



Alfa Laval 180 Filter

Automatic oil filtration

Introduction

The Alfa Laval 180 fuel, lubrication and hydraulic oil filter is an automatic self-cleaning disc-type filter, engineered to meet the demanding expectations of designers, builders, and operators of diesel engines. Whether for propulsion, auxiliary or emergency power generation, for land or marine applications, the Alfa Laval 180 filter offers a low-pressure drop, highly compact and reliable continuous fine filtration performance.

Application

The Alfa Laval 180 range builds on the innovating Alfa Laval Atrium 2.0 technology for automatic self-cleaning filters. It allows continuous back flushing of the filter mesh with virtually no pressure drop and enables a large filtering area using less space than traditional automatic back flushing filters. Further improvements to the distribution system enhance the back flushing efficiency.

The Alfa Laval 180 range is available for the following filtration duties:

- Fuel oil filtration
- Four-stroke engine lube oil filtration
- Two-stroke engine hydraulic control oil filtration

Benefits

Compact protection

With its large filtration area and small footprint, the Alfa Laval 180 filter provides genuine fine filtration in a variety of applications to efficiently safeguard engine operation. Each configuration is designed in line with each application's specific challenges to bring space savings where they matter most.

Easy Installation

Whatever the application, the essential functions and options of the Alfa Laval 180 filter such as a bypass filter with change-over valve assembly, a secondary filtration stage to remove pollution or even fluid heating capabilities are neatly integrated into the product. The product can be installed and commissioned rapidly with very little or no hot work.



Easy Integration

Requiring no ancillaries such as compressed air, external tanks, and often no external power supply, the Alfa Laval 180 filter can be quickly integrated into existing installations and new build designs alike with minimal effort. By design, the 180 filter is fully integrated into the Alfa Laval Adaptive Fuel Line and communicates with the Alfa Laval Fuel Line Commander.

Minimal pressure drop

The Alfa Laval 180 filter, derived from the Atrium technology, is designed to generate as little pressure drop as possible. The oil pressure to the downstream system – fuel injection pumps, FIVA hydraulic control oil systems, engine main lubrication oil system – is kept constant for a safe and steady operation.

Low and predictable maintenance

The large filtering area and continuous backflushing protect the filter mesh from early wear, thereby lengthening the maintenance intervals. Users can easily plan for routine preventive inspections at regular intervals with full peace of mind.

The small number of parts and the leak-proof change-over unit make maintenance operations safe, quick, and easy.

Design

All products of the Alfa Laval 180 filter range are engineered for the same objective: very fine particle filtration with virtually no pressure drop. The Atrium 2.0 technology gives the best footprint-to-filtering surface ratio available on the market.

Highly adaptable, the 180 range can be configured as engine-mounted filters, or even integrated into the engine housing for virtually no footprint. The duplex configuration includes a redundancy filter which can be easily put in operation during maintenance or for routine oil polishing operation by actuating the integrated change-over valve.

Disc-shaped filter elements

The main components of the Alfa Laval 180 filter are patented disc-shaped Atrium 2.0 filter elements (Figure 1) assembled into a disc stack. One filter element is comprised of two identical halves.

Ribbed aluminium filter frame

Each half includes a stack of filter media housed in an aluminium frame with ribbed sections (Figure 2). The filter media has three layers: two outer layers to provide support and fatigue resistance and a filter layer in the middle.

Wide opening for oil inlet and outlet

The Alfa Laval Atrium 2.0 technology also features a special arrangement of the filter mesh for wider openings at the inlet and outlet than conventional filters. These openings smooth the passage of oil through the filter (Figure 3).

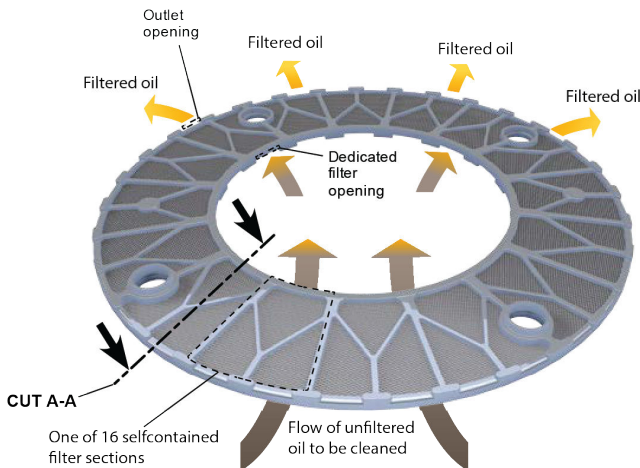


Figure 1. half of one 180 filtration element

High-efficiency redundancy filter

The redundancy insert designed specifically for the Hydraulic Control Oil application has a high retention capacity for very small particles, exceeding the specifications of MAN Energy Solutions while maintaining low pressure drop.

Operating Principle

For fuel oil used in two- or four-stroke engines

Unfiltered oil is transferred from the fuel supply system by means of a circulation pump, through a heat exchanger and on to the fuel oil filter. The filtered oil then passes on to the engine's fuel injection system. Back flushed fuel oil is treated for particle removal in the integrated secondary filtration stage and is then returned upstream of the pumps, typically into the mixing tank. The sludge collected in the secondary stage is periodically removed by way of an automatic drain valve.

For lubrication oil for four-stroke engines

Unfiltered oil is transferred from the sump by means of a pump, through a heat exchanger, and on to the lubricating oil filter. Filtered oil then passes to the engine. Back flushed oil is re-circulated to the sump. For highly efficient sludge removal, an optional sludge removal centrifuge, can be installed on the back flush line. Oil cleaned in the centrifuge is then transferred to the oil sump. This is the Alfa Laval Eliminator concept, proven to remove contaminants at up to four times the rate of traditional bypass centrifuge setups and to increase the service lifetime of the lubrication oil by up to three to four times.

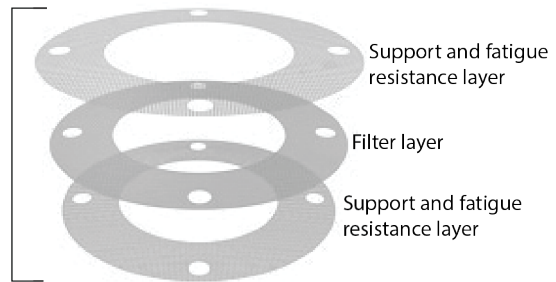


Figure 2. Mesh stack arrangement

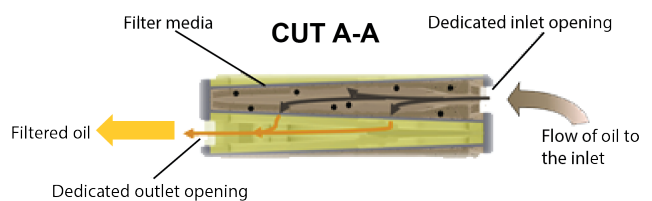


Figure 3. Flow path through elements stack

For hydraulic oil for two-stroke engines

A fraction of the coarsely pre-filtered main lubrication oil flow rate is diverted to the hydraulic control oil system via the fine HCO filter, and then to the engine's hydraulic control unit. The outlet oil is filtered to $6\mu\text{m}$ to protect this sensitive system from fine particulate pollution and low pressure. The filter back flush flow is treated in the diversion chamber and directly re-circulated to the oil sump.

The high-efficiency redundancy filter can be periodically put in service to polish the oil quality and remove very fine pollutants that may have accumulated in the oil loop.

Optimized flow distribution system

Each filter element features a highly optimized flow distribution system. Ribs in the aluminium frame separate each element into several self-contained sections. The filter elements are tightly stacked together, creating filtration columns sized to

meet the capacity requirements of the application. A finned shaft is inserted into the element stack central channel. Each fin of the shaft perfectly aligns with the elements' axial ribs, thereby centering the vertical distribution channels with the inlet openings of each independent filtration column.

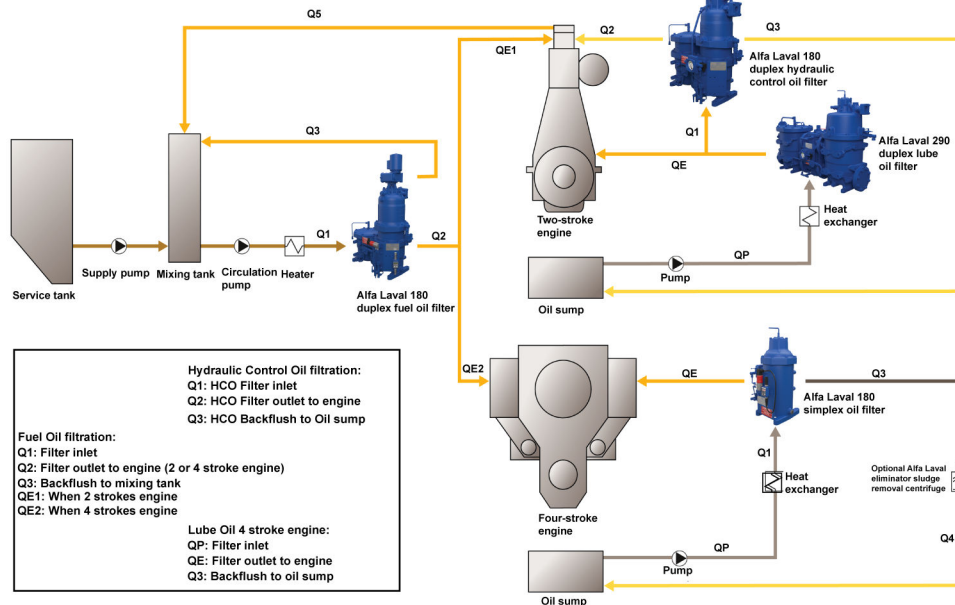


Figure 4. Clockwise from left - Fuel Oil, Hydraulic Control Oil and 4-Stroke Lubrication Oil 180 filter installations

Self-powered hydraulic drive

A hydraulic motor located on top of the filter housing and driven by the system pressure actuates a distributor. It rotates continuously to feed oil to most of the columns and simultaneously drive back flushed oil from one of the columns. An indicator shows the rotation of the hydraulic motor, which can also be actuated manually in case of emergency.

This is replaced by an electric motor for fuel oil applications.

Continuous back flushing

Solids collect on the filter medium and the filtered oil flows to the engine. A small amount of the filtered oil is used to back flush one of the filtration columns and remove all the previously collected solids. The distributor rotates to route the oil to backwash each filtration column in sequence. In this way, all the columns are back flushed once per full rotation of the distributor. Back flushed oil is then re-circulated upstream for reuse.

Highly efficient sludge removal

For highly efficient removal of solids in the back flushed oil, Alfa Laval 180 filters can be fitted with an integrated diversion chamber, which is an automatic second stage filter. It ensures continuous solids removal from the system, even when the high-efficiency redundancy filter is not in operation. It requires no additional pump or separate tank and is standard for fuel oil and hydraulic control oil filtration applications.

Alternatively a self-spinning centrifuge can be fitted to continuously remove solids from the system. Available as an option for lubrication oil filtration.

Options

- Duplex version with integrated bypass
- Single version, with custom housing
- Sludge removal devices (Diversion chamber or Eliminator concept)
- Counter-flanges included in delivery, connection size upon request
- Analog pressure drop transmitter, indicator and gauges
- Manual or automatic drain valve

Dimensions

Shown below are the maximum dimensions of the duplex 180DM models. For indication only.

Dimensions (max.)	
Length	690 mm
Width	543 mm
Height	816 to 992 mm
Weight (in operation)	230 to 268 kg

Class Certification

BV, LRS, CCS, ABS, DNV-GL

KR, NKK, RINA, MRS

CE, ATEX upon request

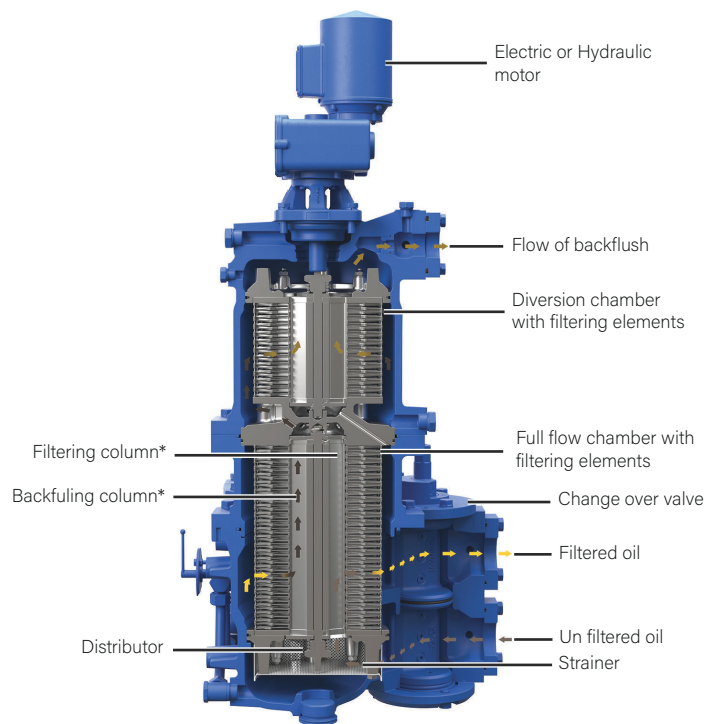
Technical data

The size, weight, flow rate and/or working conditions of the Alfa Laval 180 filter is highly dependent on the application. The information provided below provides an indication of

technical data for the filter. Contact Alfa Laval for more detailed information.

Engine type	Oil type	Filtration grade
Two-stroke	Hydraulic control oil	6 µm
Four-stroke	Lubrication oil	25, 34, 45 µm
All	Fuel oil	10, 25, 34, 45 µm

Filtration grade	Down to 6 µm abs
Max. filter inlet pressure	7-16 bar
Max. temperature	150°C
Alarm (pressure drop)	0.8 bar
Backflushing flow	Down to 3%
Test pressure	32 bar
Housing material	Cast iron or aluminum
Filter medium material	Stainless steel



*One filtering column is in backflush while all others are in full flow filtration

Figure 5. Cross-section of and Alfa Laval 180DM automatic filter (bypass not shown)

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