Filter element

Element description

M - Wire Mesh

A - Microfibre

Characteristics of filter elements with nominal filtration, M series

For wire mesh filter elements, filtration degree is defined as the maximum diameter of a sphere corresponding to the mesh size, in microns.

Characteristics of filter elements with absolute filtration, A series

For microfibre filter elements, filtration degree is defined by the test bench MULTIPASS ISO 16889.

Reference standards

All filter elements comply with the following **ISO** standards.

ISO	**2941**	- Collapse and burst resistance.
ISO	**2942**	- Bubble point test resistance.
ISO	**2943**	- Compatibility with fluids.
ISO	**3723**	- Resistance to axial deformation.
ISO	**23181**	- Fatigue test with flow.
ISO	**3968**	- Pressure drop.
ISO	**16889**	- Filtration efficiency by means of Multipass.

Multipass test in compliance new ISO 16889
Contaminant ISO MTD

Filtration	$\beta_{X©} \geq 1000$
Filter element	
A01*	<4
A03	5
A06	7
A10	10
A16	15
A25	20

* On request

International standards for fluid contamination control

Components	**Recommended filtrations**								
Servo valves			●	●	●				
Proportional Valves				●	●	●			
Variable displacement pumps.					●	●	●		
Cartridge valves						●	●	●	
Piston pumps						●	●	●	
Vane pumps							●	●	●
Pressure - flow rate control valves							●	●	●
Solenoid valves							●	●	●
ISO code	12/10/7	13/11/8	14/12/9	15/13/10	16/14/11	17/15/12	18/16/13	19/17/14	20/18/15
NAS code	1	2	3	4	5	6	7	8	9
Absolute filtration recommended	$\beta_{<4©} \geq 1000$	$\beta_{5©} \geq 1000$			$\beta_{7©} \geq 1000$		$\beta_{10©} \geq 1000$	$\beta_{15©} \geq 1000$	$\beta_{20©} \geq 1000$

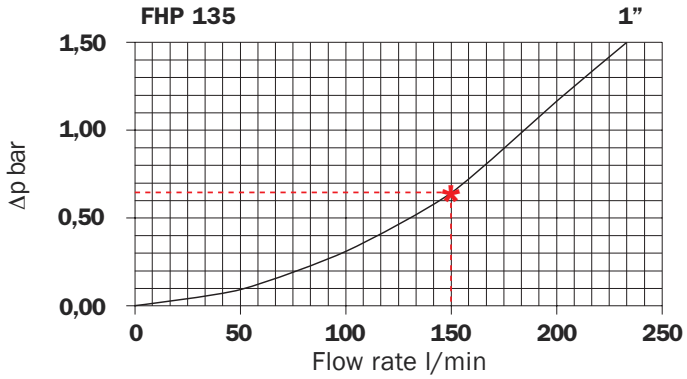
Correct sizing of the filter must be based on a variable pressure drop depending on the application:

- pressure filter Δp from 0,8 to 1,5 bar

The pressure drop calculation is performed by adding together the value for the housing and the value for the filter element. The pressure drop in the housing is proportional to the fluid density kg/dm³; all the graphs in the catalogue are referred to mineral oil with density of 0,86 kg/dm³. The filter element pressure drop value is proportional to viscosity mm²/s, the Y values in the catalogue are referred to viscosity of 30 mm²/s.

Filter housing Δp pressure drop

The curves are plotted utilising mineral oil with density of 0,86 kg/dm³ to ISO 3968. Δp varies proportionally with density.



For Y values see next page:

Sizing data for single cartridge, head at top

Δp Tot.
Δpc Filter housing
Δpe Filter element
Y Multiplication factor (see pages 126 - 127)
Q l/min = flow rate
V1 = reference viscosity 30 mm²/s (cSt)
V2 = operating viscosity in mm²/s (cSt)
Δp Tot. = Δpc + Δpe
Δpe = Y : 1000 x Q x (V2/V1)

Calculation example with HLP Mineral Oil Variation in viscosity

Data:
Filter with in-line connections
Pressure = 380 bar
Flow rate = 150 l/min
Viscosity = 46 mm²/s (cSt)
Density = 0,86 Kg/dm³
Filtration = 10 μm absolute
With bypass valve

Filter type - FHP 135 3 (see housings pressure drop graphs on page 146)

Practical example

Q = 150 l/min
V_2 = 46 mm²/s (cSt)
Pmax = 380 bar
Filtration = 10 μm absolute
Δp Tot. max = **1,5 bar** (max. recommended value)
Filter element series N, Δp max 20 bar
Δpc = 0,657 bar (* see diagram)
Δpe = (3,38 : 1000) x 150 x (46/30) = 0,777 bar
Δp Tot. = 0,657 + 0,777 = 1,434 bar

Sized filter type:
FHP 135 3 B A G2 A10 N P01

Calculation examples with HFD fluid Variations in viscosity and density

Data:
Filter with in-line connections
Pressure = 380 bar
Flow rate = 150 l/min
Viscosity = 46 mm²/s (cSt)
Density = 1,1 Kg/dm³
Filtration = 10 μm absolute
With bypass valve

Filter type - FHP 135 3 (see housings pressure drop graphs on page 146)

Practical example

Q = 150 l/min
V_2 = 46 mm²/s (cSt)
Pmax = 380 bar
Filtration = 10 μm absolute
Δp Tot. max = **1,5 bar** (max. recommended value)
Filter element series N, Δp max 20 bar
Δpc = 0,657 x (1,1/0,86)= 0,84
Δpe = (3,38 : 1000) x 150 x (46/30) = 0,777 bar
Δp Tot. = 0,84 + 0,777 = 1,62 bar

Filter type:
FHP 135 3 B A G2 A10 N P01 (Δp max exceeded)

Switch to next size up **FHP 320...**

Multiplication factor “Y” for definition of the pressure drop of filter elements.

Reference viscosity 30 mm²/s

Filter Element	Absolute Filtration N - R Series					Nominal Filtration N Series
Type	**A 0 3**	**A 0 6**	**A 1 0**	**A 1 6**	**A 2 5**	**M 2 5**
HP 011 1	332,71	250,07	184,32	152,36	128,36	-
2	220,28	165,56	74,08	59,13	37,05	-
3	123,24	92,68	41,48	33,08	20,72	-
4	77,76	58,52	28,37	22,67	16,17	-
HP 039 2	70,66	53,20	25,77	20,57	14,67	4,90
3	36,57	32,28	18,00	13,38	8,000	2,90
4	26,57	23,27	12,46	8,80	5,580	2,20
HP 050 1	31,75	30,30	13,16	12,3	7,29	1,60
2	24,25	21,26	11,70	9,09	4,90	1,40
3	17,37	16,25	8,90	7,18	3,63	1,25
4	12,12	10,75	6,10	5,75	3,08	1,07
5	7,00	6,56	3,60	3,10	2,25	0,80
HP 065 1	58,50	43,46	23,16	19,66	10,71	1,28
2	42,60	25,64	16,22	13,88	7,32	1,11
3	20,50	15,88	8,18	6,81	3,91	0,58
HP 135 1	20,33	18,80	9,71	8,66	4,78	2,78
2	11,14	10,16	6,60	6,38	2,22	1,11
3	6,48	6,33	3,38	3,16	2,14	1,01
HP 320 1	10,88	9,73	5,02	3,73	2,54	1,04
2	4,40	3,83	1,75	1,48	0,88	0,71
3	2,75	2,11	1,05	0,87	0,77	0,61
4	2,12	1,77	0,98	0,78	0,55	0,47
HP 500 1	4,44	3,67	2,300	2,10	1,65	0,150
2	3,37	2,77	1,775	1,68	1,24	0,100
3	2,22	1,98	1,114	1,09	0,75	0,075
4	1,81	1,33	0,930	0,86	0,68	0,050
5	1,33	1,15	0,766	0,676	0,48	0,040

Filter Element	Absolute Filtration N Series					Nominal Filtration N Series
Type	**A 0 3**	**A 0 6**	**A 1 0**	**A 1 6**	**A 2 5**	**M 2 5**
HF 320 1	3,65	2,95	2,80	1,80	0,90	0,38
2	2,03	1,73	1,61	1,35	0,85	0,36
3	1,84	1,42	1,32	1,22	0,80	0,35

Multiplication factor “Y” for definition of the pressure drop of filter elements.

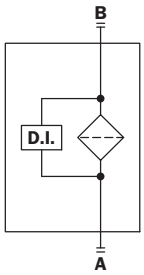
Reference viscosity 30 mm²/s

Filter Element	Absolute Filtration H - S Series				
Type	**A 0 3**	**A 0 6**	**A 1 0**	**A 1 6**	**A 2 5**
HP 011 1	424,58	319,74	235,17	194,44	163,78
2	281,06	211,25	94,53	75,45	47,26
3	130,14	97,50	43,63	34,82	21,81
4	109,39	82,25	36,79	29,37	18,40
HP 021 2	216,2	162,5	72,72	58,04	36,36
3	108,1	81,25	36,36	29,02	18,18
HP 050 1	47,33	34,25	21,50	20,50	14,71
2	29,10	25,95	14,04	10,90	5,88
3	20,85	19,50	10,68	8,61	4,36
4	14,55	12,90	7,32	6,90	3,69
5	9,86	9,34	6,40	4,80	2,50
HP 065 1	62,28	58,56	26,66	21,66	12,42
2	43,30	36,63	17,66	14,44	8,88
3	20,55	16,90	8,55	7,09	4,16
HP 135 1	29,16	25,33	13,00	12,47	5,92
2	14,28	11,04	7,86	7,60	4,44
3	8,96	7,46	4,89	4,16	3,07
HP 320 1	13,00	12,19	6,80	6,40	3,32
2	6,45	5,31	3,01	2,89	1,73
3	4,13	3,140	1,90	1,78	1,17
4	3,17	2,71	1,80	1,70	1,10
HP 500 1	9,70	8,81	4,55	4,47	2,8
2	5,46	4,63	2,88	2,68	2,2
3	3,90	3,74	2,20	2,07	1,53
4	3,10	2,48	1,56	1,53	1,02
5	1,93	1,83	1,14	1,08	0,69

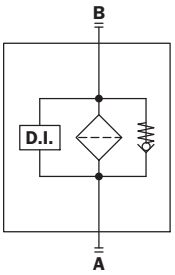
Filter Element	Absolute Filtration H Series				
Type	**A 0 3**	**A 0 6**	**A 1 0**	**A 1 6**	**A 2 5**
HF 320 1	6,50	6,20	3,95	3,32	2,70
2	3,17	2,87	2,23	2,02	1,65
3	2,60	2,40	1,64	1,62	1,42

Hydraulic symbols & Compatibility

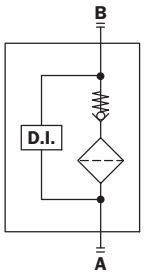
Style **S**



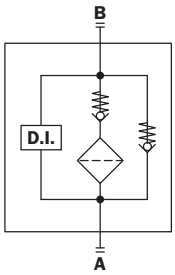
Style **B**



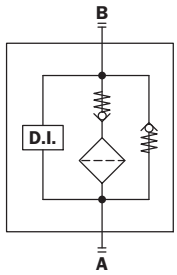
Style **T**



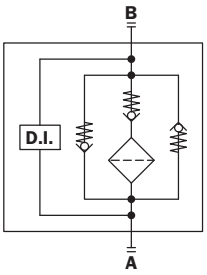
Style **D**



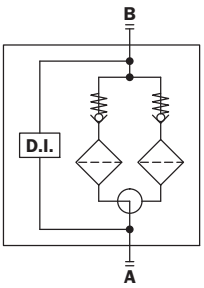
Style **V**



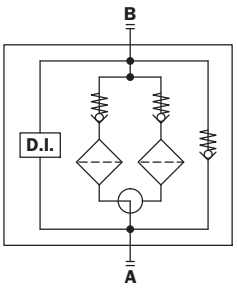
Style **Z**



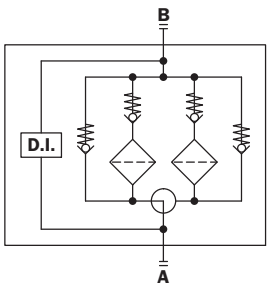
Style **S**
Serie FHD



Style **B**
Serie FHD 051



Style **B**
Serie FHD 326 - 333

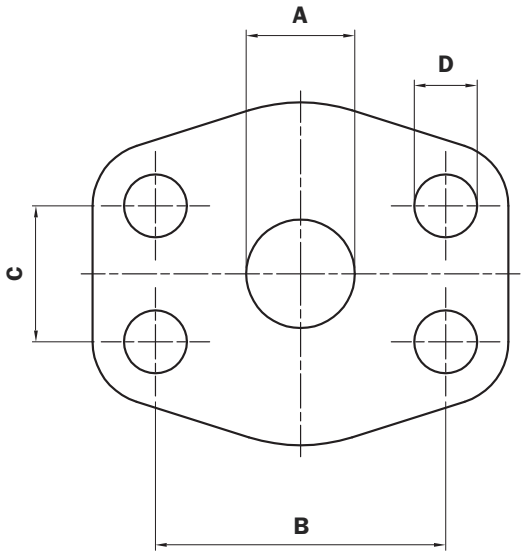


Filter series	Hydraulic symbols					
	Style S	Style B	Style T	Style D	Style V	Style Z
FMP 039	●	●				
FMM 050	●	●	●	●		
FHA 051	●	●	●	●		●
FMP	●	●	●	●		
FHP 010-011	●	●			●	●
FHP	●	●	●	●		
FHP 320-500	●	●	●	●	●	●
FHM CETOP	●					
FHM MANIFOLD	●	●	●	●		
FHB	●	●	●	●		
FHF 325	●	●				
FHD 021	●					
FHD 051	●	●				
FHD 326-333	●	●				

Compatibility (to ISO 2943)

- Housings compatible with:
  Mineral oils, synthetic fluids
  aqueous emulsions, water and glycol.
- The filter elements are compatible with:
  Mineral oils, synthetic fluids.
  Aqueous emulsions, water and glycol
  (series W required: only for FHF 325 element).
- NBR seals series A, compatible with:
  Mineral oils, synthetic fluids, aqueous emulsions
  and water and glycol.
- FPM seals series V, compatible with:
  Mineral oils, synthetic fluids
  aqueous emulsions, water and glycol.

FLANGE SAE 3000 - 6000 PSI



Connection to 3000 psi SAE flange

Dimension	3/4" SAE 3000 PSI **M**	3/4" SAE 3000 PSI **UNC**	1" SAE 3000 PSI **M**	1" SAE 3000 PSI **UNC**	1 1/4" SAE 3000 PSI **M**	1 1/4" SAE 3000 PSI **UNC**	1 1/2" SAE 3000 PSI **M**	1 1/2" SAE 3000 PSI **UNC**	2" SAE 3000 PSI **M**	2" SAE 3000 PSI **UNC**
A	19	19	25	25	32	32	38	38	51	51
B	47,6	47,6	52,4	52,4	58,7	58,7	70	70	77,8	77,8
C	22,2	22,2	26,2	26,2	30,2	30,2	35,7	35,7	42,9	42,9
D	M10	3/8" UNC	M10	3/8" UNC	M10	7/16"UNC	M12	1/2" UNC	M12	1/2" UNC

Connection to 6000 psi SAE flange

Dimension	3/4" SAE 6000 PSI **M**	3/4" SAE 6000 PSI **UNC**	1 1/4" SAE 6000 PSI **M**	1 1/4" SAE 6000 PSI **UNC**	1 1/2" SAE 6000 PSI **M**	1 1/2" SAE 6000 PSI **UNC**	2" SAE 6000 PSI **M**	2" SAE 6000 PSI **UNC**
A	19	19	32	32	38	38	51	51
B	50,8	50,8	66,7	66,7	79,4	79,4	96,8	96,8
C	23,8	23,8	31,8	31,8	36,5	36,5	44,5	44,5
D	M10	3/8" UNC	M14	1/2" UNC	M16	5/8" UNC	M20	3/4" UNC

SAE flange connections available on Pressure filters

Filter Type	Connections								
	SAE 3000 psi					SAE 6000 psi			
	3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1 1/4"	1 1/2"	2"
FMP 135	X	X							
FMP 320			X	X					
FHP 135	X	X				X			
FHP 320			X	X			X		
FHP 500				X	X			X	X
FHF 325								X	
FHD 333								X	