



## ALF - Alfa Laval Filter

Filtration for cooling systems using low-quality water



Closed-loop cooling systems where the secondary circuit is cooled using inexpensive water from the sea, lakes or rivers are widely used in many industries.

Such installations require large quantities of clean cooling water. With an ever-diminishing supply of high-quality cooling water, the need for cost-effective solutions to eliminate clogging, fouling and corrosion becomes ever-greater. In a cooling system incorporating a heat exchanger and an Alfa Laval Filter, even polluted or corrosive water can be used to cool the most sensitive process equipment.

The Alfa Laval Filter (ALF) operates as an integral part of a cooling system to remove debris that can foul and clog plate heat exchangers, tubular condensers, cooling tower spray nozzles or any similar equipment. In spite of effective screening at the water intake, mussels, seaweed and other forms of marine life can settle on the heat transfer surfaces. Conditions are ideal for the growth of these forms of life and they multiply rapidly as a result. This causes less effective heat transfer and possibly the complete breakdown of heat exchangers or other equipment.

If these kinds of blockages are severe, measures such as pesticides or chlorination are often no longer sufficient. In some cases these cannot be used because they are prohibited by environmental legislation.

This is where Alfa Laval Filter technology comes in. It protects a wide range of sensitive equipment from clogging and fouling, and prevents blockages in the cooling water system. An Alfa Laval Filter removes debris and marine life, and is automatically backflushed at regular intervals to keep it clean.

Several thousand ALF filters are in operation in cooling systems around the world. Characterized by its effectiveness, fully automatic operation and low maintenance requirements, ALF filters have become popular in many different applications including power plants, processing industries, district heating, sea vessels and comfort cooling systems

## Operation and design

The Alfa Laval Filter is a pressure filter with an automatic flushing arrangement. The design features a pressure vessel casing made of stainless steel (ALF-S), fibreglass reinforced polyester (ALF-P) or rubber-lined carbon steel (ALF-R and ALF-B). Along with other wetted parts, the internal cylindrical filter basket is usually made of stainless steel, super stainless steel (SMO) or titanium.

ALF-B is a standardized model aimed at tasks where special options are not required. Just as the other models it offers reliable protection for your heat exchangers and fully automatic operation (backflushing).

Apart from the standard range of ALF filters, we can supply special versions that can handle pressures up to 16 bar and temperatures up to 100°C (212°F). We also provide N and U stamp certificates.

The filter system is available with connections ranging from 100 mm/4" to 800 mm/32" and is designed to be placed directly in the pipe system. ALF filters can be installed in almost any position, horizontally or vertically thanks to the flexible nozzle orientation and because the automatic regeneration process is run by the inlet pressure.

The inlet is placed at one end and the main outlet at a 90° angle, making it suitable for installation on any 90° pipe bend close to the equipment to be protected. The inspection/service opening is placed on the opposite side of the inlet, providing easy service access with no need to remove the pipe connection.

Backflushing is carried out automatically at regular intervals without interrupting the filtering process. The flushing valve and a flow diverter valve are controlled by a PLC in the control panel, which can be installed close to the filter.

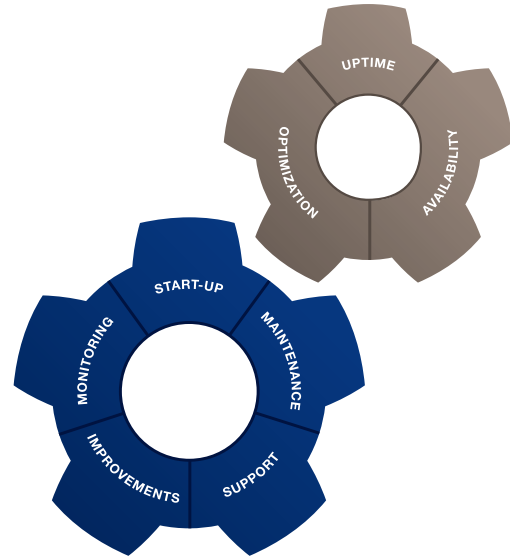
The filter is divided into two sections by the flow diverter valve, the inlet section and the outlet section. A flushing valve for discharging the debris is located at the end of the outlet section.

## Installation

ALF units can be installed upstream of heat exchangers with shut-off valves placed upstream of the filter and downstream of the heat exchanger. This enables flexible servicing if many units are installed in parallel – for instance in a duty/standby installation or when installed on a bypass pipe, allowing the filter to be taken out of service separately.

Depending on pipe dimensions, flow rate and permissible pressure drop, one ALF filter can be installed to protect several heat exchangers. The filter(s) should preferably be mounted close to the heat exchanger(s) in order to minimize the risk of biological growth in the pipe system connecting the components.

We recommend connecting the flushing outlet to the heat exchanger outlet when possible, and returning the debris to the natural water source. It is important that the filter is installed downstream of the feed pump(s), operating as a pressure filter.



## Extending performance with the Alfa Laval 360° Service Portfolio

Our extensive service offer ensures top performance throughout the lifetime of your Alfa Laval equipment. Excellent availability of parts and the commitment and expertise of our team bring you peace of mind.

### Start-up

- Installation
- Installation Supervision
- Commissioning

### Maintenance

- Service kits and spare parts
- Preventive maintenance
- Repairs

### Support

- Troubleshooting
- Telephone support
- Training

### Improvements, monitoring

- Equipment upgrades
- Replacement and retrofit

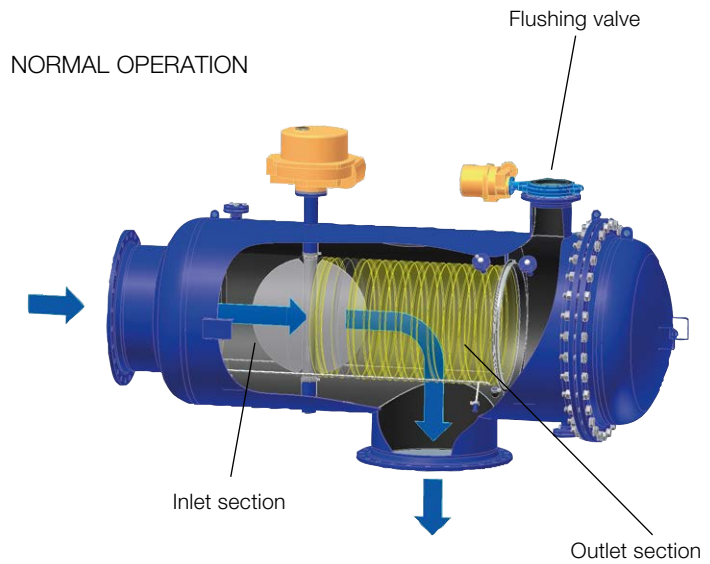
We can also create a Performance Agreement – a customized service agreement for you that includes any or all of the above services..



Standard control panel with PLC for one filter. Alternative configurations are available for controlling multiple filters. Options for remote control or high protection classes, such as ATEX, are also available.

### Normal operation

During normal operation, liquid passes through the inlet into the filter basket. The flow diverter valve is open and the flushing valve closed. The liquid passes through the filter basket prior to being discharged at the main outlet.



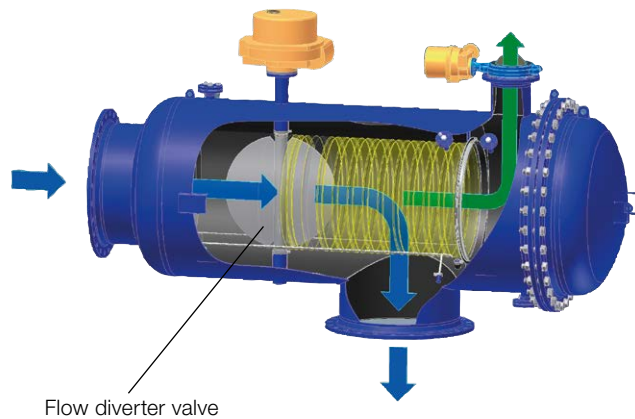
### Regeneration

ALF units can be cleaned either automatically, using a timer, at predetermined intervals, or manually by pushing a button on the control panel. An optional differential pressure control system is available as a back-up and for monitoring the filter status.

#### 1. Primary flushing

The flushing valve opens, reducing the pressure drop and increasing velocity and total flow through the filter. Any debris sticking to the filter basket is dislodged and flushed out through the flushing valve. The velocity of the liquid is sufficient to remove any debris embedded in the inlet section of the basket.

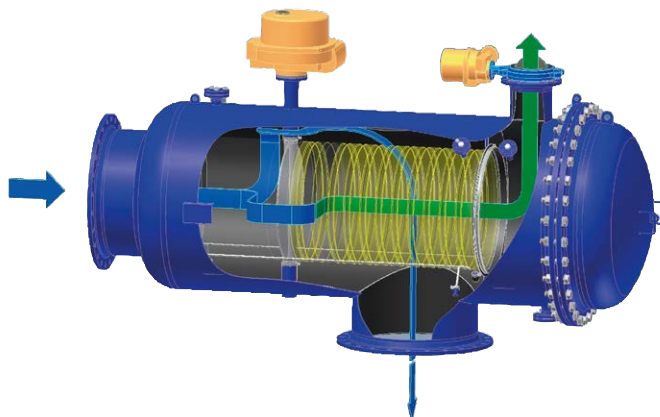
REGENERATION – primary flushing



#### 2. Secondary flushing (backflushing)

The flow diverter valve closes while the flushing valve remains open. The flow is diverted and forced to pass through the filter basket in the inlet section. The majority of the liquid is discharged through the main outlet, but the pressure in the filter draws part of the flow from the exterior to the interior of the outlet section. This provides a backflushing effect in this section of the filter. Any dislodged remnants are discharged through the flushing valve.

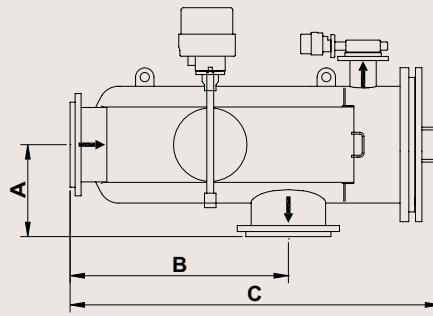
REGENERATION – secondary flushing (backflushing)



## Dimensions



ALF-R with filter casing made of rubber-lined carbon steel

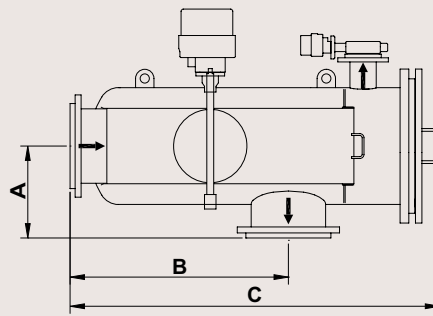


### ALF-R

	A	B	C
ALF 20R	325	720	1,230
ALF 30R	425	950	1,610
ALF 40R	496	1,150	1,961
ALF 50R	600	1,400	2,380
ALF 60R	700	1,650	2,605
ALF 80R	905	2,080	3,720



ALF-S with filter casing made of stainless steel

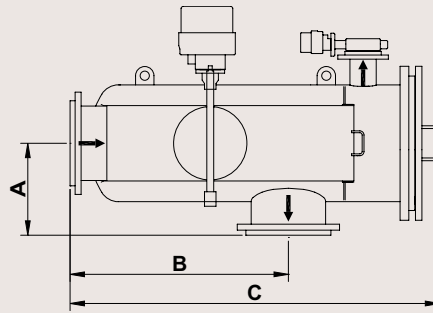


### ALF-S

	A	B	C
ALF 10S	175	450	740
ALF 15S	250	595	975
ALF 20S	300	720	1,180
ALF 30S	400	950	1,610



ALF-P with filter casing made of fibreglass reinforced polyester

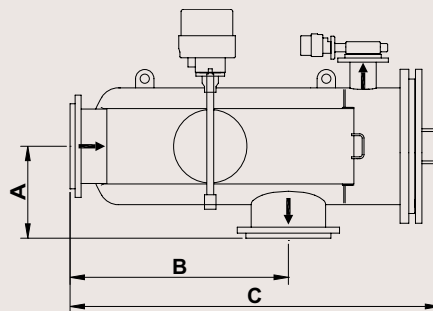


### ALF-P

	A	B	C
ALF 10P	250	530	890
ALF 15P	300	685	1,150
ALF 20P	350	840	1,400
ALF 30P	520	1,130	1,820
ALF 40P	570	1,150	2,110



ALF-B with filter casing made of rubber-lined carbon steel



### ALF-B

	A	B	C
ALF 10B	146	411	696
ALF 15B	210	567	948
ALF 20B	242	649	1,107
ALF 30B	340	852	1,454

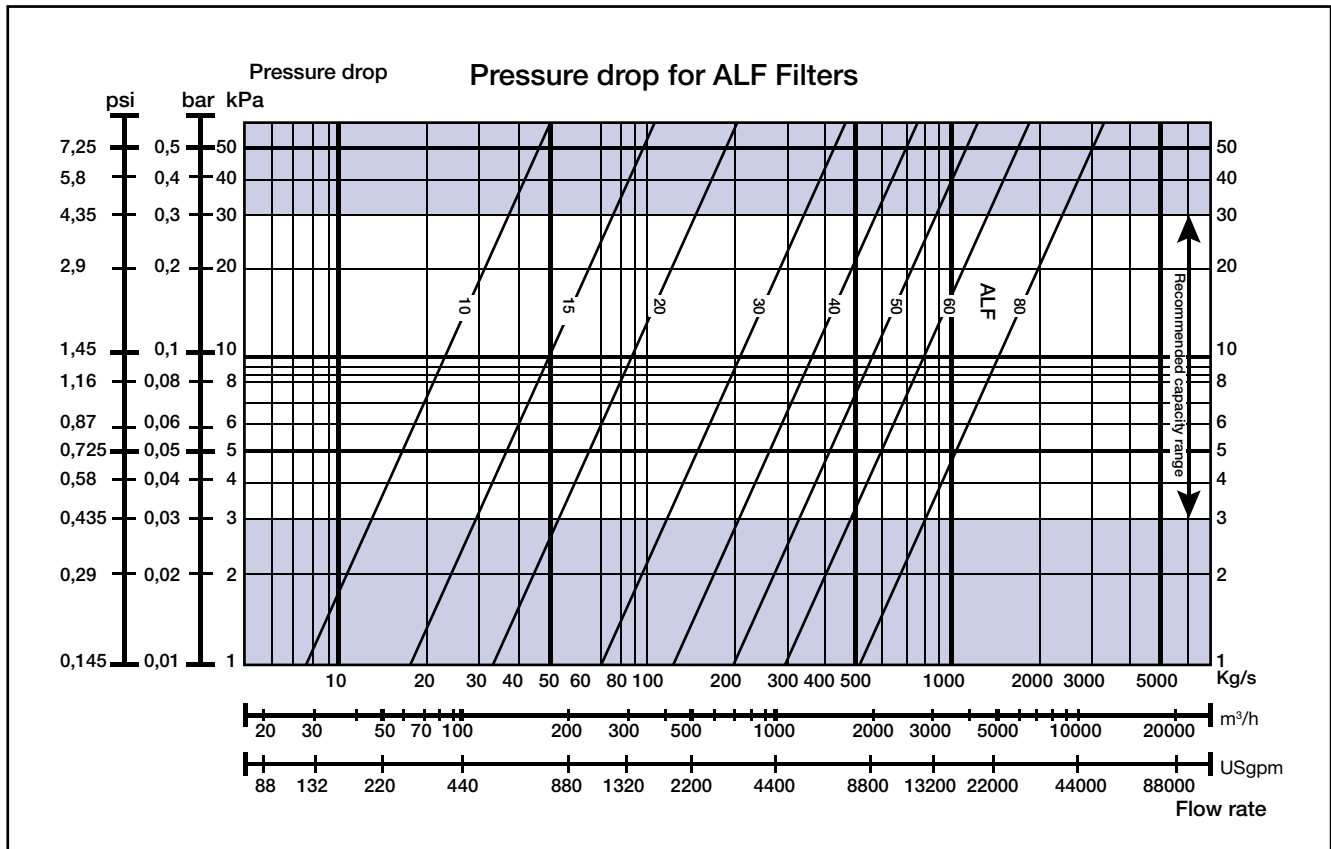


Fig. 3 Recommended pressure drop and capacity range

**Technical data**

Connections	EN 1092.1/PN10 ANSI B16.5/B16.47, B series, # 150	DN100-DN800 4"-32" DN100-DN800
Operation	Pneumatic, electric	Actuator controlled valves
Mesh size	Perforated plate design (Ø hole) Wedge wire design (slot size)	1.0-1.5-2.0-2.5 mm 0.1-0.3-0.5-1.0 mm
Materials	Filter body (ALF-R) Filter body (ALF-S) Filter body (ALF-P) Filter body (ALF-B) Internal parts (wetted) Internal parts (wetted) Internal parts (wetted)	Rubber-lined carbon steel EN P265 GH/ASTM A516 Gr60 Stainless steel EN 1.4404 ASTM 316L Fibreglass reinforced polyester (GRP/FRP) Rubber-lined carbon steel P355GH / ASTM A516 Gr 70 Stainless steel EN 1.4404 ASTM 316L Super stainless steel, EN 1.4547 / ASTM S31254 (SMO) Titanium, EN 3.7025 / ASTM B265 Grade 2
Design code	EN13445 / ASME VIII, div.1/div.2	ALF-R / ALF-S
Design code	ADM N1	ALF-P
Design code	EN13445	ALF-B
Design pressure	10 bar (g) / 150 psi	Alternatives on request
Design temperature	60°C / 149°F	Alternatives on request
Control panel	PLC-based	Power supply: 1~ 110-230 V, 50-60 Hz
Required service area	X x Y m (Z x W ft)	

**How to contact Alfa Laval**

Up-to-date Alfa Laval contact details for all countries are always available on our website at [www.alfalaval.com](http://www.alfalaval.com)