

## Automatic metal-edge filter

### AF 71 G

with radial scraper cleaning  
Connection size G1, G1 ½

### 1. Features

MAHLE automatic metal-edge filters are suitable for all applications where low or high-viscosity liquids or pastes have to be filtered and homogenised.

These compact inline filter systems can be designed for semi or fully automatic cleaning. The system is cleaned by rotating the filter cartridge against a spring actuated scraper.

#### Advantages:

- Extended filter service life due to the use of a cleanable element
- Cleaning is possible without interrupting filtration
- Precise separation quality in accordance with the metal-edge principle
- Sturdy filter cartridge made of triangular stainless steel wire on a rugged core element
- Efficient filter cleaning assures maximum process stability
- Solid construction and high-quality materials for a long service life
- Modular MAHLE Vario system for optimum filter selection
- Material variants open up a wide range of applications
- Application in Ex zone 1 and 2 optional
- Easy maintenance
- Worldwide distribution



## 2. Operating principle

The MAHLE AF 71 G metal-edge filter belongs to the small Vario series. The MAHLE metal-edge filter system is used to filter and homogenise a wide range of liquids and pastes.

This compact, inline filter system consumes no filter material, which means there is also no need for subsequent disposal. The filter is cleaned either automatically or semi-automatically without

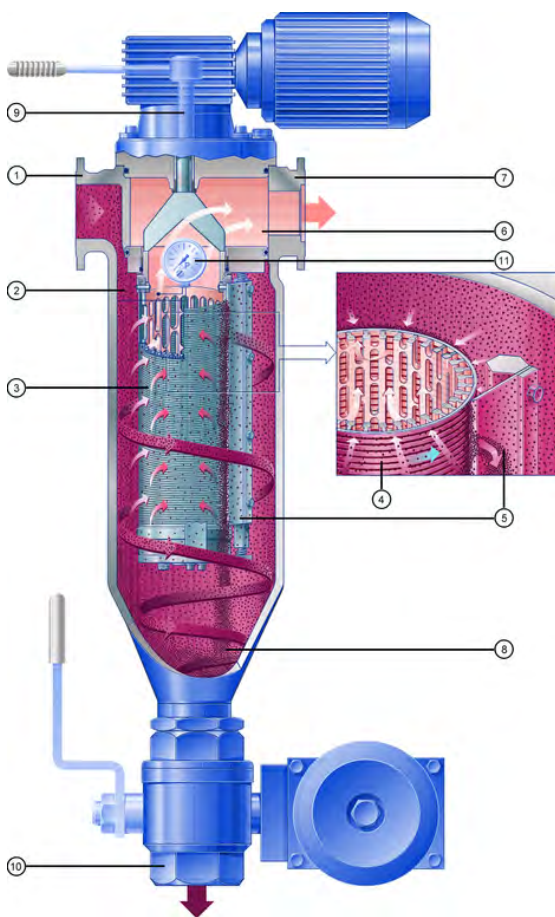
interrupting operation. Optional a pneumatical rotary drive is also available. Its advance is given by use with the differential pressure measure and display unit with integrated control function PiC 3170 MFC. Autarcic automatic filters can be combined without need of a power station for a 3-phase motor. 24 V DC field voltage and compressed air as auxilliary energy are sufficient. 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 or in suction mode. It flows inward through the MAHLE filter cartridge. The solids are separated on the surface of the triangular filter cartridge wires. The filtered fluid exits the filter housing at the top opposite the inlet connection.

The filter is cleaned either when a preset differential pressure limit is reached or after a specified cycle time elapses. The MAHLE filter cartridge is rotated against a spring actuated scraper for this purpose. The special gap geometry of the filter cartridge guarantees efficient cleaning.

The particles or agglomerates are skimmed from the surface and settle in the collection cone. The patented filter cartridge bearing (AKF system) prevents high axial forces and facilitates the cleaning process.

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.



The schematic drawing deviates slightly from the actual technical lay-out.

### Used MAHLE filter cartridges in the AF 71 G metal-edge filter:

#### MAHLE coiled cartridge (standard):

- Optimum cleaning by means of sharp-edged triangular wire
- Large effective filter surface
- Small, precise gap widths
- High differential pressure stability and torsional strength
- Several material combinations possible



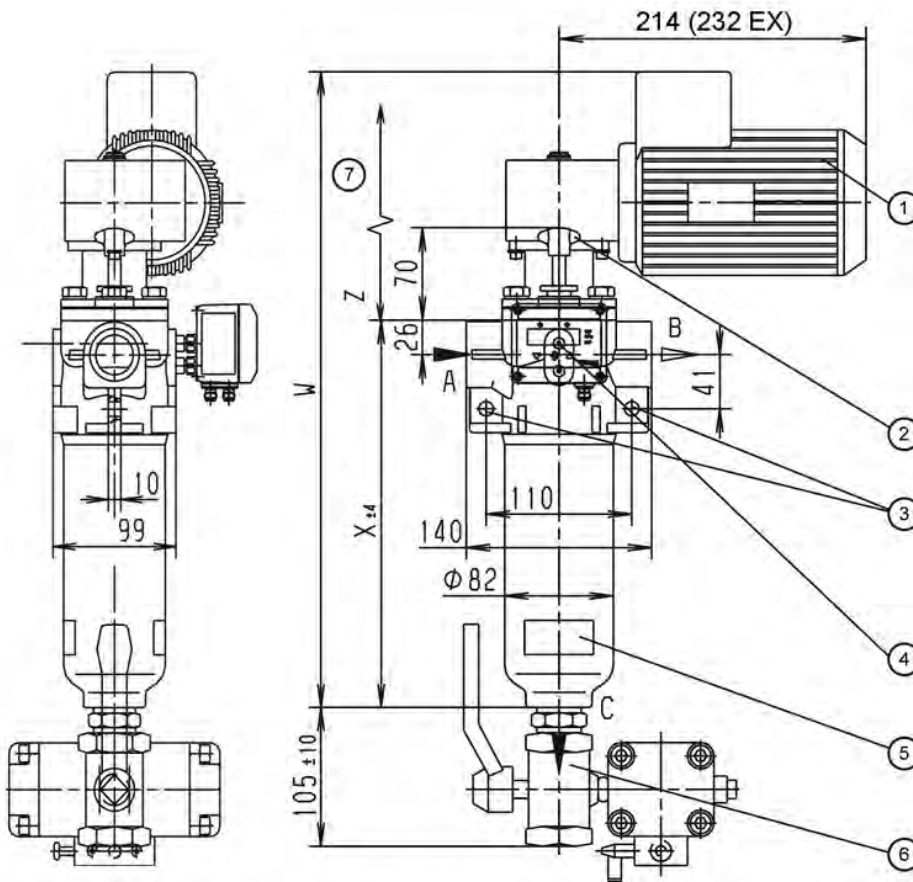
#### MAHLE welded cartridge:

- High wear resistance to abrasive media
- Sturdy trapezoidal wire for high-viscosity media
- Welded design
- Manufactured in stainless steel



- 1 Inlet connection
- 2 Inlet plenum
- 3 MAHLE filter cartridge
- 4 Triangular wire winding
- 5 Scraper
- 6 Plenum for filtered fluid
- 7 Outlet connection
- 8 Particle collection cone
- 9 Cleaning drive with gear motor or star handle
- 10 Drain valve (automatic or manual)
- 11 Differential pressure indicator/switch

### 3. Technical data



- 1 Cleaning drive for size AF 713, gear motor can be mounted at each 90° position
  - 2 Cleaning drive for size AF711/AF713, star handle
  - 3 Mounting holes Ø11
  - 4 Optional differential pressure indicator/switch
  - 5 Type plate
  - 6 Optional drain valve, manual or automatic mode
  - 7 Z = Clearance required
- The pneumatical rotary drive is not shown in this drawing!

#### Filter data

- Max. operating pressure: 40 bar, 63 bar
- Max. operating temperature: - up to 63 bar max. 200 °C
- Materials: - Housing and cover: GGG 40  
- Internals: nodular cast iron, steel, optional stainless steel  
- Bearing bushes: PTFE based  
- Seals: FPM (Viton)  
- Coiled cartridge: 1.4571 or 1.4571/Al ( $\Delta p$  max. 40 bar)  
- Welded cartridge: 1.4571 ( $\Delta p$  max. 10 bar)
- Cover fastening: 4x M10 hexagon screws
- Connections and nominal diameters: - A-inlet, B-outlet: G1, G1½  
- C-drain: G1  
- G-indicator: G1/8  
All threaded holes acc. to DIN 3852 form X
- Drive shaft seal: Square seal ring
- Outside coating: Synthetic resin primer  
blue acc. to RAL 5007

#### Motor data

- Worm gear motor  
Multi-range winding

V	Hz	kW	U/min	A
$\Delta$ 230 ± 10%	50	0.060	18	0.60
$\lambda$ 400 ± 10%	50	0.060	18	0.35
$\Delta$ 266 ± 10%	60	0.072	21	0.60
$\lambda$ 460 ± 10%	60	0.072	21	0.35

Protection class: IP55, insulation class F; output torque: 14 Nm

Type	W [mm]	X [mm]	Z [mm]	Volume [l]	Weight [kg]
AF 711x*	240	170	130	0.6	4.2
AF 713x	363*	293	250	1.0	5.5*
	481				10.0
AF 7133-2xx	490	302	280	1.0	11.0
AF 7137	470	302	260	1.0	9.5

\* with star handle

#### Optional:

- Ex protection acc. to ATEX 94/9/EC
- Electrical design in Ex II 2G T3
- Mechanical design in Ex II 2G c T3
- Pneumatical rotary drive

Other types available on request!

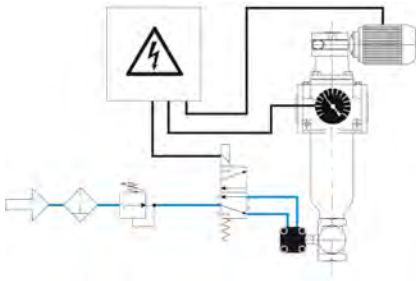
Technical data is subject to change without notice!

## 4. Design and application

Cartridge type (see section 6)	Total surface in cm <sup>2</sup>	Gap width in µm/ effective filter surface in cm <sup>2</sup>														
		30	40	50	60	80	100	130	160	200	250	360	500	1000	1500	2000
AF 7011	71	5	6	8	9	12	14	17	20	24	28	35	42			
AF 7031	71	5	6	8	9	12	14	17	20	24	28	35	42			
AF 7071	71						8	10	12	14	17	22	28	42	51	
AF 7081	71			5	6	8	10	12	15							
AF 7013	230	14	18	22	26	33	40	50	59	69	81	102	121	162		
AF 7033	230	14	18	22	26	33	40	50	59	69						
AF 7073	230						22	28	33	40	49	64	81	121	146	162
AF 7083	230			15	18	23	29	36	43	51	61	79	97	139	162	177

Recommended design

### Cleaning and emptying



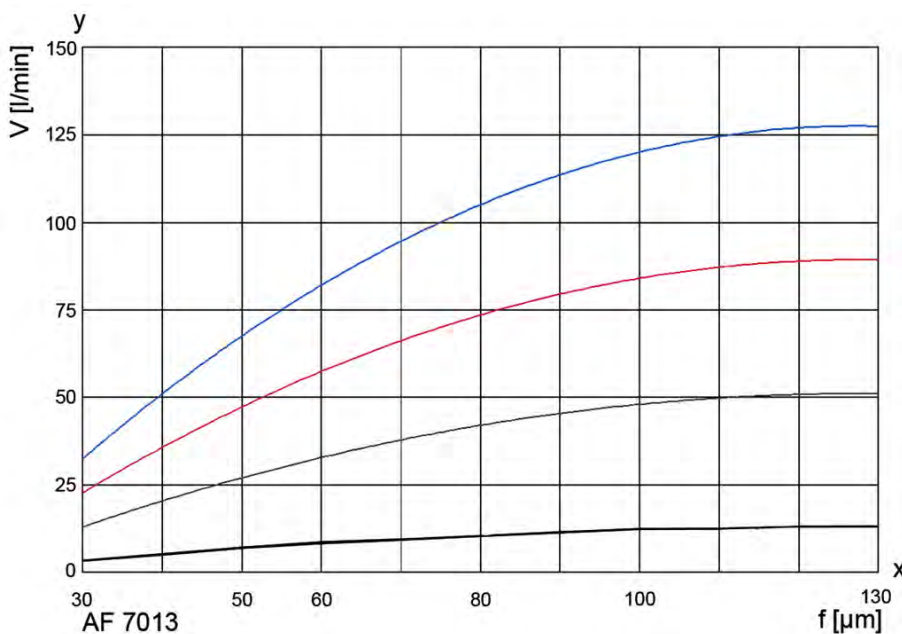
#### Fully automatic operation:

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 approximately 4 times the initial differential pressure. The cleaning motor is operated for around 10 seconds (about three turns of the filter cartridge). This is sufficient to clean the filter thoroughly. The motor may need to run continuously in exceptional cases. The drive shaft is always turned clockwise. The drain valve is opened in order to empty the filter. Depending on the residue concentration, this can either take place synchronously with cleaning or be time or cycle controlled. The opening time of the drain valve can be set between 2 and 6 s. The filter can be emptied in suction mode using a buffer or by interrupting the filtration process.

Semi-automatic and manual operation are also possible.

Refer to the Instruction Manual for further information.

## 5. Efficiency 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 in mm<sup>2</sup>/s

- 1 mm<sup>2</sup>/s
- 33 mm<sup>2</sup>/s
- 100 mm<sup>2</sup>/s
- 500 mm<sup>2</sup>/s

y = Volume flow V [l/min]  
x = Gap width f [µm]  
mm<sup>2</sup>/s = cst

## 6. Type number key

### Type number key with selection example for AF 7133-1241-10200/G1

#### Size

AF 711	1x 42x68	No. of steps x diameter x length [mm]
AF 713	1x 42x190	No. of steps x diameter x length [mm]

#### Cleaning drive

- 1 Star handle
- 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
- 7 Pneumatically rotary drive

#### Inlet and outlet connections

- 12 G1
- 2 G1½

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

- 4 PN 40
- 5 PN 63

#### Material Seal FPM, bearing PTFE

- 1 Housing and cover nodular cast iron, steel, aluminium
- 3 Housing and cover steel, grey cast iron or nodular cast iron, internals stainless steel 1.4301/1.4571
- 4 Housing and cover steel, grey cast iron or nodular cast iron, aluminium-free
- 6 Housing and cover nodular cast iron with delta seal coating, internals stainless steel 1.4301

#### Differential pressure indicator and switch

- 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
- 3 PiS 3170 MFC
- 4 PiS 3170, digital Δp gauge, 2 switching levels settable from 0 to 16 bar
- 8 PiS 3076, switching level at 2.2 bar, static 63 bar, aluminium/FPM
- 9 PiS 3076, switching level at 5 bar, static 63 bar, aluminium/FPM

#### Valves and control throttles

- 0 Without/special version

#### Drain valve

- 1 Ball valve, manual
- 2 Ball valve, electropneumatic 24 V
- 3 Ball valve, electropneumatic 230 V
- 4 Ball valve, electric 24 V
- 5 Ball valve, electric 230 V

#### Cleaning valve

- 0 Without/special version

#### Optional features

- 0 Without/special version
- 1 Bypass valve 20 bar

AF 713    3    - 12    4    1    -1    0    2    0    0    -XXXX (end number for special version)/G1

End number	Special version
3001	Standard complete inner assembly, without housing or drive
3002	Standard complete inner assembly, without housing, with drive
3700	PTFE seals
Other numbers	On request

Type number key with selection example for coiled or welded cartridges for AF 70

Series						/E1
<b>AF 70</b>	Coiled or welded cartridge with triangular wire winding					
	<b>Material</b>	<b>Core element</b>	<b>Filter medium</b>	<b>Clamp rings</b>	<b>Wire width in mm</b>	
	<b>Coiled cartridge</b>					
	1	Al	1.4571	1.4571	0.5	
	3	1.4581	1.4571	-	0.5	
	<b>Welded cartridge</b>					
	7	-	1.4571	1.4571	1	
	8	-	1.4571	1.4571	0.75	
	<b>Overall length</b> Diameter x length in mm					
	1	42 x 70				
	3	42 x 190				
	<b>Gap width/rating in µm (see 4. Design and application)</b>					
	<b>003</b>	30 µm	<b>010</b>	100 µm	<b>036</b>	360 µm
	<b>004</b>	40 µm	<b>013</b>	130 µm	<b>050</b>	500 µm
	<b>005</b>	50 µm	<b>016</b>	160 µm	<b>100</b>	1000 µm
	<b>006</b>	60 µm	<b>020</b>	200 µm	<b>150</b>	1500 µm
	<b>008</b>	80 µm	<b>025</b>	250 µm	<b>200</b>	2000 µm
	Other filter ratings on request					
<b>AF 70</b>	<b>1</b>	<b>3</b>	<b>-005</b>			<b>/E1</b>

## 7. Spare parts

No.	Designation	Material no.	
		FPM/C steel	PTFE/VA
1	Bush kit		76148654
2	Seal kit (complete)	76148647	76198352
3	Scraper AF 711/AF 713		71371269/71371285
4	Filter cartridge	See name-plate	
5	Flat spring	79745365	

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.