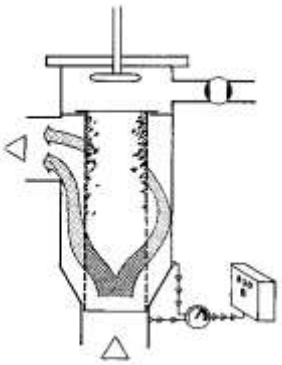

Fig. 1 shows the filter in a normal operating situation. The flushing valve is closed and the cleaning plunger is drawn right back from the filter strainer. The dirt will mainly collect in the upper part of the filter strainer where the filter outlet is located. During operation the dirt zone will move towards the filter inlet. It will not be possible to register an actual change in the differential pressure across the filter until the dirt has reduced the free filter area to less than the inlet area. The internal pressure drop will then already have registered that the filter is dirty and activated the cleaning process.

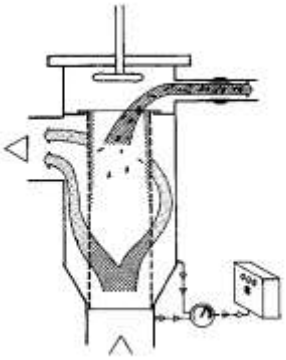

Fig. 2 shows the first phase in the cleaning process. This is where the flushing valve opens, and large particles are flushed out. The cleaning process is initiated by the internal pressure drop or after a pre-set minimum time interval between flushes.

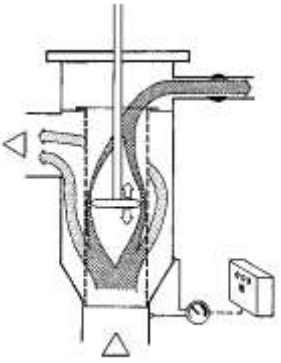

Fig. 3 shows the second phase of the cleaning process. This is where the plunger is moved into the strainer twice. The plunger does not touch the sides of the filter strainer, but creates a gap increasing the water speed. This means that a local negative pressure occurs at the plunger, the direction of the liquid is reversed locally and dirt particles are flushed away from the surface of the filter strainer.

The principle works as if the surface is vacuum-cleaned. The loosened particles are flushed out through the sludge outlet.

As the plunger does not touch the filter strainer, no wear occurs on these parts. The filter is also made with a minimum of moving parts, which reduces the requirement for service and maintenance significantly.

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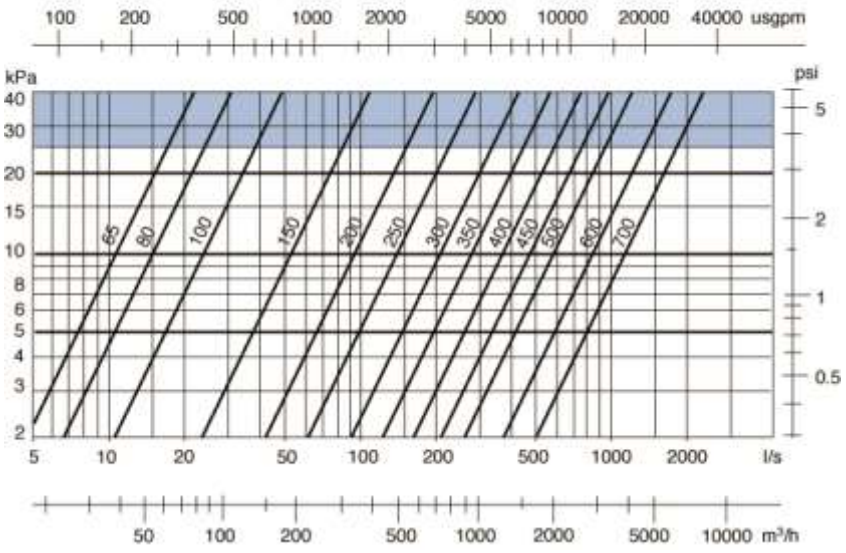
Data

Particle size:	40 mm max.
Flange connection:	According to EN 1092-1 PN10
Material strainer:	Acid proof stainless steel EN 1.4404, Duplex or Titanium
Degree of filtration:	Stainless acid-proof: 0,2 - 0,3 - 0,5 - 1,0 - 2,0 mm Titanium: 1,0 - 1,5 - 2,0 mm Duplex: 0,3 mm
Flushing valve:	PVC or EN 1.4404 valve with compressed airactivator
Plunger drive:	Compressed air cylinder EN 1.4404
Supply:	Power: 230 VAC 50/60 Hz Air: 6 bar, filtered
Functions:	Electronic controller, built-in differential pressure switch, time-controlled bypass coupling, double monitoring system
Signal outlet:	Filter in operation, cleaning progress, error alarm



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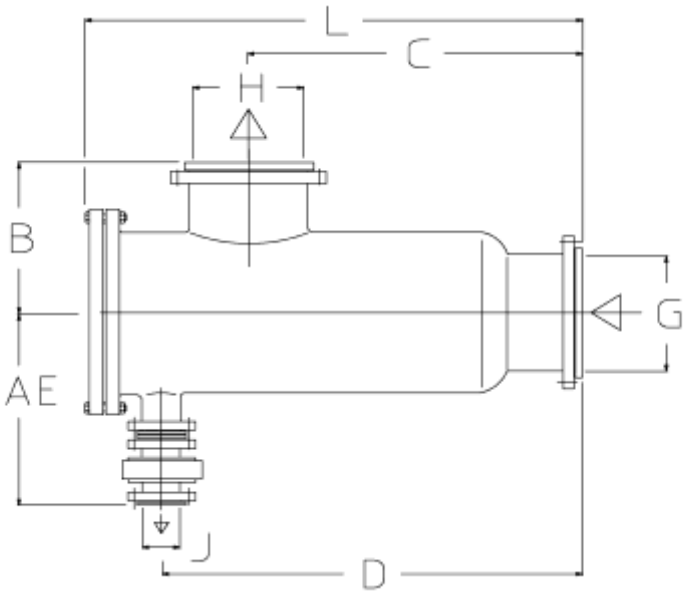

The filter is supplied complete with a strainer, electronic controller, solenoid valves for controlling the flushing valve and cylinder, flushing valve and differential pressure switch. The filter accommodates current standards and norms for pressure vessels, complies with the EMC Directive and is CE-labelled.

The system pressure requirement for operation is from 0.3 bar.

Filter type	Flow capacity		Dimensions (mm)								Weight
	Max flow	Flush flow									
	(l/s)	(l/s)	AE	B	C	D	L	FS	G/H	J	(kg)
Filterbody in PVC											
BSP 65	17	2	102	205	300	390	480	330	DN 65	BSP 1"	12
BSP 80	23	3	330	235	385	490	650	470	DN 80	DN 40	17
BSP 100	36	4	335	275	440	550	735	470	DN 100	DN 40	24
Filterbody in GRP											
BSG 100	36	4	397	200	385	495	630	470	DN 100	DN 40	18
BSG 150	83	9	452	275	530	675	830	650	DN 150	DN 40	40
BSG 200	145	17	533	350	705	880	1100	700	DN 200	DN 50	60
BSG 250	235	26	403	400	825	1050	1270	1000	DN 250	DN 100	105
BSG 300	325	37	453	475	1000	1260	1500	1100	DN 300	DN 100	160
BSG 350	450	50	453	475	1100	1380	1650	1200	DN 350	DN 100	180
BSG 400	580	67	503	600	1240	1540	1800	1200	DN 400	DN 100	300
BSG 450	735	85	553	650	1450	1770	2050	1650	DN 450	DN 100	500
BSG 500	910	105	658	700	1600	2050	2350	1650	DN 500	DN 150	550
BSG 600	1300	150	708	900	1800	2250	2650	1800	DN 600	DN 150	850
BSG 700	1770	200	808	850	2250	2750	3250	2150	DN 700	DN 150	1300
Filterbody in EN 1.4404											
BSS 80	23	3	252	165	340	455	590	460	DN 80	BSP 1 1/4"	30
BSS 100	36	4	302	175	350	465	600	460	DN100	BSP 1 ½"	37
BSS 150	83	9	352	250	500	650	800	700	DN 150	BSP 1 ½"	90
BSS 200	145	17	388	300	630	810	980	700	DN 200	BSP 2"	140
BSS 250	235	26	378	350	750	975	1175	1000	DN 250	DN 100	210
BSS 300	325	37	433	380	900	1160	1370	1100	DN 300	DN 100	270
BSS 400	580	67	513	450	1050	1350	1600	1250	DN 400	DN 100	550

Filter type	Material	Design pressure	Max operating tem
BSP	PVC	10 bar	40^0 C
BSG	GRP (polyester)	10/6 bar	60^0 C
BSS	EN1.4404	10 bar	80^0 C

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