



## MultiRho Filter

### MRF 1/2/3/4/5/6/7

### Description

The MultiRho filters of the MRF series are filter housings for use in open systems which are continually exposed to contamination.

The candle filter elements protect components such as nozzles, high pressure pumps or working filters, for example in function test rigs or industrial part washers.

There are seven sizes of filter available in single or change-over versions.

Depending on the model, between 1 and 52 elements of different lengths can be fitted.

### Applications

- Function test rigs
- Industrial part washers
- Machining centres
- Filling stations
- Engine oils
- Lubrication oil systems

### Advantages

- Economical operation ensured by high quality standards, specified filtration rates and high separation values
- Compact housing with high flow rates
- Easy element change
- Efficient protection of system and components
- Environmentally safe disposal of elements (incinerable)

### Model code

MRF - 4 - N / 17 - Q - 40 - 10 - N - E - 0 / OC

#### Type

MRF = Multi Rho Filter  
MRFD = Change-over Multi Rho Filter

#### Size

1 = ≈ 76 mm housing diameter  
2 = ≈ 220 mm housing diameter  
3 = ≈ 274 mm housing diameter  
4 = ≈ 355 mm housing diameter  
5 = ≈ 406 mm housing diameter  
6 = ≈ 508 mm housing diameter  
7 = ≈ 610 mm housing diameter

#### Housing material

E = Stainless steel\*  
N = Carbon steel, aluminium\*  
\* or quality, see technical specifications

For size						
1	2	3	4	5	6	7
1						
	2					
		3				
			4			
				5		
					6	
						7

#### Element quantity

1 = 1 filter element  
5 = 5 filter elements  
11 = 11 filter elements  
17 = 17 filter elements  
22 = 22 filter elements  
36 = 36 filter elements  
52 = 52 filter elements

For size						
1	2	3	4	5	6	7
1						
	2					
		3				
			4			
				5		
					6	
						7

#### Hydraulic connection

D = G 1"  
F = G 1 1/2"  
G = G 2"  
L = SAE DN50  
J = DIN DN 50  
Q = DIN DN 80  
R = DIN DN 100  
V = DIN DN 150  
W = DIN DN 200

For size						
1	2	3	4	5	6	7
1						
	2					
		3				
			4			
				5		
					6	
						7

#### Element length

10 = 10 "  
20 = 20 "  
30 = 30 "  
40 = 40 "

For size						
1	2	3	4	5	6	7
1						
	2					
		3				
			4*	5*	6*	7*

\* only for stainless steel

#### Pressure range

10 = 10 bar  
16 = 16 bar  
25 = 25 bar  
40 = 40 bar

For size						
1	2	3	4	5	6	7
1						
	2					
		3				
			4	5	6	7

#### Material of seal

N = NBR  
F = FKM (FPM, Viton®)  
E = EPDM

#### Clogging indicator for housing material E

C12 = Differential pressure indicator - electrical (PVD 2 C.0)  
D17 = Differential pressure indicator - visual/electrical (PVD 2 D.0/-L220)  
D18 = Differential pressure indicator - visual/electrical (PVD 2 D.0/-L24)  
D32 = Differential pressure indicator - visual/electrical (PVL 2 GW.0/-V-113)  
D33 = Differential pressure indicator - visual/electrical (PVL 2 GW.0/-V-111-16-)

#### Clogging indicator for housing material N

E = Standard, pressure gauge  
B = Differential pressure indicator - visual (VM 2 B.1)  
C = Differential pressure indicator - electrical (VM 2 C.0)  
D3 = Differential pressure indicator - visual/electrical (VM 2 D.0/-L220)  
D4 = Differential pressure indicator - visual/electrical (VM 2 D.0/-L24)  
D5 = Differential pressure indicator - visual/electrical (VD 2 LZ.1/-DB)  
F = Pressure switch, electrical (VR 2 F.0)  
O = Without clogging indicator

See Hydac brochure for Clogging Indicators (E 7.050...)

#### Modification number

0 = The latest version is always supplied

#### Supplementary details

OE = without drain  
L = Without stand / oil drip tray

<sup>1)</sup> for FlexMicron S/E/P elements

## Filter calculation

The total pressure drop of the filter at a certain flow rate is the sum of the housing  $\Delta p$  and the element  $\Delta p$ . The housing pressure drop can be determined using the following pressure drop curves. The filter element  $\Delta p$  is calculated using the R-factors (see below).

### Housing $\Delta p$ : Housing pressure drop graphs

The higher curve in each pair of housing curves applies to mineral oil with a density of  $0.86 \text{ kg/dm}^3$  and a kinematic viscosity of  $30 \text{ mm}^2/\text{s}$ . The lower curve applies to water at  $20^\circ\text{C}$ . For turbulent flow, the differential pressure will change proportionally to the density; for laminar flow, it will change proportionally to the density and viscosity. The flow velocity should not exceed  $3 \text{ m/s}$  at the filter inlet for oil and  $4 \text{ m/s}$  for water.

### Element $\Delta p$ : Pressure drop calculation for elements

The following calculation is based on clean filter elements.

$$\Delta p \text{ [bar]} = \frac{R \times V \text{ [mm}^2/\text{s]} \times Q \text{ [l/min]}}{n \times l \text{ [inch]} \times 1000}$$

R = R factor

V = Viscosity  $[\text{mm}^2/\text{s}]$

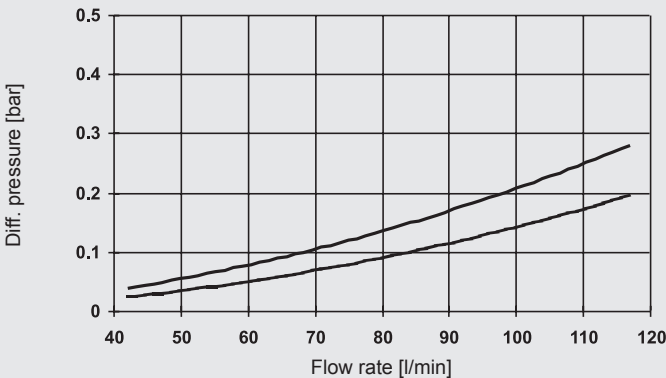
Q = Flow rate  $[\text{l/min}]$

n = No. of elements

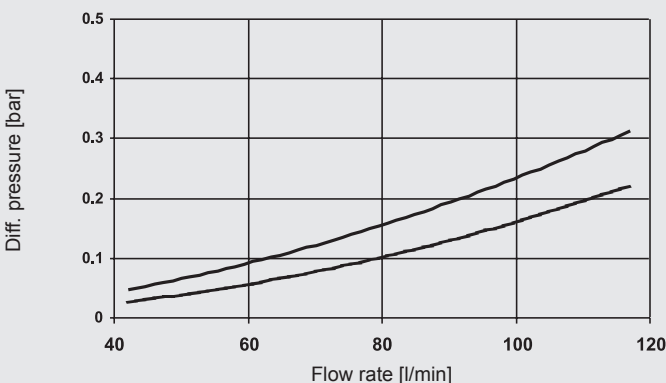
L = Element length  $[\text{inch}]$

### Housing pressure drop graphs (Housing- $\Delta p$ )

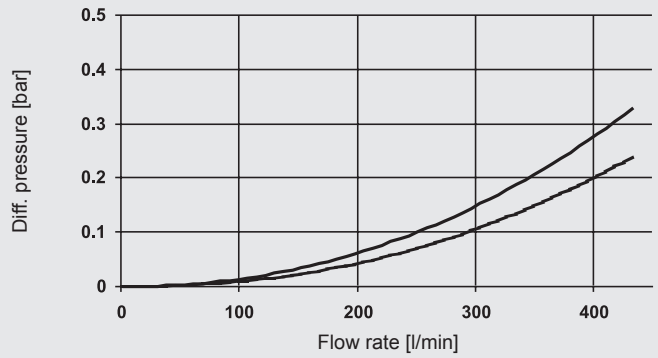
#### MRF-1



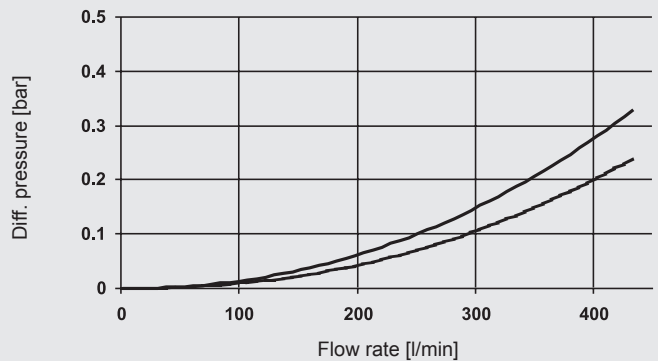
#### MRFD-1



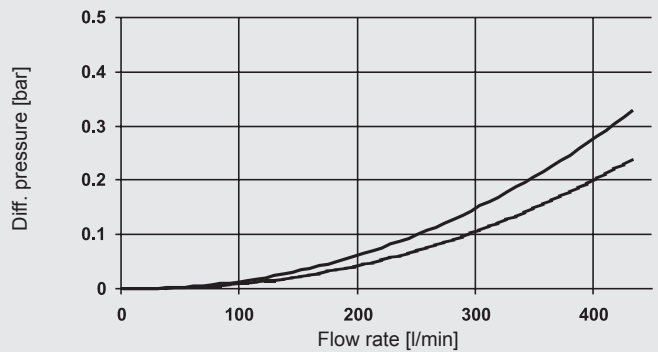
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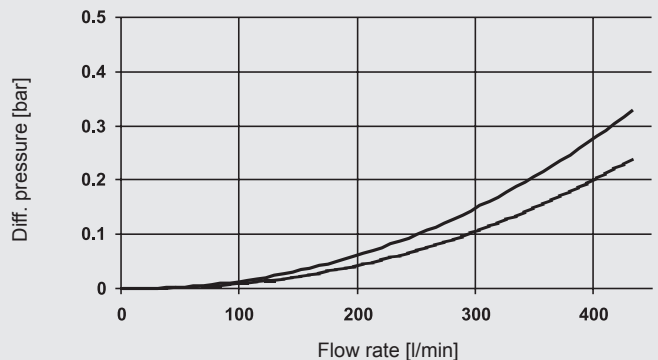
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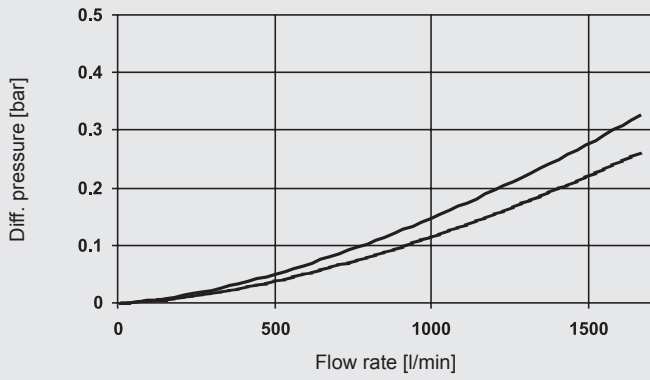
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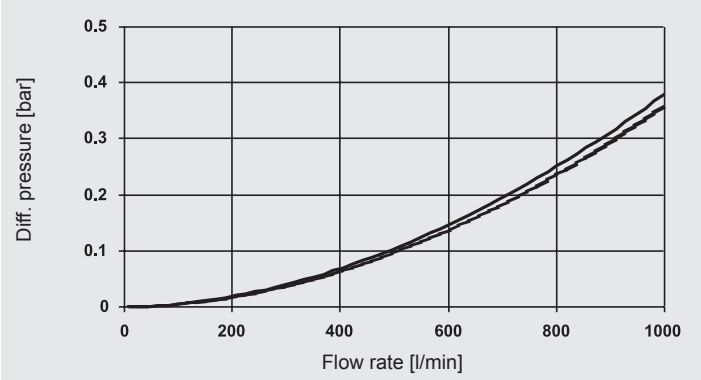
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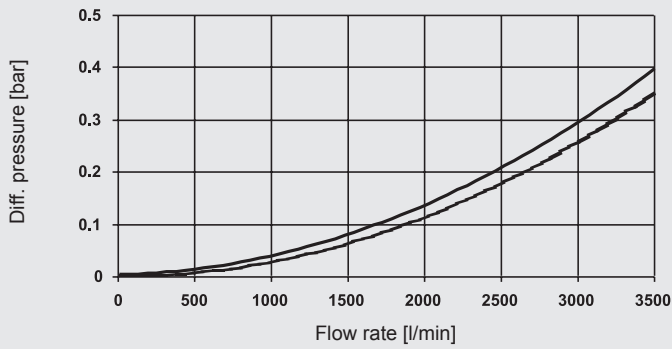
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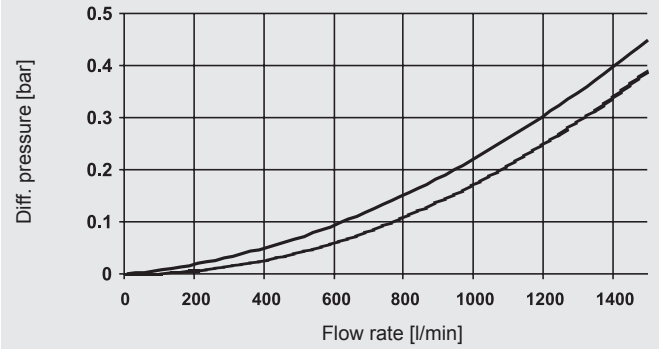
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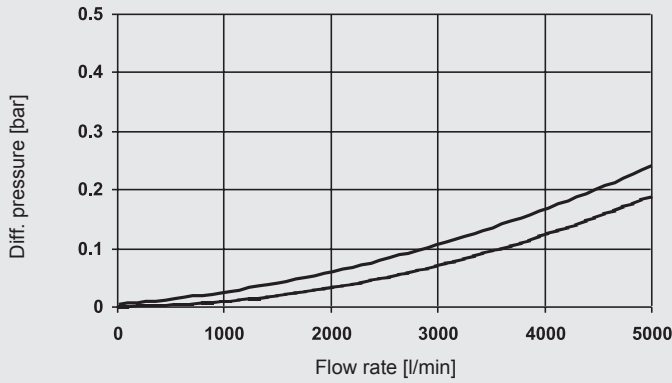
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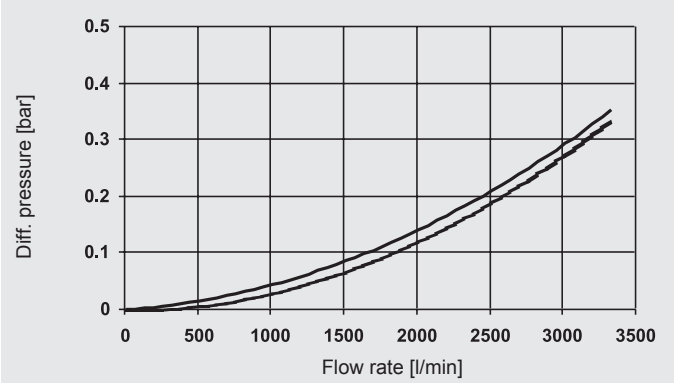
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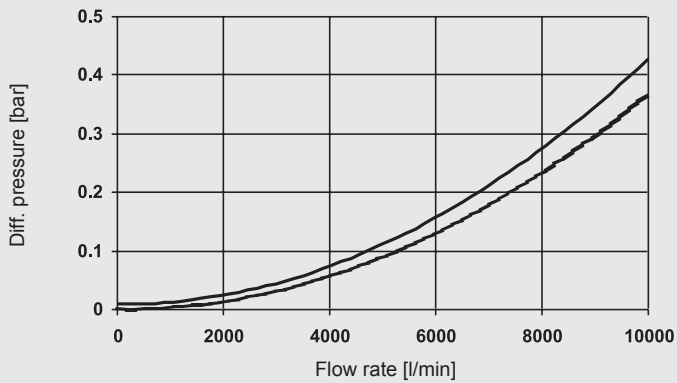
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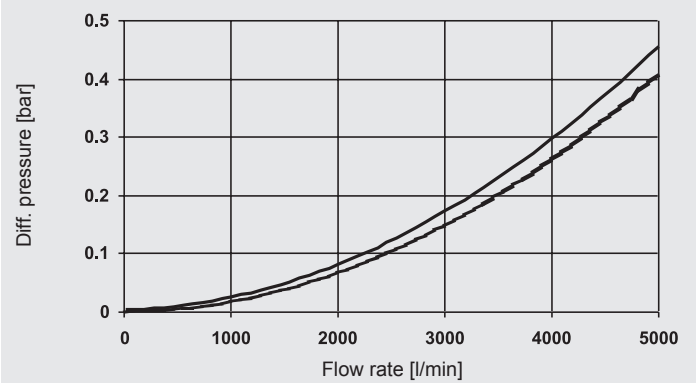
### MRFD-6



### MRF-7

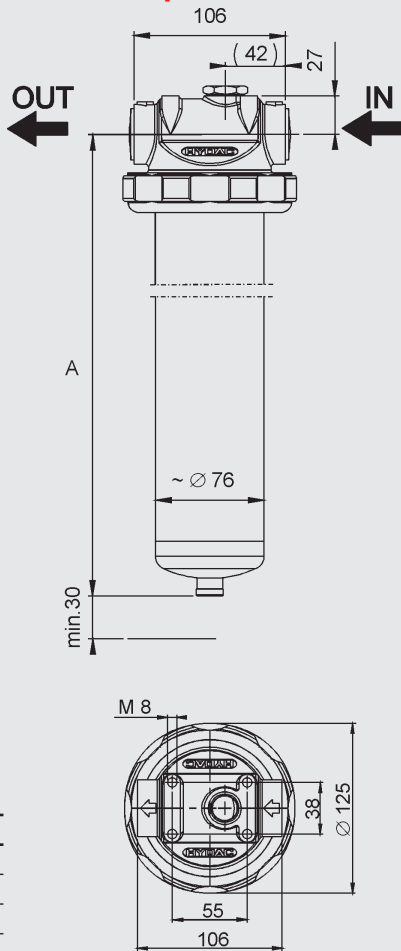


### MRFD-7



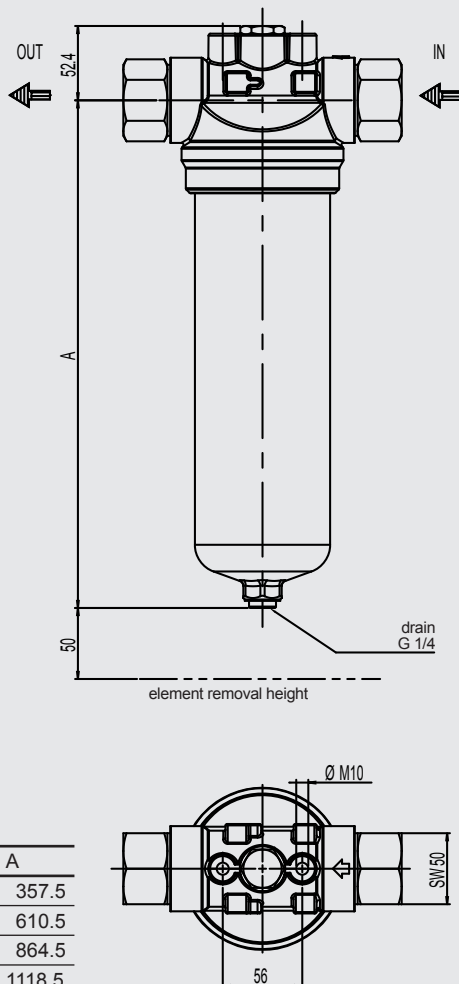
## Dimensions and technical specifications

### MRF-1 E



Element size	A
10 = 10"	332.5
20 = 20"	586.5
30 = 30"	816
40 = 40"	1094.5

### MRF-1 N

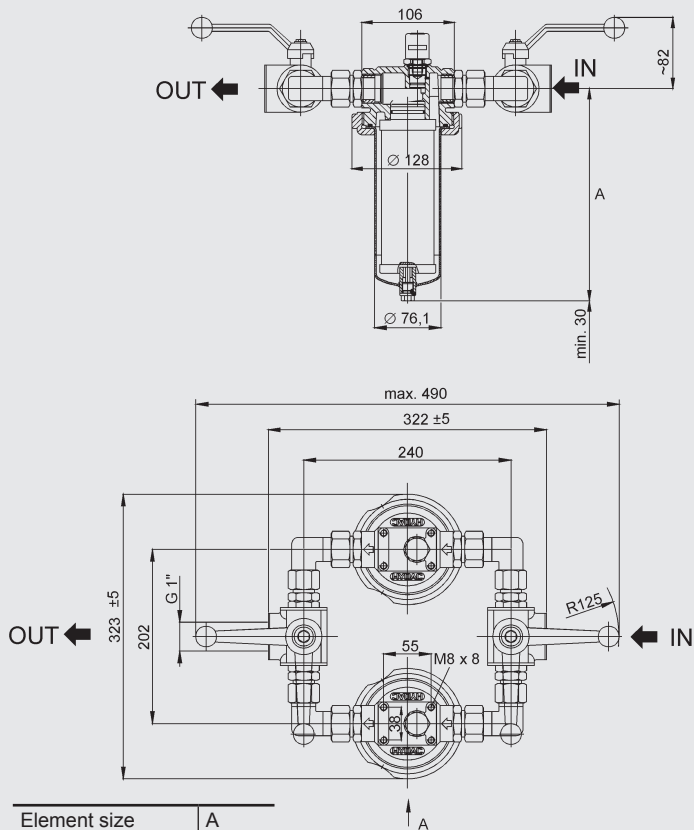


Element size	A
10 = 10"	357.5
20 = 20"	610.5
30 = 30"	864.5
40 = 40"	1118.5

Max. operating pressure	10 bar / 40 bar
Hydraulic connection (IN, OUT)	G 1"
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 4.5 kg 20": 5.9 kg 30": 7.4 kg 40": 8.8 kg
Volume of housing	10": 1.1 l 20": 2.2 l 30": 3.2 l 40": 7.4 l
Material of filter head	Stainless steel 1.4581
Material of filter bowl	Stainless steel 1.4571
Material of seals	NBR, FPM, EPDM

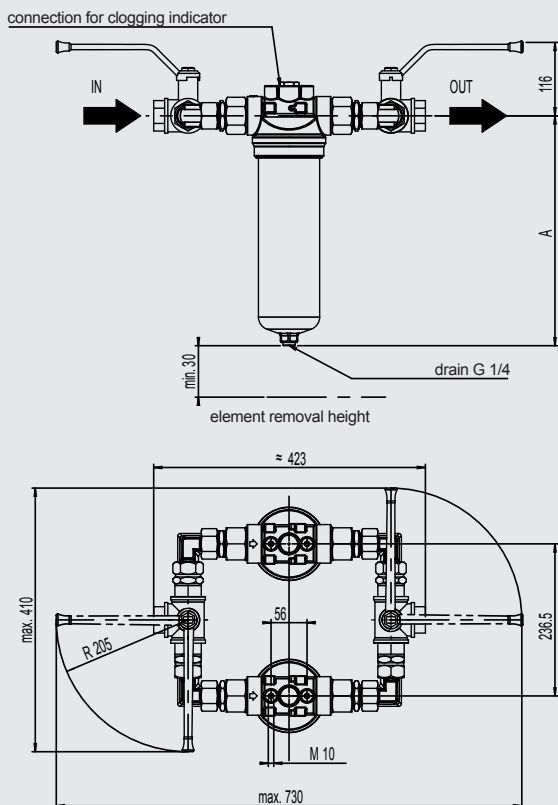
Max. operating pressure	25 bar
Hydraulic connection (IN, OUT)	G 1"
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 2.3 kg 20": 3.2 kg 30": 4.2 kg 40": 5.2 kg
Volume of housing	10": 1.9 l 20": 3.2 l 30": 4.6 l 40": 5.9 l
Material of filter head	Aluminium AC-44100
Material of filter bowl	Aluminium
Material of seals	NBR, FPM, EPDM

## MRFD-1 E



Element size	A
10 = 10"	332.5
20 = 20"	586.5
30 = 30"	816
40 = 40"	1094.5

## MRFD-1 N

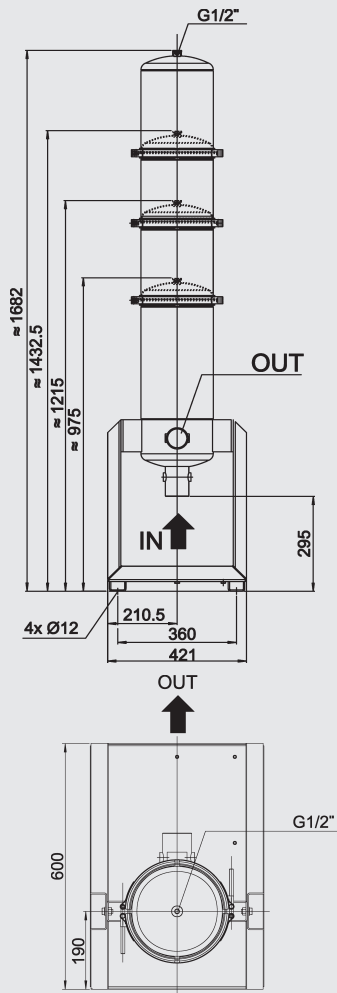


Element size	A
10 = 10"	357.5
20 = 20"	610.5
30 = 30"	864.5
40 = 40"	1118.5

Max. operating pressure	10 bar / 40 bar
Hydraulic connection (IN, OUT)	G 1"
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 14 kg 20": 17 kg 30": 20 kg 40": 23 kg
Volume of housing	10": 2 x 1.1 l 20": 2 x 2.2 l 30": 2 x 3.2 l 40": 2 x 7.4 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Stainless steel 1.4581
Material of filter bowl	Stainless steel 1.4571
Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

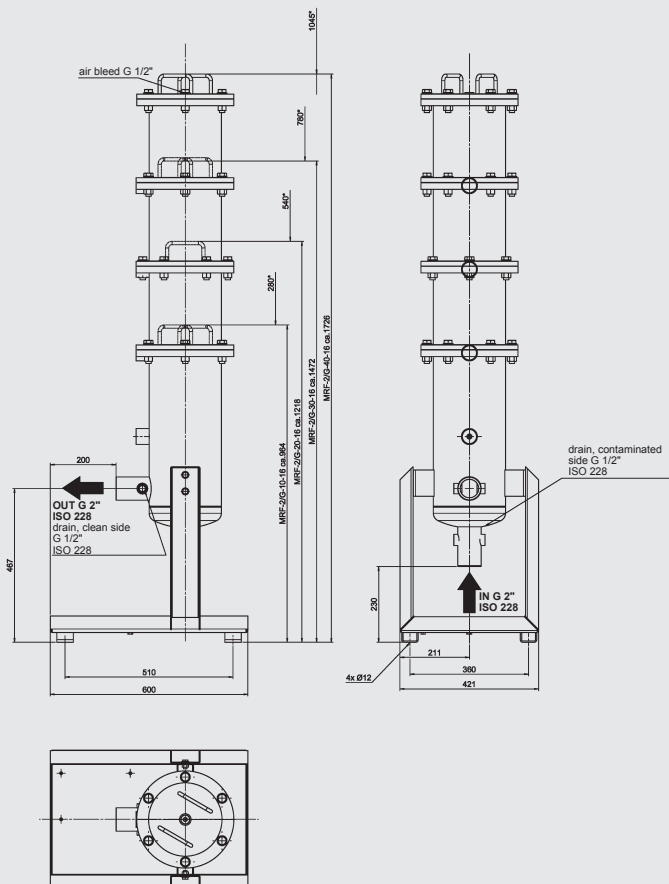
Max. operating pressure	25 bar
Hydraulic connection (IN, OUT)	G 1"
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 12.2 kg 20": 14.0 kg 30": 16.0 kg 40": 20.6 kg
Volume of housing	10": 2x1.9 l 20": 2x3.2 l 30": 2x4.6 l 40": 2x5.9 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Aluminium AC-44100
Material of filter bowl	Aluminium
Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRF-2



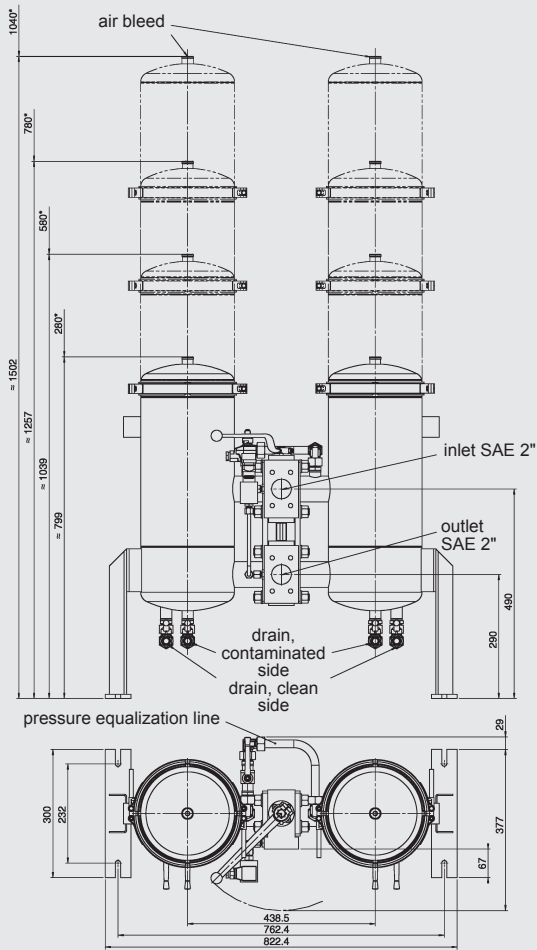
Max. operating pressure	10 bar
Hydraulic connection (IN, OUT)	G 1", G1 1/2", G2"
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 30 kg 20": 35 kg 30": 36 kg 40": 38 kg
Volume of housing	10": 16 l 20": 24 l 30": 32 l 40": 40 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Stainless steel 1.4301
Material of filter bowl	Stainless steel 1.4301
<b>For housing material N</b>	
Material of connections	Carbon steel
Material of clogging indicator	Aluminium
<b>For housing material E</b>	
Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRF-2 16bar



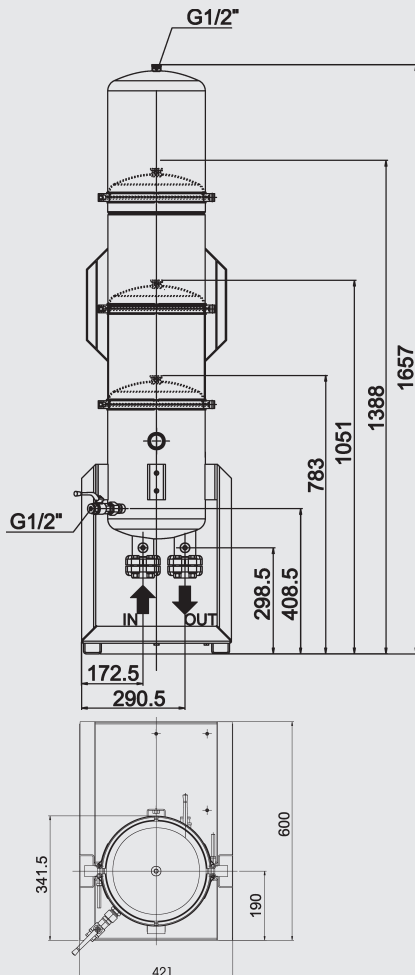
Max. operating pressure	16 bar
Hydraulic connection (IN, OUT)	G 1", G1 1/2", G2"
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 66 kg 20": 70 kg 30": 75 kg 40": 78 kg
Volume of housing	10": 21 l 20": 31 l 30": 40 l 40": 50 l
Material of seals	FPM, NBR, EPDM
Material of filter head	Stainless steel 1.4301
Material of filter bowl	Stainless steel 1.4301
<b>For housing material N</b>	
Material of connections	Carbon steel
Material of clogging indicator	Aluminium
<b>For housing material E</b>	
Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRFD-2 10bar



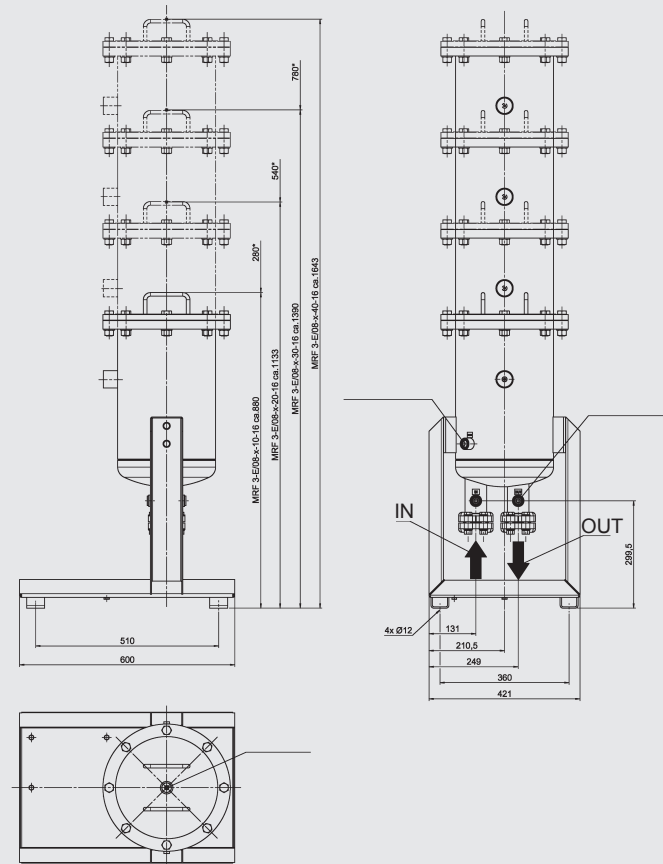
Max. operating pressure	10 bar
Hydraulic connection (IN, OUT)	SAE DN 50
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 120 kg 20": 130 kg 30": 135 kg 40": 144 kg
Volume of housing	10": 2 x 17 l 20": 2 x 26 l 30": 2 x 35 l 40": 2 x 45 l
Material of seals	FPM, NBR, EPDM
Material of filter head	Stainless steel 1.4301
Material of filter bowl	Stainless steel 1.4301
<b>For housing material N</b>	
Material of connections	Carbon steel
Material of clogging indicator	Aluminium
<b>For housing material E</b>	
Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRF-3



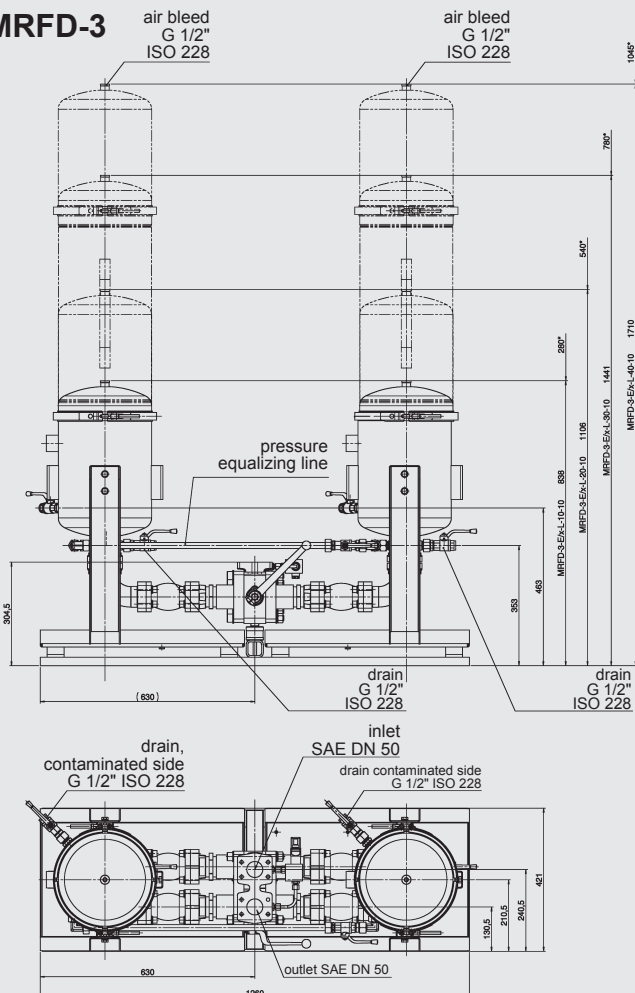
Max. operating pressure	10 bar
Hydraulic connection (IN, OUT)	G1", G1 1/2", G2", SAE DN50, DIN DN50
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 35 kg 20": 40 kg 30": 45 kg 40": 49 kg
Volume of housing	10": 21 l 20": 42 l 30": 56 l 40": 70 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Stainless steel 1.4301
Material of filter bowl	Stainless steel 1.4301
<b>For housing material N</b>	
Material of connections	Carbon steel
Material of clogging indicator	Aluminium
<b>For housing material E</b>	
Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRF-3 16bar



Max. operating pressure	16 bar
Hydraulic connection (IN, OUT)	G 1", G1 1/2", G2" SAE DN 50, DIN DN 50
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 105 kg 20": 110 kg 30": 120 kg 40": 125 kg
Volume of housing	10": 33 l 20": 47 l 30": 60 l 40": 71 l
Material of seals	FPM, NBR, EPDM
Material of filter head	Stainless steel 1.4301
Material of filter bowl	Stainless steel 1.4301
<b>For housing material N</b>	
Material of connections	Carbon steel
Material of clogging indicator	Aluminium
<b>For housing material E</b>	
Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

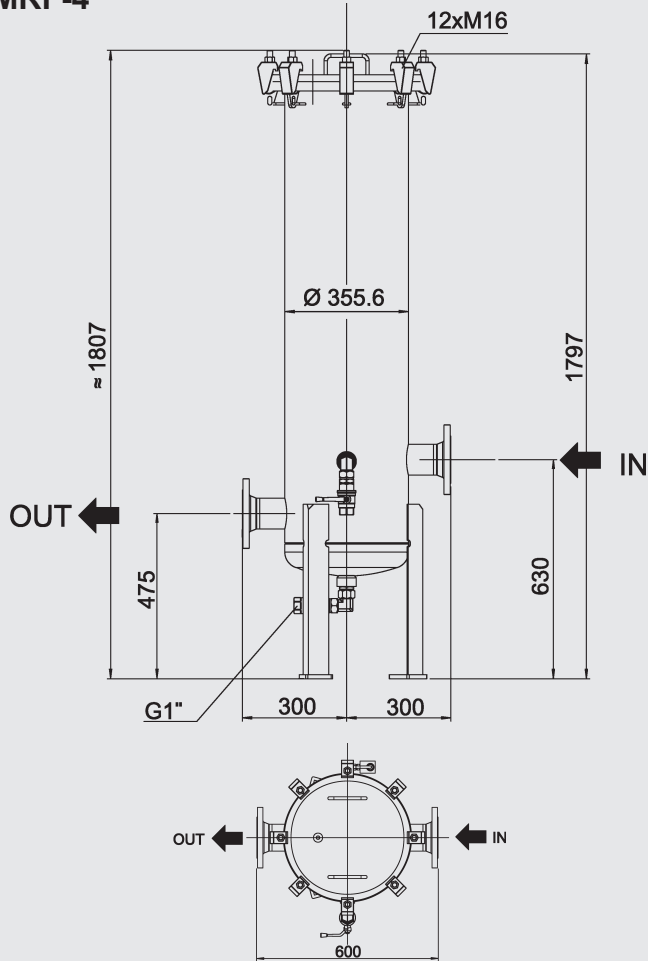
## MRFD-3



Max. operating pressure	10 bar
Hydraulic connection (IN, OUT)	SAE DN 50
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	10": 140 kg 20": 150 kg 30": 170 kg 40": 180 kg
Volume of housing	10": 2 x 33 l 20": 2 x 47 l 30": 2 x 60 l 40": 2 x 71 l
Material of seals	FPM, NBR, EPDM
Material of housing	Stainless steel 1.4301
Material of drip tray	S235JR powder-coated
Material of change-over valve	EN-G35-400-15
<b>For housing material N</b>	
Material of connections	Carbon steel
Material of clogging indicator	Aluminium



## MRF-4



Max. operating pressure	10 bar / 16 bar
Hydraulic connection (IN, OUT)	DN 80/ EN 1092
Permitted temperature range of fluid	-10 to 90°C
Weight (empty)	165 kg (10 bar)
Volume of housing	130 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher
Material of filter bowl	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher

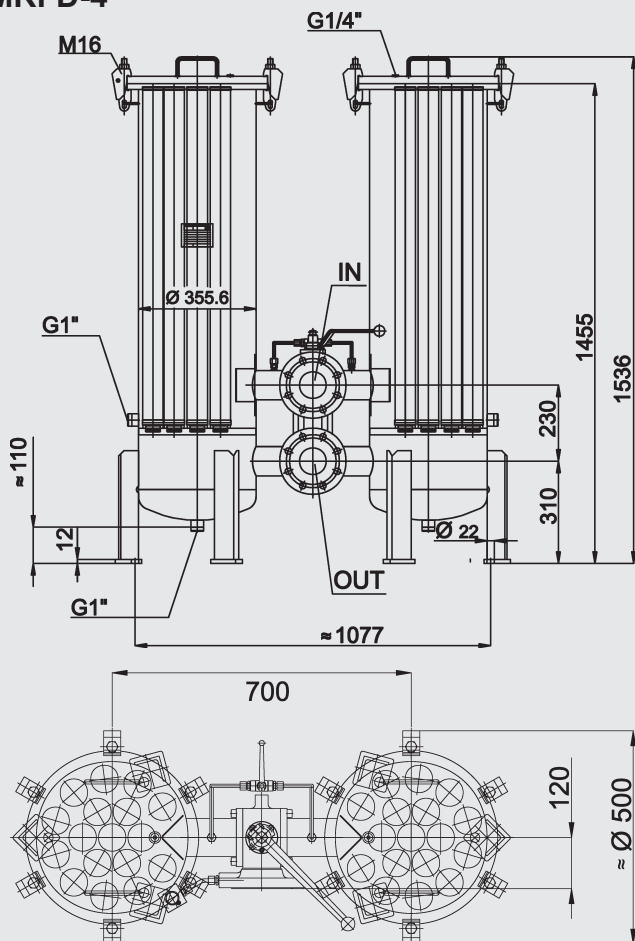
### For housing material N

Material of connections	Carbon steel
Material of clogging indicator	Aluminium

### For housing material E

Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRFD-4



Max. operating pressure	10 bar / 16 bar
Hydraulic connection (IN, OUT)	DN 80/ EN 1092
Permitted temperature range of fluid	-10 to 90 °C
Weight (empty)	380 kg (10 bar)
Volume of housing	2 x 130 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher
Material of filter bowl	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher

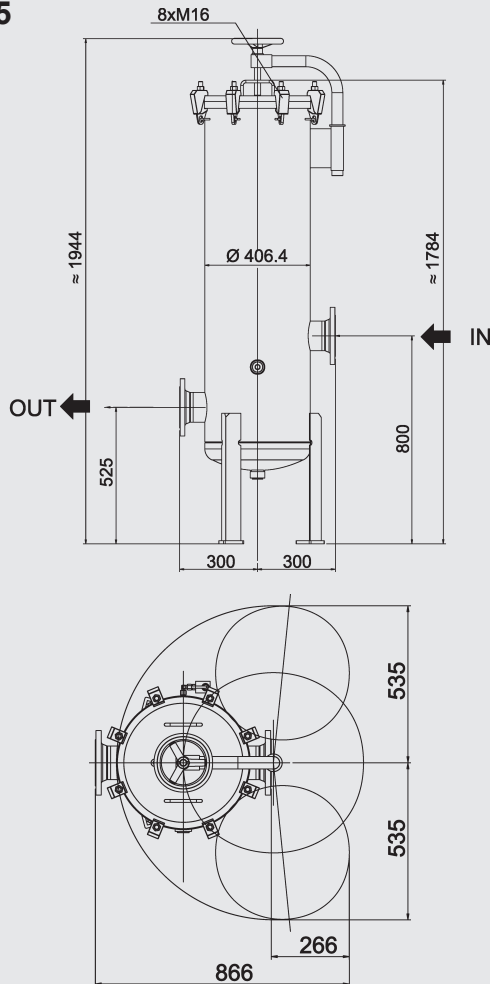
### For housing material N

Material of connections	Carbon steel
Material of clogging indicator	Aluminium

### For housing material E

Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRF-5



Max. operating pressure	10 bar / 16 bar
Hydraulic connection (IN, OUT)	DN 100/ EN 1092
Permitted temperature range of fluid	-10 to 90°C
Weight (empty)	230 kg (10 bar)
Volume of housing	180 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher
Material of filter bowl	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher

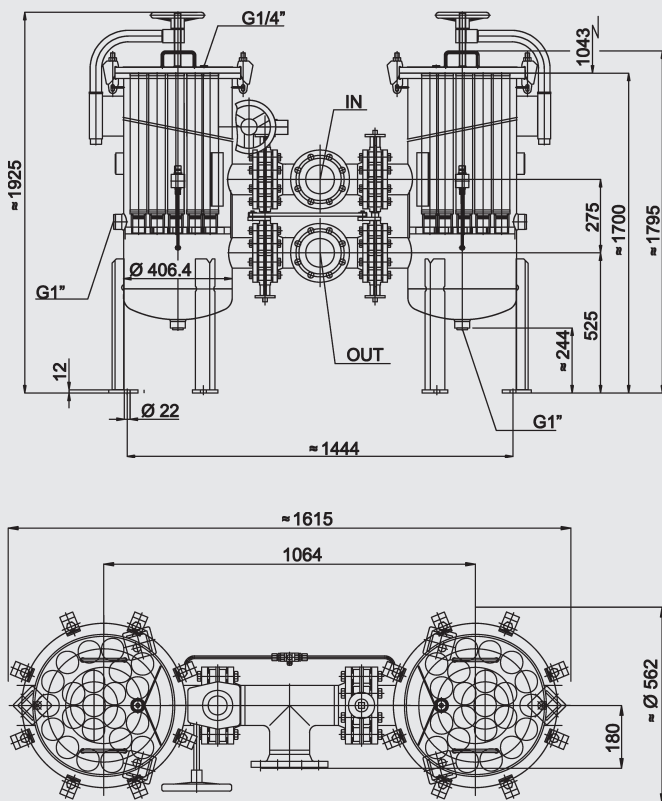
### For housing material N

Material of connections	Carbon steel
Material of clogging indicator	Aluminium

### For housing material E

Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRFD-5



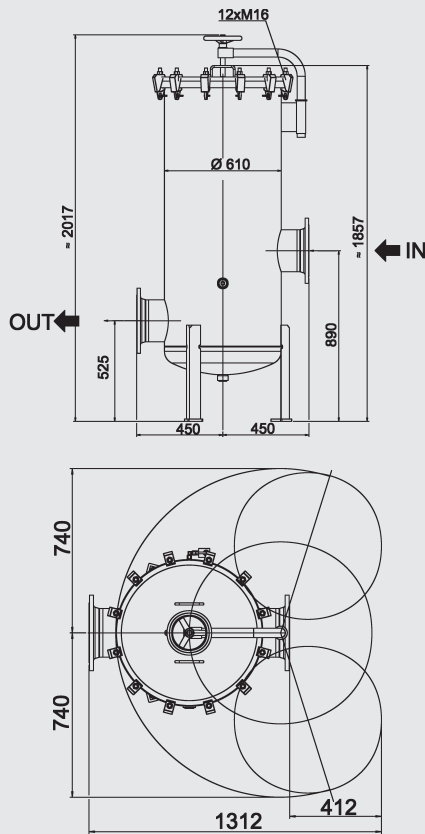
Max. operating pressure	10 bar / 16 bar
Hydraulic connection (IN, OUT)	DN 100/ EN 1092
Permitted temperature range of fluid	-10 to 90°C
Weight (empty)	530 kg (10 bar)
Volume of housing	2 x 180 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher
Material of filter bowl	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher

### For housing material N

Material of connections	Carbon steel
Material of clogging indicator	Aluminium



## MRF-7



Max. operating pressure	10 bar / 16 bar
Hydraulic connection (IN, OUT)	DN 200/ EN 1092
Permitted temp. range of fluid	-10 to 90°C
Weight (empty)	400 kg (10 bar)
Volume of housing	465 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher
Material of filter bowl	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher

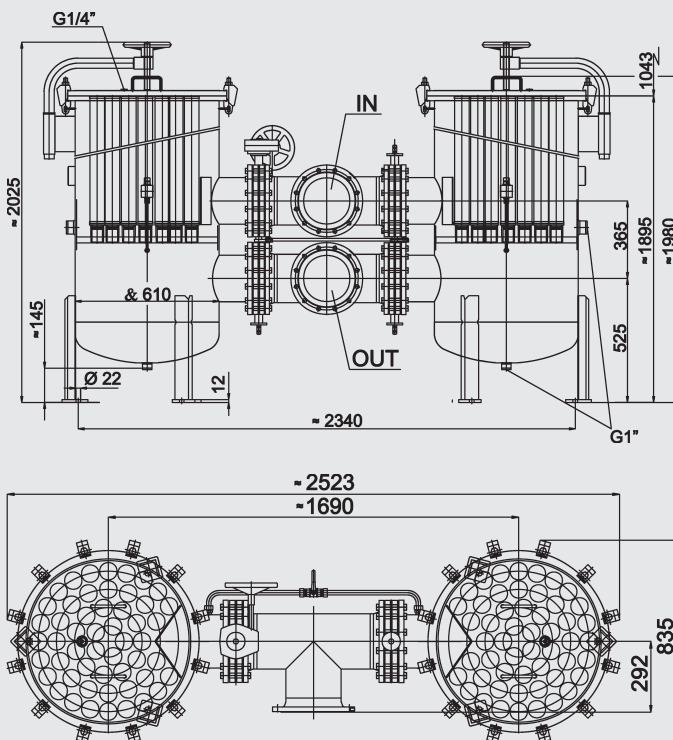
### For housing material N

Material of connections	Carbon steel
Material of clogging indicator	Aluminium

### For housing material E

Material of connections	Stainless steel
Material of clogging indicator	Stainless steel

## MRFD-7



Max. operating pressure	10 bar / 16 bar
Hydraulic connection (IN, OUT)	DN 200/ EN 1092
Permitted temperature range of fluid	-10 to 90°C
Weight (empty)	920 kg (10 bar)
Volume of housing	2 x 465 l
Material of seals	NBR, FPM, EPDM
Material of filter head	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher
Material of filter bowl	Carbon steel 1.0305, 1.0038/ Stainless steel 1.4301 or higher

### For housing material N

Material of connections	Carbon steel
Material of clogging indicator	Aluminium

## NOTE

The information in this brochure relates to the operating conditions and applications described.

For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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