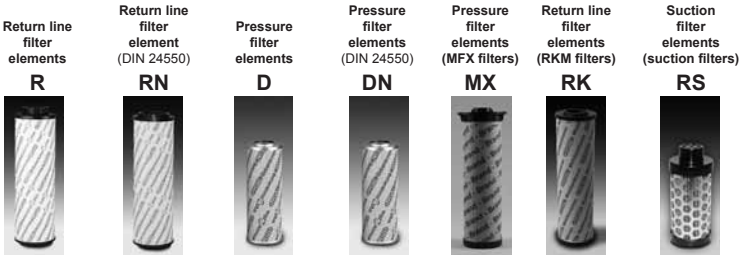
Filter Elements
for use in HYDAC filters*

*** For HYDAC filter elements which are suitable for use in other manufacturers' filters, please see brochure no. 7.208**



1. TECHNICAL SPECIFICATIONS

1.1 CONSTRUCTION

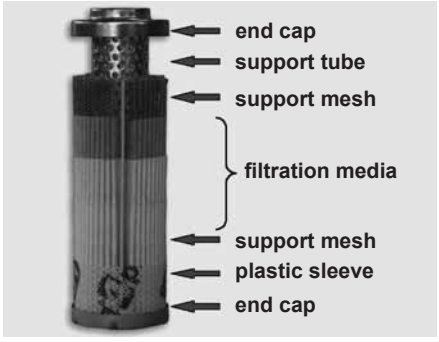
As the core of the filter, it is the filter element which performs the actual filtration and/or dewatering function in the housing.

They consist of several pleated filtration and support layers which are placed as a cylinder around or inside the stabilizing support tube. These mesh packs are sealed by the end-caps.

Regardless of the type of filter, flow direction through the filter elements is from out to in.

Depending on the filter material, the filter mesh pack is encased in an additional outer plastic sleeve.

As an example, the construction of a Betamicron®-4 element is illustrated below.

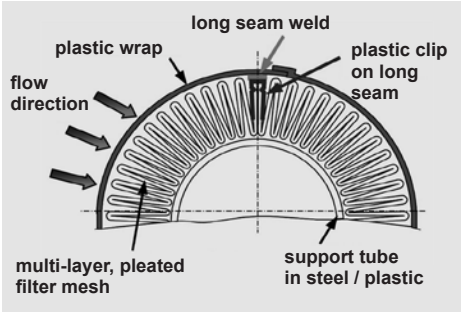


New element technology

With the new Stat-Free filter elements, HYDAC has for the first time succeeded in combining excellent electrostatic characteristics with filtration performance. A new type of filter mesh-pack and element design have enabled unrivalled low charge generation of the filter element and of the fluid in system operation.

1.2 SPECIFICATIONS

Pressure stability (permitted Δp across element)	10 to 210 bar depending on the selection of filter material (see point 2.2)
Temperature range	**-30 °C to +100 °C** for FPM seal material to -10 °C **0 °C to +100 °C** (for water absorbing filter material)
Filtration ratings	3 µm to 200 µm (1 µm on request)
Filtration performance	depending on filter material, nominal or or absolute filtration up to $\beta_{x(c)} \geq 1000$



1.3 SEALS

NBR (= Perbunan)

1.4 INSTALLATION

- in return line filters (element type **R**)
- in return line filters to DIN 24550 (element type **RN**)
- in inline filters (element type **D**)
- in inline filters to DIN 24550 (element type **DN**)
- in inline filters MFX (element type **MX**)
- in return line suction filters (element type **RK**)
- in suction filters (element type **RS**)

To select the element types for particular HYDAC housings, please refer to the table in point 2.1.

1.5 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.6 QUALITY ASSURANCE

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941
- ISO 2942
- ISO 2943
- ISO 3724
- ISO 3968
- ISO 11170
- ISO 16889

1.7 SPECIAL MODELS AND ACCESSORIES

- Bypass valve models which differ from the particular standard
- Only wire mesh elements are suitable for filtering HFA and HFC emulsions
- Seals in FPM, EPDM
- Customized versions

E 7.200.11/03.12

2. SELECTING THE FILTER ELEMENT

2.1 TYPES

Using the table below, select the correct element type for the relevant HYDAC housing type.

For installation in housing types	Element type	Sizes	Direction of flow	Element description
DF, DFF, DFDK, DFM, DF...M A, DF...Q E, DFP, DFPF, DFZ, HDF, HDFF, HFM, LF, LFF, LFM, LPF, MFM, LPF...DA	D	30, 35, 55, 60, 75, 95, 110, 140, 160, 240, 260, 280, 300, 330, 450, 500, 650, 660, 900, 990, 1320, 1500	From out to in	- without bypass valve
DFN, DFNF, LFN, LFNF, FLN, FLND, FMND, DFDKN, DFN...Q E	DN	40, 63, 100, 160, 250, 400	From out to in	- without bypass valve
NF, NFD, RF, RFD, RFL, RFLD, RFM	R	30, 60, 75, 90, 110, 150, 160, 165, 185, 210, 240, 270, 330, 450, 500, 580, 600, 660, 750, 850, 950, 1300, 1700, 2600	From out to in	- with bypass valve
RFN, RFND, RFLN, RFLND	RN	40, 63, 100, 160, 250, 400, 630	From out to in	- without bypass valve
MFX	MX	100, 200	From out to in	- with bypass valve
RKM	RK	80, 100, 120, 151, 201, 251, 300, 350, 400, 800	From out to in	- without bypass valve
SF, SFF, SFM	RS	60, 110, 160, 240, 330, 400, 500	From out to in	- with bypass valve

2.2 FILTER MATERIALS

The following materials are available for filtering solid particles:

Photo	Filter material	Short description	Filtration rating in µm	Pressure stability
	BN4HC BH4HC BNK BHK	Betamicron®4 glass fibre, multi-layer with support (BNK and BHK: with synthetic support)	3, 5, 10, 20* 3, 5, 10, 20* 3, 5, 10, 20* 3, 5, 10, 20* *or 3, 6, 10, 25 when dimensions are to DIN 24550	20 bar 210 bar 20 bar 210 bar
	MM	Mobilemicron synthetic fibre, multi-layer with support	10, 15	10 bar
	ECON2	ECOmicron® glass fibre, multi-layer with support	3, 5, 10, 20	10 bar
	G/HC	Lubimicron synthetic fibre, multi-layer with support	10	10 bar
	W, W/HC	Stainless steel wire mesh	25, 50, 100, 200,....	20 bar
	P, P/HC	Paper (cellulose fibre)	10, 20	10 bar
	V VB	Metal fibre	3, 5, 10, 20 3, 5, 10, 20	210 bar 210 bar

For the removal of emulsified or free water, we recommend using HYDAC Aquamicron® filter elements: A super absorber reacts with the water present in the medium and expands to form a gel, from which the water can no longer be extracted even by increasing the pressure.
These filter elements cannot remove dissolved water from the system, i.e. water below the saturation level of the hydraulic medium.

	BN4AM	Betamicron® / Aquamicron® glass fibre with super absorber	3, 10	10 bar
	AM	Aquamicron® super absorber	40	10 bar

2.3 EXAMPLE MODEL CODE

0060 D 010 BN4HC /-V

Size
0060

Type
D

Filtration rating in µm
010

Filter material
BN4HC

Supplementary details
V = FPM seal
SFREE = Stat Free element technology (only for BN4HC and MM filter material;
For G/HC material it is essential to add "SFREE" to code!)

To order the filter element with the correct size, filtration rating and material for the filter you are using, see the "REPLACEMENT ELEMENT" section, Point 2.2., of the relevant complete filter brochure.

Plastic sleeve	Flow direction	Notes	Typical applications
Yes	From out to in	4th generation, improved performance data	working filter in mobile and industrial systems; for systems with high pressure/ flow rate fluctuations; improved static conductivity
Yes	From out to in	particularly low pressure drop; ECON2 is 100% incinerable	for mobile applications; transmission lubrication, systems with high temperature fluctuations and high viscosity oils > ISO VG 100, ...
No, cleaning effect is improved!	From out to in	low pressure drop; can be cleaned to limited extent;	protective filter in cooling lubricant systems
No	From out to in	for low filtration demands	waste compacters, high viscosity oils > ISO VG 100, ...
No, cleaning effect is improved!	From out to in	can be cleaned to a limited extent	protective filter for highly dynamic applications working filter for highly dynamic applications

As an added bonus when using the straight Aquamicron® elements (filter material AM) solid contamination is also filtered out of the hydraulic medium;
with the combined element Betamicron®/Aquamicron® (BN4AM) the particle filtration is further increased by the integration of glass fibre in the construction.
These filter elements are particularly suitable for use offline to condition fluids.

No	From out to in	filtration of particles and water removal	fluid conditioning in mobile machines, hydraulic steel engineering, blast furnace and foundry machines
No	From out to in	primarily for water removal where there is a risk of water condensation forming	hydraulic steel engineering, blast furnace and foundry machines

3. FILTER CALCULATION / SIZING

The total pressure drop of a filter at a certain flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$

$\Delta p_{housing}$ = see housing curve in the relevant filter brochure

$$\Delta p_{element} = Q \cdot \frac{SK^*}{1000} \cdot \frac{viscosity}{30}$$

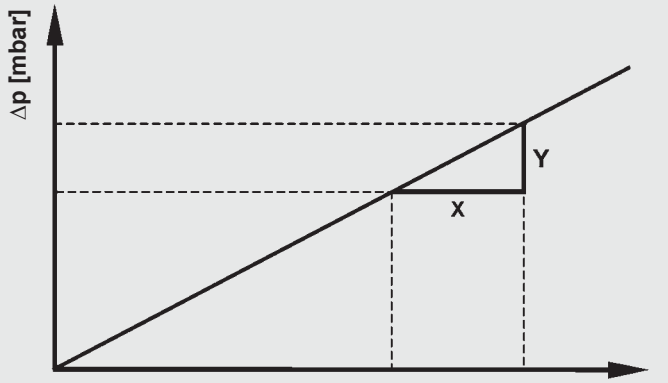
(*see point 3.3)

For ease of calculation, our Filter Sizing Program is available on request free of charge.
NEW: Sizing online at www.hydac.com

3.1 DETERMINING THE ELEMENT GRAPH

The element graph is determined according to ISO 3968 and always corresponds to a straight line with a specific gradient coefficient SK.

This represents the ratio of the flow rate to the pressure drop for a clean element (see below).



$$SK = \frac{Y\ [mbar]}{X\ [l/min]}$$

3.2 QUICK SIZING FOR AQUAMICRON ELEMENTS

When sizing elements with the water absorbing filter material Aquamicron® (AM or BN4AM) we recommend using the quick sizing tables:

Betamicron® - Aquamicron® BN4AM

Size	Recommended Filter flow rate [l/min]	Water retention capacity in cm³ at Δp=2.5 bar and a viscosity of 30 mm²/s
330	13	190
660	28	400
950	39	560
1300	54	790
2600	109	1570

Aquamicron® AM

Size	Recommended filter flow rate [l/min]	Water retention capacity in cm³ at Δp=2.5 bar and a viscosity of 30 mm²/s
330	13 ideal 100 maximum	260 180
500	19 ideal 155 maximum	400 280
660	28 ideal 255 maximum	570 400
850	35 ideal 286 maximum	730 520
950	39 ideal 314 maximum	800 570
1300	54 ideal 437 maximum	1120 790
2600	109 ideal 870 maximum	2230 1570

3.3 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

Size	Filter material: BN4HC							
	Element type: D				Element type: R			
	3 µm	5 µm	10 µm	20 µm	3 µm	5 µm	10 µm	20 µm
30	63.9	43.3	22.8	11.3	68.4	43.9	26.8	14.7
35	23.6	19	14.8	9.3	-	-	-	-
55	13.7	11	8.1	4.8	-	-	-	-
60	28.9	20.4	13.2	7.9	26.8	18.3	10.9	6.9
75	9.3	7.5	5.3	3.1	22	14.2	8.1	4.4
90	-	-	-	-	14.9	10.1	6.7	3.2
95	7.5	6	4.1	2.4	-	-	-	-
110	14.9	10.7	6.6	3.7	14.9	9.4	6	3.2
140	12.8	8.2	4.8	2.9	-	-	-	-
150	-	-	-	-	8.9	6	4	1.9
160	13.1	8.8	4.6	3.5	9.5	5.9	3.8	2.9
165	-	-	-	-	11.2	7.8	4.5	2.4
185	-	-	-	-	8.9	6.1	3.3	1.8
210	-	-	-	-	3.9	2.6	1.8	1.1
240	8.2	6.1	3.6	2.3	6.2	3.8	2.6	1.8
260	5.9	4.4	2.6	1.6	-	-	-	-
270	-	-	-	-	2.5	1.7	1.1	0.7
280	4	3.1	1.7	1.3	3.1	2.2	1.6	1
300	10.6	8.1	5.3	2.9	-	-	-	-
330	5.4	3.9	3	1.7	4.2	2.7	1.7	1.2
450	5.3	4.0	2.6	1.4	3.6	2.3	1.6	1.0
500	3.3	2.4	1.5	1.1	3	1.9	1.3	0.8
580	-	-	-	-	1.4	0.9	0.6	0.4
600	-	-	-	-	1.4	1.1	0.7	0.4
650	3.2	2.5	1.6	0.9	-	-	-	-
660	2.5	1.8	1.1	0.8	1.9	1.2	0.8	0.5
750	-	-	-	-	1.3	0.9	0.6	0.4
850	-	-	-	-	1.5	1	0.7	0.4
900	2.5	1.9	1.2	0.7	-	-	-	-
950	-	-	-	-	1.2	0.8	0.5	0.4
990	1.6	1.2	0.7	0.5	-	-	-	-
1300	-	-	-	-	0.8	0.6	0.4	0.3
1320	1.2	0.9	0.5	0.4	-	-	-	-
1500	1.1	0.8	0.6	0.4	-	-	-	-
1700	-	-	-	-	0.7	0.5	0.3	0.2
2600	-	-	-	-	0.4	0.3	0.2	0.1

Size	Filter material: BN4HC Element type: MX		
	5 µm	10 µm	20 µm
100	9.0	4.6	3.4
200	5.3	2.7	2.0

Size	Filter material: BH4HC Element type: D			
	3 µm	5 µm	10 µm	20 µm
30	91.2	50.7	36.3	19.0
35	47.8	28.1	16.8	10.5
55	24.2	14.2	8.5	5.3
60	58.6	32.6	18.1	12.2
110	25.4	14.9	8.9	5.6
140	19.9	11.3	8.1	4.3
160	16.8	10.4	5.9	4.4
240	10.6	6.8	3.9	2.9
280	5.7	3.4	1.8	1.6
300	16.0	8.9	7.1	3.3
330	7.7	4.5	2.8	2.0
450	7.8	4.3	3.4	1.6
500	4.2	2.6	1.5	1.2
650	4.7	2.6	2.1	1.0
660	3.3	1.9	1.0	0.9
900	3.5	2.0	1.6	0.7
990	2.2	1.3	0.8	0.6
1320	1.6	1.0	0.6	0.4
1500	1.4	0.8	0.6	0.5

Size	Filter material: BN4HC (dimensions to DIN 24550)							
	Element type: DN				Element type: RN			
	3 µm	6 µm	10 µm	25 µm	3 µm	6 µm	10 µm	25 µm
40	23.9	14.9	8.6	6.6	14.2	7.8	4.8	2.6
63	16.3	9.9	6.0	4.6	9.5	5.2	3.4	1.8
100	11.9	6.6	4.0	3.2	6.8	3.3	2.3	1.2
160	7.9	5.1	3.4	2.6	3.6	1.8	1.2	0.5
250	5.1	3.2	2.1	1.8	2.8	1.4	0.9	0.4
400	3.2	2.0	1.3	1.0	2.2	1.6	1.3	1.0
630	-	-	-	-	2.1	1.2	0.9	0.7

Size	Filter material: BH4HC (dimensions to DIN 24550) Element type: DN			
	3 µm	6 µm	10 µm	25 µm
40	40.4	24.8	16.4	10.9
63	29.0	18.2	11.7	7.6
100	19.0	11.7	7.7	5.3
160	8.0	5.1	3.8	2.5
250	5.4	3.4	2.8	1.9
400	3.4	2.1	1.7	1.1

Size	Filter material: W and W/HC	
	Element type: D W -W/HC	Element type: R W/HC
30	3.030	-
60	0.757	0.912
75	-	0.72
110	0.413	0.502
140	0.324	-
150	-	0.32
160	0.284	0.348
165	-	0.328
240	0.189	0.228
260	0.131	-
280	0.089	0.114
330	0.138	0.164
500	0.091	0.109
660	0.069	0.082
750	-	0.049
850	-	0.063
950	-	0.058
990	0.046	-
1300	-	0.043
1320	0.035	-
1700	-	0.033
2600	-	0.022

Size	Filter material: V							
	Element type: D				Element type: R			
	3 µm	5 µm	10 µm	20 µm	3 µm	5 µm	10 µm	20 µm
30	18.4	13.5	7.5	3.6	19.4	14.2	7.9	3.8
60	16.0	9.3	5.4	3.3	15.9	9.3	5.4	3.3
110	8.2	5.6	3.3	2.2	7.6	5.1	3.0	2.0
140	5.8	4.8	3.1	2.3	-	-	-	-
160	4.6	3.2	2.3	1.4	4.9	3.5	2.4	1.5
240	3.1	2.5	1.7	1.1	3.2	2.6	1.7	1.2
280	2.3	1.7	1.2	0.8	1.4	1.1	0.7	0.5
330	2.2	1.8	1.2	0.8	2.1	1.7	1.1	0.8
500	1.5	1.2	0.8	0.5	1.5	1.2	0.8	0.5
660	1.1	0.9	0.6	0.4	1.0	0.8	0.6	0.4
750	-	-	-	-	0.6	0.5	0.3	0.2
850	-	-	-	-	0.8	0.6	0.4	0.3
950	-	-	-	-	0.7	0.6	0.4	0.2
990	0.8	0.6	0.4	0.3	-	-	-	-
1300	-	-	-	-	0.5	0.4	0.3	0.2
1320	0.6	0.5	0.3	0.2	-	-	-	-
1700	-	-	-	-	0.4	0.3	0.2	0.1
2600	-	-	-	-	0.3	0.2	0.1	0.1

Size	Filter material: P/HC		Filter material: ECON2			
	Element type: R					
	10 µm	20 µm	3 µm	5 µm	10 µm	20 µm
30	3.30	1.67	68.4	43.9	26.8	14.7
60	1.67	0.83	26.8	18.3	10.9	6.9
75	1.29	0.65	22.0	14.2	8.1	4.4
90	-	-	14.9	10.1	6.7	3.2
110	0.91	0.46	14.9	9.4	6.0	3.2
150	-	-	8.9	6.0	4.0	1.9
160	0.63	0.31	9.5	5.9	3.8	2.9
165	0.61	0.30	11.2	7.8	4.5	2.4
185	-	-	8.9	6.1	3.3	1.8
240	0.42	0.21	6.2	3.8	2.6	1.8
280	-	-	3.1	2.2	1.6	1.0
330	0.30	0.15	4.2	2.7	1.7	1.2
500	0.20	0.10	3.0	1.9	1.3	0.8
660	0.15	0.08	1.9	1.2	0.8	0.5
750	-	-	1.3	0.9	0.6	0.4
850	0.12	0.06	1.5	1.0	0.7	0.4
950	0.11	0.05	1.2	0.8	0.5	0.4
1300	0.08	0.04	0.8	0.6	0.4	0.3
1700	0.06	0.03	0.7	0.5	0.3	0.2
2600	0.04	0.02	0.4	0.3	0.2	0.1

Size	Filter material: ECON2 Element type: MX		
	5 µm	10 µm	20 µm
100	10.0	6.5	4.8
200	5.9	3.8	2.8

Size	Filter material: W Element type: RS			
	25 µm	50 µm	75 µm	125 µm
60	2.00	1.70	1.03	0.54
110	0.98	0.83	0.50	0.26
160	-	-	0.36	0.19
240	-	-	0.25	0.13
330	-	-	0.19	0.10
400	-	-	0.20	0.16
500	-	-	0.20	0.16

Size	Filter material: AM	Filter material: BN4AM Element type: R	
	40 µm	3 µm	10 µm
330	2.10	8.7	3.0
500	1.38	-	-
660	0.93	3.5	1.2
850	0.72	-	-
950	0.66	2.4	0.8
1300	0.47	1.6	0.6
2600	0.23	1.0	0.3

Size	Filter material: MM Element type: RK	
	10 µm	15 µm
80	2.70	1.60
100	1.80	1.10
120	1.40	0.90
151	1.00	0.65
201	0.75	0.47
251	0.58	0.36
300	0.62	0.39
350	0.30	0.20
400	0.56	0.35
800	0.44	0.27

Size	Filter material: MM Element type: MX	
	10 µm	15 µm
100	2.7	2.2
200	1.6	1.3

Size	Filter material: G/HC Element type: R
	10 µm
110	1.91
240	0.92
330	0.69
500	0.45
660	0.30
850	0.23
950	0.21
1300	0.15
1700	0.11
2600	0.08

4. MULTIPASS FILTER PERFORMANCE DATA TO ISO 16889

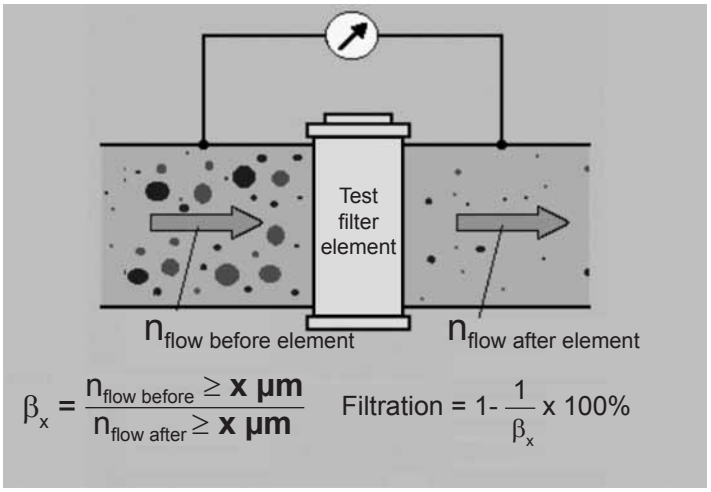
The contamination retention and particle filtration performance of an element (with the exception of: paper P, P/HC, wire mesh W, W/HC, V and super absorber AM) are established in the multipass test to ISO 16889. This procedure with its precisely defined test conditions and standard test dust (ISO MTD) enables the performance data of different elements to be compared.

4.1 EXPLANATION OF THE MULTIPASS TEST

The multipass test is an idealised hydraulic circuit, in which the filter element under test is subjected to a constant flow rate. The size and number of contamination particles are calculated before and after the element.

The ratio of the number of particles of a certain size (and larger) before the filter to the number of particles of a certain size after the filter indicates the filtration performance, what is known as the $\beta_{x(c)}$ value. The "x" stands for the particular particle size being considered. A $\beta_{x(c)}$ value of 200 or above is considered (according to DIN 24550) to be absolute filtration. It is important that the $\beta_{x(c)}$ values remain at absolute level over a wide differential pressure range and do not fall as the element contamination and operating time increase.

The filtration rating is determined from the $\beta_{x(c)}$ value (see illustration).



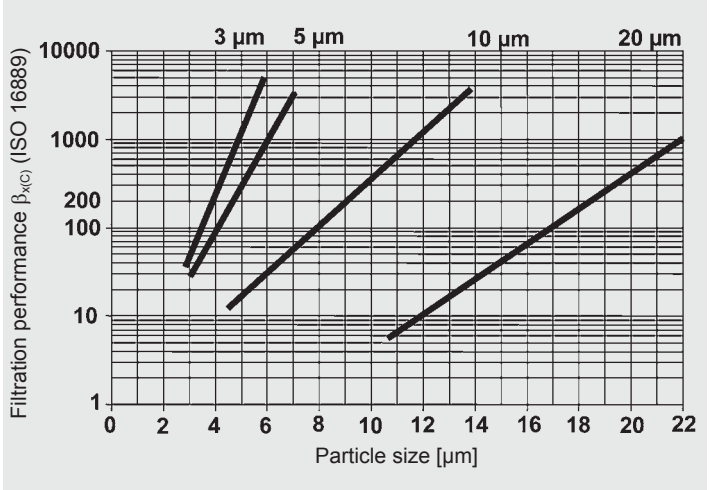
Performance features

Owing to their high performance standard, HYDAC absolute elements protect the functions of important and expensive hydraulic components and increase their service life. The most important performance features are:

- High level of particle separation ($\beta_{x(c)}$ values)
- High level of particle separation over a wide differential pressure range (high $\beta_{x(c)}$ value stability)
- High contamination retention capacity
- High pressure stability values
- Low initial differential pressure
- Good flow fatigue strength
- Good water retention capacity (for water-absorbing filter material)

4.2 FILTRATION PERFORMANCE

The graph below shows the filtration performance of different filtration ratings.



4.3 REAL CONTAMINATION RETENTION CAPACITY [g]

Size	Filter material: BN4HC							
	Element type: D				Element type: R			
	3 µm	5 µm	10 µm	20 µm	3 µm	5 µm	10 µm	20 µm
30	4.6	5.1	5.4	5.6	2.6	2.9	3.5	4.0
35	7.2	8.1	8.6	8.8	-	-	-	-
55	14.0	15.8	16.6	17.2	-	-	-	-
60	6.5	7.3	7.8	8.0	5.7	6.3	7.6	8.6
75	21.6	24.3	25.7	26.5	10.3	11.4	13.7	15.5
90	-	-	-	-	12.2	13.5	16.2	18.3
95	27.5	30.9	32.7	33.7	-	-	-	-
110	13.8	15.5	16.4	16.9	12.0	13.3	16.0	18.1
140	18.1	20.3	21.5	22.2	-	-	-	-
150	-	-	-	-	20.4	22.6	27.2	30.8
160	19.8	22.2	23.5	24.3	18.6	20.7	24.9	28.1
165	-	-	-	-	18.7	20.7	24.9	28.2
185	-	-	-	-	25.6	28.4	34.1	38.6
210	-	-	-	-	50.7	56.2	67.6	76.5
240	32.3	36.3	38.4	39.6	29.3	32.5	39.1	44.2
260	46.4	52.0	55.0	56.9	-	-	-	-
270	-	-	-	-	78.4	86.9	104.5	118.2
280	70.6	79.3	83.9	86.6	62.3	69.0	83.0	93.9
300	26.1	29.3	31.0	32.0	-	-	-	-
330	47.2	53.1	56.1	57.9	38.4	42.6	51.2	57.9
450	52.1	58.7	62.0	63.9	49.1	54.4	65.5	74.1
500	76.9	86.5	91.5	94.4	58.9	65.3	78.6	88.9
580	-	-	-	-	124.7	138.2	166.3	188.1
600	-	-	-	-	145.5	161.3	194.0	219.4
650	85.4	96.1	101.5	104.7	-	-	-	-
660	102.2	114.9	121.5	125.4	87.1	96.5	116.1	131.3
750	-	-	-	-	147.1	163.0	196.1	221.9
850	-	-	-	-	112.1	124.2	149.5	169.1
900	112.8	127.0	134.1	138.3	-	-	-	-
950	-	-	-	-	130.0	144.1	173.3	196.1
990	154.5	173.7	183.7	189.5	-	-	-	-
1300	-	-	-	-	181.0	200.7	241.4	273.1
1320	209.9	236.0	249.6	257.5	-	-	-	-
1500	220.0	226.0	238.0	246.0	-	-	-	-
1700	-	-	-	-	229.8	254.7	306.4	346.6
2600	-	-	-	-	369.4	409.4	492.5	557.2

Size	Filter material: BN4HC Element type: MX		
	5 µm	10 µm	20 µm
100	27.8	27.8	28.8
200	47.4	47.4	49.4

Size	Filter material: BH4HC Element type: D			
	3 µm	5 µm	10 µm	20 µm
30	3.0	2.9	3.2	3.7
35	5.3	5.2	5.8	6.6
55	10.5	10.3	11.5	13.0
60	4.6	4.5	5.0	5.7
110	10.1	9.9	10.9	12.4
140	13.3	13.0	14.3	16.3
160	12.9	12.6	13.9	15.9
240	21.6	21.1	23.2	26.5
280	48.1	47.1	51.8	59.1
300	17.0	16.6	18.3	20.9
330	34.6	33.9	37.2	42.5
450	35.0	34.2	37.6	42.9
500	57.5	56.3	61.8	70.5
650	58.3	57.1	62.8	71.6
660	76.8	75.2	82.6	94.3
900	77.3	75.7	83.1	94.8
990	111.8	109.4	120.2	137.2
1320	153.8	150.7	165.5	188.8
1500	126.4	137.8	160.9	195.3

Size	Filter material: BN4HC (dimensions to DIN 24550)							
	Element type: DN				Element type: RN			
	3 µm	6 µm	10 µm	25 µm	3 µm	6 µm	10 µm	25 µm
40	5.2	5.6	6.3	7.0	7.1	8.0	8.9	10.6
63	9.2	9.9	11.1	12.8	13.0	14.7	16.3	19.6
100	15.4	16.5	18.6	20.6	22.0	24.7	27.5	33.0
160	27.5	29.3	33.1	36.7	36.2	40.7	45.3	54.2
250	46.0	49.0	55.2	61.3	61.4	69.1	76.8	92.1
400	76.2	81.3	91.4	101.5	88.2	99.2	110.2	132.3
630	-	-	-	-	148.6	167.3	185.8	222.9

Size	Filter material: BH4HC (dimensions to DIN 24550) Element type: DN			
	3 µm	6 µm	10 µm	25 µm
40	4.1	4.4	5.2	6.2
63	7.3	7.9	9.2	11.2
100	12.2	13.2	15.5	18.9
160	21.8	23.9	27.8	33.8
250	38.1	41.7	48.6	59.0
400	63.6	69.5	81.0	98.3

Size	Filter material: MM Element type: RK	
	10 µm	15 µm
80	11.0	13.3
100	16.3	19.6
120	20.7	25.0
151	26.6	31.4
201	50.9	61.4
251	61.9	74.7
300	55.6	67.1
350	87.0	105.0
400	67.4	81.3
800	86.3	104.2

Size	Filter material: MM Element type: MX	
	10 µm	15 µm
100	19.6	19.6
200	33.0	33.0

Size	Filter material: ECON2 Element type: R			
	3 µm	5 µm	10 µm	20 µm
30	2.6	2.9	3.5	4.0
60	5.7	6.3	7.6	8.6
75	10.3	11.4	13.7	15.5
90	12.2	13.5	16.2	18.3
110	12.0	13.3	16.0	18.1
150	20.4	22.6	27.2	30.8
160	18.6	20.7	24.9	28.1
165	18.7	20.7	24.9	28.2
185	25.6	28.4	34.1	38.6
240	29.3	32.5	39.1	44.2
280	62.3	69.0	83.0	93.9
330	38.4	42.6	51.2	57.9
500	58.9	65.3	78.6	88.9
660	87.1	96.5	116.1	131.3
750	147.1	163.0	196.1	221.9
850	112.1	124.2	149.5	169.1
950	130.0	144.1	173.3	196.1
1300	181.0	200.7	241.4	273.1
1700	229.8	254.7	306.4	346.6
2600	369.4	409.4	492.5	557.2

Size	Filter material: ECON2 Element type: MX		
	5 µm	10 µm	20 µm
100	29.9	29.9	33.0
200	50.5	50.5	56.0

Size	Filter material: BN4AM Element type: R	
	3 µm	10 µm
330	55.0	60.0
660	120.0	140.0
950	170.0	190.0
1300	240.0	270.0
2600	490.0	540.0

5. FILTER AREAS [cm²]

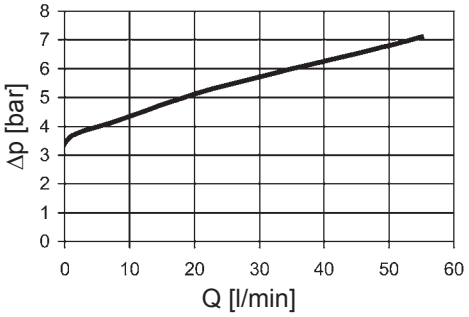
Size	Filter material: V (VB on request)	Filter material: W/HC	Filter material: W	Filter material: V (VB on request)	Filter material: W	Filter material: W/HC	Filter material: P/HC
		Element type: D			Element type: R		
30	268	-	256	221	256	-	283
60	318	418	330	372	330	507	572
110	648	910	672	758	672	1034	1166
140	852	1200	884	-	-	-	-
160	1082	1144	857	1071	857	1607	1978
165	-	-	-	-	1556	1556	1915
240	1702	1911	1348	1685	1348	2527	3110
260	-	3180	-	-	-	-	-
280	3615	4264	2862	-	-	-	-
330	2260	3133	1795	2081	1795	3695	4230
500	3640	5207	2891	3182	2745	5651	6470
660	4770	6958	3795	4659	3998	8232	8722
850	-	-	-	5999	5148	10599	11230
950	-	-	-	6813	5596	11521	15221
990	-	10091	-	-	-	-	-
1300	-	-	-	9520	7820	16099	21269
1320	-	13916	-	-	-	-	-
1700	-	-	-	-	10550	21730	23020
2600	-	-	-	19424	15954	32847	43394

6. BYPASS VALVE CURVES

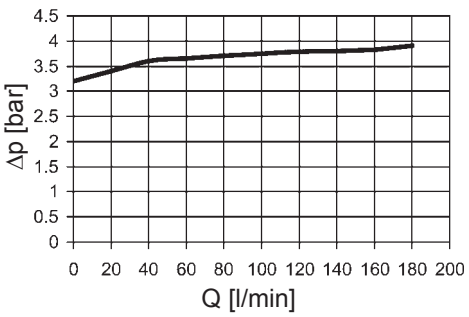
The bypass curves apply to mineral oil with a density of 0.86 kg/dm³.

The valve differential pressure changes proportionally to the density.

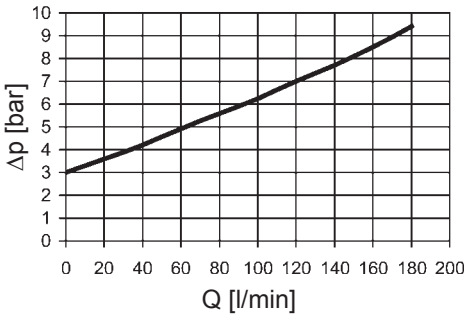
30



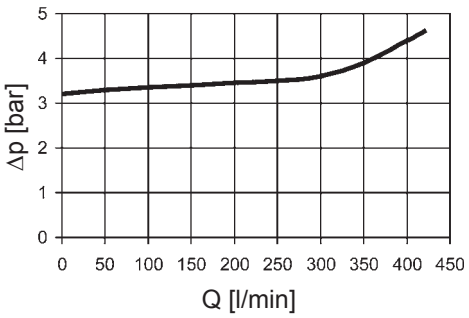
75, 160, 165, 185, 240, 280



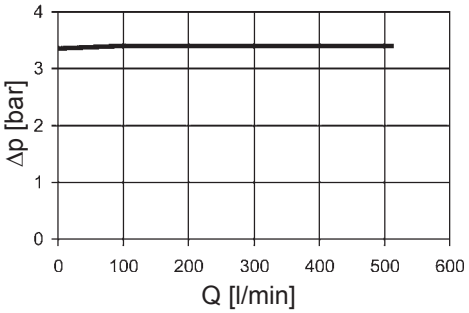
60, 90, 110, 140, 150



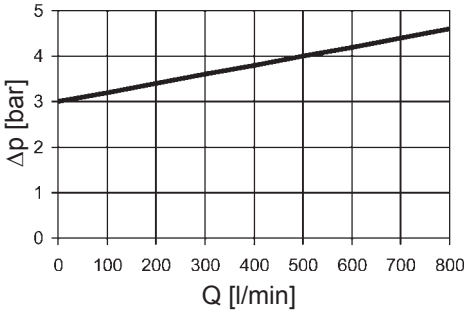
210, 270, 330, 500, 750



660, 850, 1700



950, 1300, 2600



NOTE

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

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

Subject to technical modifications.