MAHLE Industry

# Automatic filter
# AF 113 G

with internal pressure cleaning and integrated cyclone effect
Connection size: DN 50/G2, cast stainless steel

## 1. Short description

MAHLE automatic backflush filters are suitable for applications where low-viscosity liquids have to be filtered.

These compact, inline filter systems are designed for automatic cleaning. The system is cleaned by rotating the element and back-flushing with internal pressure media.

**Advantages:**

- Extended filter service life due to the use of a cleanable element
- Cleaning without interrupting filtration
- Precise separation quality in accordance with the surface filter principle
- Top-quality, asymmetric filter medium made of multiple-sintered stainless steel fleece on a rugged core element
- Efficient filter cleaning assures maximum process stability
- Solid construction and high-quality materials for a long service life
- Minimal liquid loss during cleaning
- Filter cleaned one segment at a time with a high backflush pulse
- Actual filter rating and nominal separation are indicated
- Integrated preseparation tanks to tangential inflow and preseparator tube
- Material variants open up a wide range of applications
- Modular MAHLE Vario system for optimum filter selection
- Gas-tight shaft seals available optional
- Application in Ex zone 1 and 2 optional
- Certification for Pressure Equipment Directive (PED) according to category III PED EN optional
- Easy maintenance
- Worldwide distribution

## 2. Operating principle

The MAHLE AF 113 G backflush filter belongs to the Vario series. The compact MAHLE automatic filter system is used for fine and micro-filtration of a variety of low-viscosity liquids.

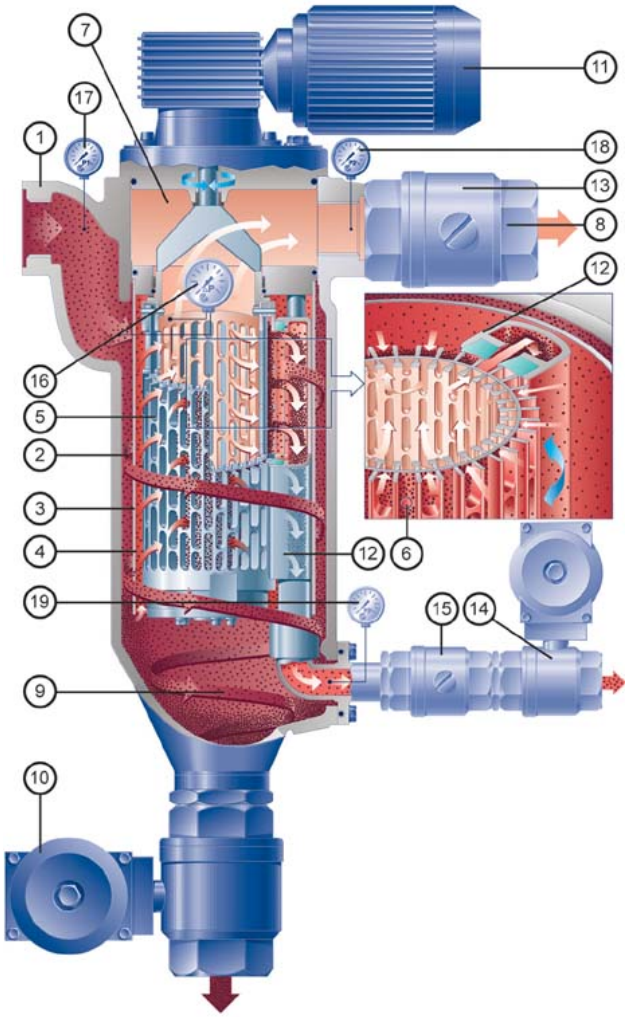
This inline pressure filter consumes no filter material, which means there is also no need for subsequent disposal. The filter is cleaned without interrupting operation. The concentrated solids are drained off simply by opening the system for a short time.

The medium to be cleaned is guided into the filter housing under pressure and flows inward through the MAHLE segmented element. Particles settle on the surface of the filter medium. The filtered fluid exits the filter housing at the top opposite the inlet connection.

The integrated preseparator relieves the load on the segmented element, particularly from coarse and heavy particles. This is achieved by a tangential flow around the preseparator tube and the deflection edges.

The filter is cleaned when a preset differential pressure limit, a set interval or a defined filtered fluid quantity is reached. The segmented element is turned as the cleaning valve is opened. The segments are then guided one at a time past the flushing channel on the outer circumference,
causing them to open and close alternately. The internal pressure is built up at a throttling point downstream of the filter, so that when one segment opens, an outward surge cleans the separated particles from the filter material. As a result of this pulse cleaning principle, the particles are catapulted out, collected in the flushing channel and discharged with a small amount of internal medium. One turn is sufficient to clean all segments. The residue that has settled in the collection cone can be emptied via the drain valve either when the machine is at a standstill or during filtration.

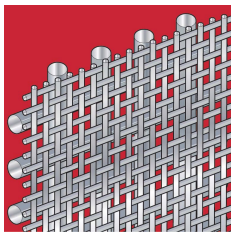
All filters of the MAHLE Vario series are protected by various patents.




**Used MAHLE filter elements in the AF 113 G backflush filter:**

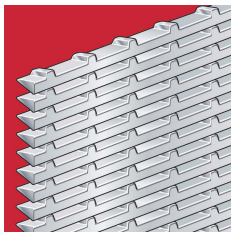
**MAHLE topmesh elements (standard):**

- Good cleanability due to asymmetric design
- Large effective filter surface
- Defined particle retention
- Several material combinations possible



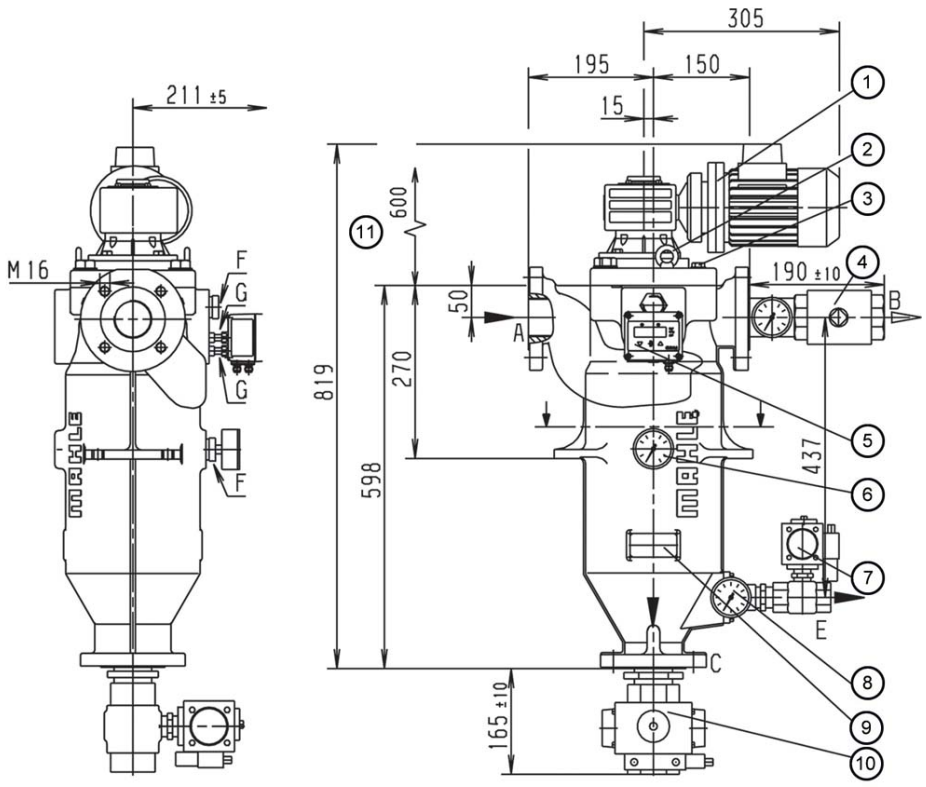
**MAHLE notched wire elements:**

- High differential pressure stability
- High wear resistance in extreme applications
- Good backflush properties
- Several material combinations possible



1 Inlet connection
2 Outer inlet plenum
3 Preseparator tube
4 Inner inlet plenum
5 MAHLE segmented element
6 MAHLE filter materials
7 Plenum for filtered fluid
8 Drain connection for filtered fluid
9 Residue collection cone
10 Drain valve
11 Drive motor
12 Flushing channel
13 P2 control throttle
14 Cleaning valve
15 P3 control throttle (not always required)
16 Differential pressure contact gauge
17 P1 gauge
18 P2 gauge
19 P3 gauge (not always required)

## 3. Technical data




1 Cleaning drive: Worm gear motor can be mounted of each 90° position
2 Lifting eyebolts
3 Vent screw G¼
4 P2 control throttle with P2 gauge
5 Optional: Differential pressure indicator/switch
6 P1 gauge
7 Optional: Automatic back-flush valve
8 Optional: P3 control throttle with P3 gauge
9 Name-plate
10 Optional: Automatic drain valve
11 Clearance required = 600 mm

**Filter data**

| | |
|---|---|
| Max. operating pressure: | 16 bar |
| Max. operating temperature: | 100 °C |
| Materials: | Housing and cover:<br>Cast steel 1.4581<br>Optional: Certificate<br>acc. to EN 10204-3.1<br>Internals: Cast steel 1.4581,<br>stainless steel 1.4571<br>Bearing bushes: PTFE based<br>Seals: FPM (Viton)<br>Segmented element: 1.4571 or<br>1.4571/Al (Δp max. 10 bar) |
| Cover lock: | 4 x M20 hexagon screws |
| Optional: Ex protection acc. to Atex 94/9/EG: | Electr. components in Ex II 2G T3<br>Mech. design in Ex II 2G c T3 |
| Connections and nominal diameters: | A-inlet, B-outlet,<br>C-drain: G2 - DN 50<br>E-backflush: G1<br>F-gauge: G1<br>G-indicator: G1/8<br>All threaded holes<br>acc. to DIN 3852 form X<br>Flanges acc. to DIN 2635 |
| Drive shaft seal: | Lip seal with O-ring |

**Motor data**

Worm gear motor
Multi-range winding

| V | Hz | kW | rpm | A |
|---|---|---|---|---|
| Δ 230 ± 10% | 50 | 0.18 | 9.3 | 1.2 |
| ⅄ 400 ± 10% | 50 | 0.18 | 9.3 | 0.7 |
| Δ 266 ± 10% | 60 | 0.22 | 11.2 | 1.1 |
| ⅄ 460 ± 10% | 60 | 0.22 | 11.2 | 0.7 |

Protection class: IP 55; insulation class F; output torque: 97 Nm

Optional:
Worm gear motor Ex
Ex II 2G T3, output torque: 97 Nm

Weight: 85 kg
Volume: 12 l

**Differential pressure resistance**
Segmented elements with topmesh or stainless steel fleece: 10 bar (140 psi)
Segmented elements with triangular notched wire winding: 25 bar (360 psi)

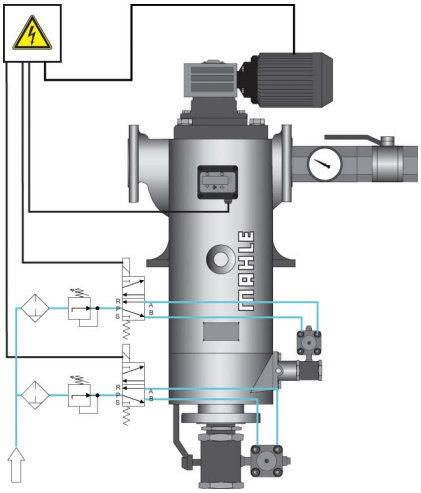
**Other versions available on request!**
**Subject to technical alteration without prior notice!**

## 4. Design and application

| Element type (see section 6) | Total surface in cm² | Filter rating in µm/ effective filter surface in cm² | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 10 | 20 | 30 | 40 | 60 | 80 | 100 | 200 |
| AF 100XX6 | 763 | | 637 | 637 | 637 | 637 | 637 | 637 | 637 | 637 |
| AF 120XX6 | Effective filter surface in % | | 6 | 32 | 39 | 40 | 40 | 43 | 45 | 48 |
| | Effective filter surface in cm² | | 38 | 204 | 248 | 255 | 255 | 274 | 286 | 306 |

recommended design

**Possible cleaning and discharge modes**

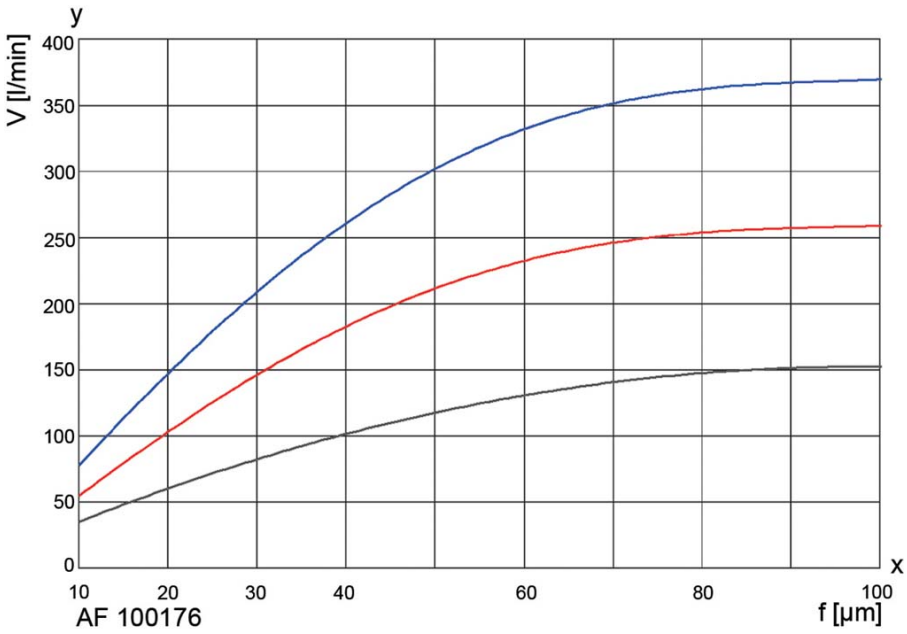


**Fully automatic operation:**
Filtration usually takes place under pressure. The filter is cleaned after a programmed time or a preset number of cycles or according to the differential pressure. We recommend cleaning the system at a differential pressure of approx. 0.5 - 0.7 bar. The cleaning motor is operated for around 7 seconds (about one turn of the element). The cleaning valve remains open for this period. An internal pressure of 2-3 bar is adequate to clean the filter efficiently.
The drain valve is opened in order to empty the filter. Depending on the residue concentration, this can either take place directly after cleaning or be time or cycle controlled. The opening time of the drain valve is 2-3 seconds.

Refer to the Instruction Manual for further information.

MAHLE's team of specialists will be pleased to assist in any way. Tests can be carried out in the absence of reliable evaluation criteria.

## 5. Performance curves




The curves indicate the vclume flow through the complete filter system (filter housing including element) and are referred to a differential pressure of 0.3 bar. Specific process information is essential to guarantee reliable operation of an automatic filter.

Viscosity

1 mm²/s
33 mm²/s
100 mm²/s

y = Volume flow V [l/min]
x = Filter rating f [µm]
mm²/s = cst

## 6. Type number key

**Type number key with selection example for AF 11363-1322-41220/G3**

**Size**

**AF 1136** 1 x 110x265 — No. of steps x diameter x length [mm]

**Cleaning drive**

- **3** Gear motor 230/400 V, 50 Hz or 266/460 V, 60 Hz
- **4** Gear motor 230/400 V, 50 Hz Ex II 2G T3

**Inlet and outlet connections**

- **3** DN 50
- **13** G2

**Permissible operating pressure in bar (housing/cover)**

- **1** PN 10
- **2** PN 16

**Material** Seal FPM bearing PTFE

- **2** Stainless steel 1.4581/1.4571

**Differential pressure indicator and gauge**

- **1** PiS 3076, switching level at 1.2 bar static 63 bar
- **2** PiS 3076, switching level at 0.7 bar static 63 bar
- **4** PiS 3170, digital Δp gauge, 2 switching levels settable from 0 to 16 bar
- **5** PiS 3175, digital Δp gauge, 2 pressure transmitters settable from 0 to 16 bar

**Valves and control throttles**

- **1** P2 control throttle with P2 gauge
- **6** Like 1 but with P3 control throttle and P3 gauge

**Drain valve**

- **2** Ball valve, electropneumatic 24 V DC
- **3** Ball valve, electropneumatic 230 V AC
- **4** Ball valve, electric 24 V DC
- **5** Ball valve, electric 230 V AC

**Cleaning valve**

- **2** Ball valve, electropneumatic 24 V DC
- **3** Ball valve, electropneumatic 230 V AC
- **4** Ball valve, electric 24 V DC
- **5** Ball valve, electric 230 V AC

**Optional features**

- **0** Without/special version

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **AF 1136** | **3** | **- 13** | **2** | **2** | **-4** | **1** | **2** | **2** | **0** | **-XXXX (end number for special version)/G3** |

| End number | Special version |
|---|---|
| 3001 | Standard filter insert (comlpete), without housing or drive |
| 3002 | Standard filter insert (comlpete), without housing, with drive |
| 3700 | PTFE seals |
| Other numbers | On request |

**Type number key with selection example for AF 100, 120**

**Series**

**AF 100** Segmented element with topmesh (5 µm to 100 µm)

**AF 120** Segmented element with triangular notched wire winding (60 µm to 250 µm)

| | **Material Segmented element** | **Core element** | **Filter medium** | **Clamp rings** | **Wire width in mm** |
|---|---|---|---|---|---|
| | **20** | Al-hartcoated | 1.4571 | 1.4571 | - |
| | **21** | 1.4571 | 1.4571 | 1.4571 | - |

**Overall length** diameter x length in mm

| | |
|---|---|
| **6** | 110x265 |

**Gap width/rating in µm (see 4. Design and application)**

| | | | | | |
|---|---|---|---|---|---|
| | | **003** | 30 µm | **010** | 100 µm |
| **0005** | 5 µm | **004** | 40 µm | **013** | 130 µm |
| **001** | 10 µm | **006** | 60 µm | **016** | 160 µm |
| **002** | 20 µm | **008** | 80 µm | **025** | 250 µm |

Other filter ratings on request

| | | | |
|---|---|---|---|
| **AF 100** | **17** | **6** | **- 006** |

For the correct choice of the filter fineness please consult the table on page 4.

## 7. Spare parts

| No. | Designation | Material no. | |
|---|---|---|---|
| | | FPM/ | PTFE/VA |
| 1 | Bush kit | | 70308169 |
| 2 | Set of seals (complete) | 70316068 | 70316071 |
| 3 | Backflush channel moulding | 79744004 | 70312375 |
| 4 | Element | See name-plate | |

Please contact us for detailed technical information, any open questions about options, accessories and for general expert advice. Completion of the relevant questionnaire would facilitate in the coordination of all important parameters. Comprehensive documentation on our filter range, filter elements and accessories can be provided. About installation and operation, please refer to the Instruction Manual.

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