

## Automatic filter AF 173 G

with external pressure cleaning and integrated cyclone effect  
Connection sizes: G2, screw-in flange DN 50 and DN 6 5, cast design

### 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 cartridge and back-flushing with external or internal pressure media.

#### Advantages:

- Low lifecycle costs because no filter material is consumed
- 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
- Optional: Gas-tight shaft seals available
- Optional: Application in Ex zone 1 and 2
- Easy maintenance
- Worldwide distribution



## 2. Operating principle

The MAHLE AF 173 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 preseperator relieves the load on the segmented element, particularly from coarse and heavy particles. This is achieved by a tangential flow around the preseperator 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 and external pressure valves are opened. The segments are then guided one at a time past the pressure channel housing on the inside and the flushing channel on the outside, causing them to open and close alternately. The integrated external pressure accumulator is pretensioned during closing, 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 almost entirely with external medium. One turn suffices 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 stillstand or during filtration.

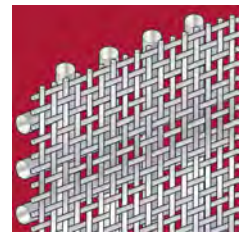
All filters of the MAHLE Vario series are protected by various patents.

### Used MAHLE filter cartridges in the AF 173 G backflush filter:

#### MAHLE topmesh cartridges

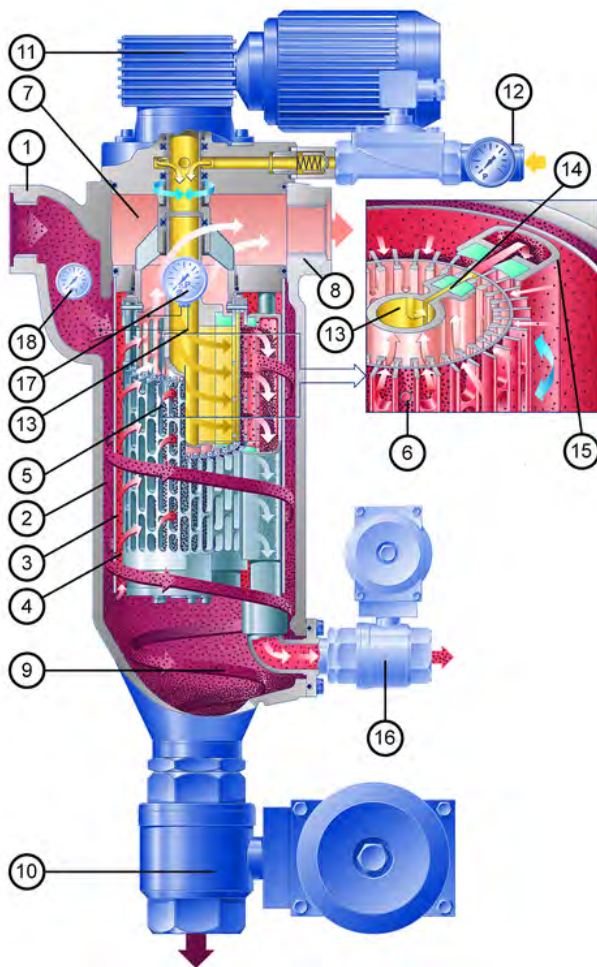
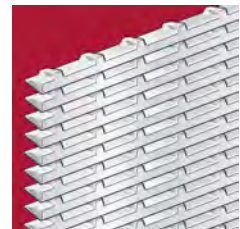
##### (standard):

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



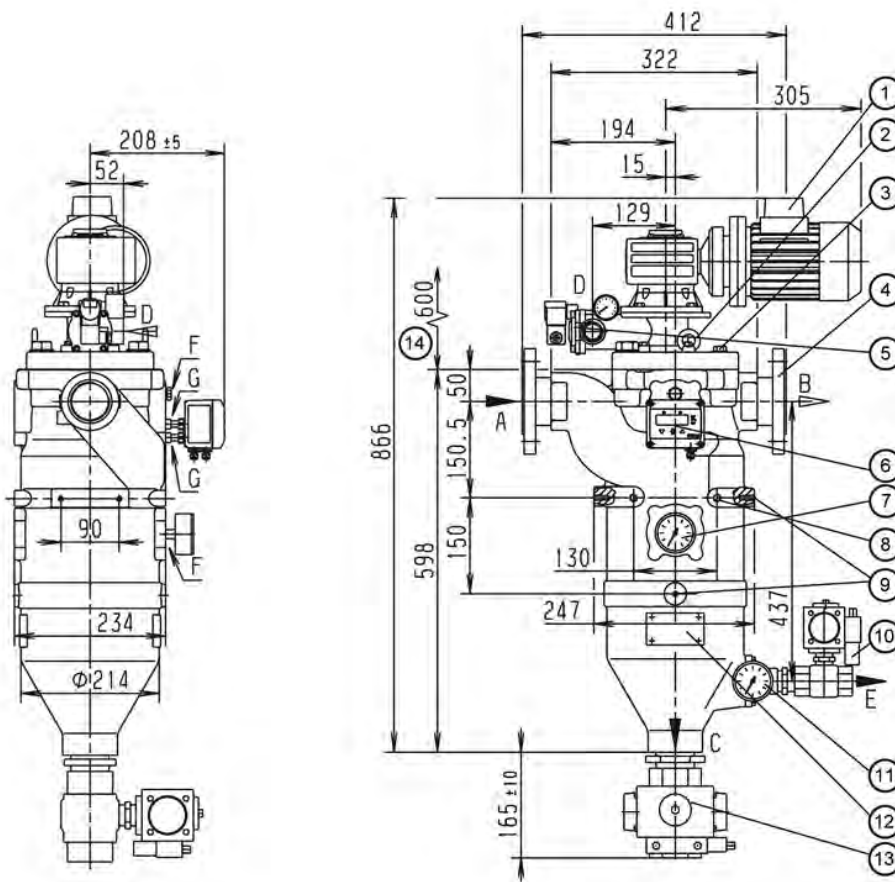
#### MAHLE notched wire cartridges:

- 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 material
- 7 Plenum for filtered fluid
- 8 Outlet connection for filtered fluid
- 9 Residue collection cone
- 10 Drain valve
- 11 Drive motor
- 12 External pressure connection, external pressure and backflush valves and gauge  $P_f$
- 13 External pressure accumulator
- 14 External pressure nozzle
- 15 Flushing channel (outside)
- 16 Cleaning valve (P3 control throttle)
- 17 Differential pressure contact gauge
- 18 P1 gauge

### 3. Technical data



- 1 Cleaning drive: can be mounted turned 90°, 180° or 270°
- 2 Lifting eyebolts
- 3 Vent screw G1/4
- 4 If DN65 screw-in flanges are used, the motor is mounted turned 90°
- 5 External pressure valve
- 6 Optional: Differential pressure indicator/switch
- 7 Optional: P1 gauge
- 8 Mounting holes M12
- 9 Mounting holes M8
- 10 Optional: Automatic backflush valve
- 11 Optional: P3 control throttle with P3 gauge
- 12 Name-plate
- 13 Optional: Automatic drain valve
- 14 Clearance = 600 mm

#### Filter data

Max. operat. pressure: 16 bar  
 Max. operat. temperature: 100 °C  
 Materials: Housing and cover: GGG  
 Internals: GGG, St  
 Bearing bushes: PTFE based  
 Seals: FPM (Viton)  
 Segmented element: 1.4571 or 1.4571/  
 Al ( $\Delta p$  max. 10 bar)

Cover lock: 4 x M20 hexagon screws  
 Optional: Ex protection acc. to Atex 94/9/EG:  
 Electrical components in Ex II 2G T3  
 Mechanical design in Ex II 2G c T3

Connections and nominal diameters: A-inlet, B-outlet, C-drain: G2  
 D-external pressure: G1 (air: must be reduced to G1/2 by the customer)  
 E-backflush: G1  
 F-gauge: G1/4  
 G-indicator: G1/8  
 All threaded holes acc. to DIN 3852 form X  
 Optional: A/B/C G2½ screw-in flanges DN50 or DN65 acc. to EN 1092-1/05A  
 Drive shaft seal: Lip seal with O-ring  
 External finish: Synthetic resin primer, blue acc. to RAL 5007

#### Motor data

Worm gear motor  
 Multi-range winding

V	Hz	kW	rpm	A
$\Delta$ 230 $\pm$ 10%	50	0.18	9.3	1.2
$\lambda$ 400 $\pm$ 10%	50	0.18	9.3	0.7
$\Delta$ 266 $\pm$ 10%	60	0.22	11.2	1.1
$\lambda$ 460 $\pm$ 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: 92 kg  
 Volume: 12 l

#### Differential pressure resistance

Segmented elements with topmesh or stainless steel fleece: 10 bar  
 Segmented elements with triangular notched wire winding: 25 bar

Other versions available on request.

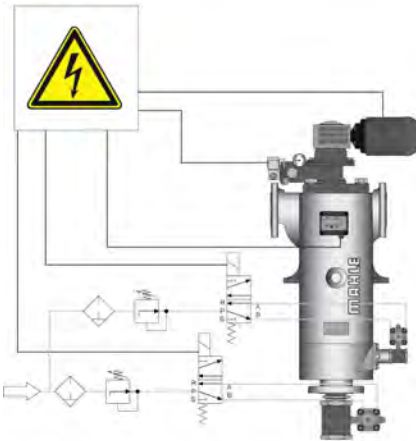
Technical data is subject to change without notice.

## 4. Design and application

Cartridge type (see section 6)	Total surface in cm <sup>2</sup>	filter rating in $\mu\text{m}$ / effective filter surface in cm <sup>2</sup>								
		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 cm <sup>2</sup>		38	204	248	255	255	274	286	306

recommended design

### Possible cleaning and discharge modes



#### Fully automatic operation:

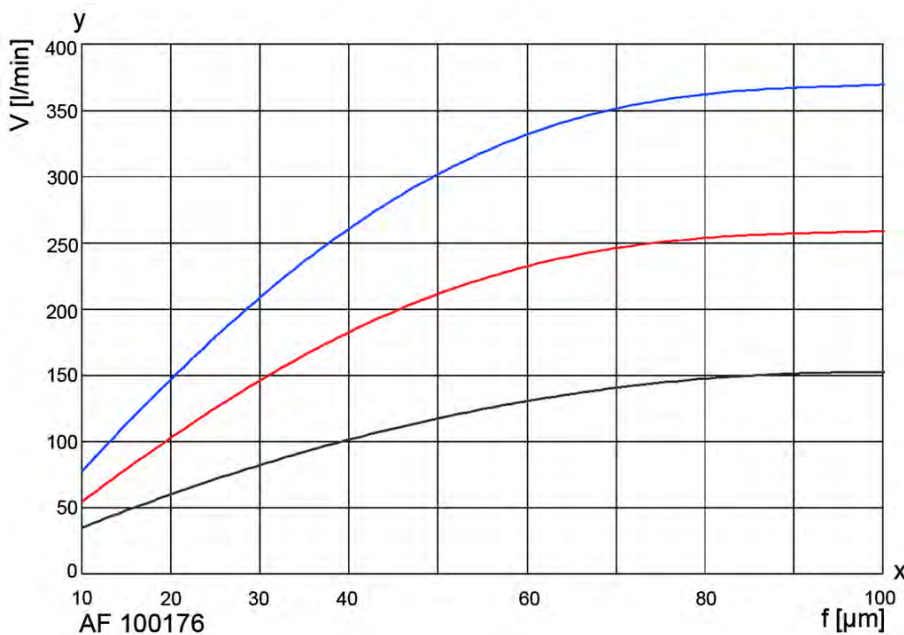
Filtration usually takes place under pressure. The filter is cleaned after a programmed time or a preset number of cycles or according to the differential pressure. We recommend cleaning the system at a differential pressure of approx. 0.5 - 0.7 bar. The cleaning motor is operated for around 7 s (about one turn of the cartridge). The external pressure and cleaning valves remain open for this period. This suffices to clean the filter thoroughly.

The drain valve is opened in order to discharge 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 s.

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 volume flow through the complete filter system (filter housing including cartridge) 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 mm<sup>2</sup>/s
- 33 mm<sup>2</sup>/s
- 100 mm<sup>2</sup>/s

y = Volum flow V [l/min]

x = Filter rating f [ $\mu\text{m}$ ]

## 6. Type number key

### Type number key with selection example for AF 17363-1321-43220/G3

#### Size

AF 1736 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

- 13 G2
- 14 Screw-in flange DN 50 for cast design
- 15 Screw-in flange DN 65 for cast design
- 18 G2 1/2

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

- 1 PN 10
- 2 PN 16

#### Material Seal FPM, bearing PTFE

- 1 Housing and cover nodular cast iron, internals steel, aluminium
- 3 Housing and cover nodular cast iron, internals stainless steel 1.4301/1.457

#### Differential pressure indicator and gauge

- 1 PIS 3076, switching level at 1.2 bar, static 63 bar, aluminium/FPM
- 2 PIS 3076, switching level at 0.7 bar, static 63 bar, aluminium/FPM
- 4 PIS 3170, digital  $\Delta p$  gauge, 2 switching levels settable from 0 to 16 bar
- 5 PIS 3175, digital  $\Delta p$  gauge, 2 pressure transmitters settable from 0 to 16 bar

#### Valves and control throttles

- 3 External pressure valve G1 for liquid, 24 V
- 4 External pressure valve G1 for liquid, 230 V
- 8 Like 3, but with P3 control throttle and P3 gauge
- 9 Like 4 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 1736 3 - 13 2 1 -4 3 2 2 0 -XXXX (end number for special version)/G3

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

## Type number key with selection example for AF 100, 120 cartridges

### 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	Core element	Filter medium	Clamp rings	Wire width in mm
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#### Segmented element

17	Al	1.4571	St	-
20	hard coated Al	1.4571	1.4571	-
21	1.4571	1.4571	1.4571	-

#### Overall length Diameter x length in mm

6 110 x 265

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

		<b>003</b>	30 µm	<b>010</b>	100 µm
<b>0005</b>	5 µm	<b>004</b>	40 µm	<b>013</b>	130 µm
<b>001</b>	10 µm	<b>006</b>	60 µm	<b>016</b>	160 µm
<b>002</b>	20 µm	<b>008</b>	80 µm	<b>025</b>	250 µm

Other filter ratings on request

**AF 100 17 6 -006**

## 7. Spare parts

No.	Designation	Material no.	
		FPM/C steel	PTFE/VA
1	Bush kit		70311579
2	Set of seals (complete)	70316231	70316233
3	Backflush channel moulding	79744004	70312375
4	Pressure channel moulding		76120810
5	Cartridge	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.