HYDAC INTERNATIONAL

Betamicron® Filter Elements BN4HC/BH4HC

up to 210 bar, filtration rating 3, 5, 6, 10, 20, 25 µm

1. BETAMICRON® ELEMENT

1.1 DESCRIPTION

The 3-stage structure of Betamicron® filter elements ensures the maximum contamination retention and filtration performance. An additional drainage layer directs the fluid flow with optimal efficiency, achieving particularly favourable Δp/Q characteristics.

An innovative bonding process used for the longitudinal seam guarantees that the cut ends of the mesh pack remain completely sealed even under high load variations. This eliminates the possibility of particles crossing from the contaminated to the clean side.

To prevent the formation of zinc soap, which occurs mainly in conjunction with water-based fluids (HFA / HFC) and bio oils, no components containing zinc are utilized.

The metal tube which forms a stable core inside the element is constructed as a spiral lock seam tube. This provides consistent stability and a significant reduction in element weight.

The pleated filter mesh pack is encased in a stable outer wrap. This wrap distributes the incoming fluid evenly over the mesh pack. In addition the mesh pack is not directly exposed to the flow, and this protects it from pulsating flows. In this way, the element achieves extremely high fatigue strength values. Moreover, the mesh pack is protected from mechanical damage.

1.2 GENERAL DATA

Collapse stability	BN4HC: 20 bar BH4HC: 210 bar
Temperature range	-30 °C to +100 °C For sealing material FPM to -10 °C
Flow direction	From outside to inside
Filtration rating	3, 5, 6, 10, 20, 25 µm
Bypass cracking pressure	Pressure filter element (**"D"**): Without bypass valve as standard Pressure filter element to DIN 24550 (**"DN"**): Without bypass valve as standard Pressure filter element for MFX filter (**"MX"**): standard 3.5 bar Return line filter element (**"R"**): standard 3 bar Return line filter element to DIN 24550 (**"RN"**): standard 3.5 bar Return line filter element for pressure filter (**"RD"**): standard 3.4 bar (others on request)
Category of filter element	Single use element

1.3 STAT-FREE® TECHNOLOGY OPTIONAL

By completely revising the materials used, e.g. through the use of conductive plastics, fully discharge-capable filter elements are the result.

Electrical charging of the filter elements during operation has therefore been reduced to a negligible level. The risks of sudden sparking and the subsequent formation of soot or sludge in the oil are therefore reliably eliminated.

With the new Stat-Free® filter elements, HYDAC has for the first time succeeded in combining excellent electrostatic characteristics with filtration performance. Unprecedented low charge generation in the filter element and in the system fluid is achieved with a new type of filter mesh pack and element design.

1.4 OUTER WRAP PRINTED WITH CUSTOMER LOGO

Since the outer wrap can be printed with the customer logo, it also acts as an advertising medium for the OEM and guarantees security of the spares business. At the same time, the user can be certain of obtaining an original spare part. Particular benefit: the logo remains perfectly legible even in the contaminated condition.

1.5 COMPATIBILITY WITH HYDRAULIC FLUIDS TO 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

2. MODEL CODE

2.1 MODEL CODE FOR STANDARD PRESSURE FILTER ELEMENTS

(Can be used in the following filters: LFM, MFM, MFM../-OIU, MFM..L.., DFM, HFM, LPF, LF, LFF, MDF, HDF, HDFF, DF, DFF, DFFX, FLND, FMND, DFDK, DF...K P, DF...MHA, DF...MHE, DF...M A, DF...M P, DFZ, DF...Q E, DFP, DFPF)

0660 D 010 BN4HC /-V

Size
0030, 0035, 0055, 0060, 0075, 0095, 0110, 0140, 0160, 0240, 0260, 0280, 0300, 0330, 0450, 0500, 0650, 0660,0900, 0990, 1320, 1500

Type
D Pressure filter element

Filtration rating in µm
003, 005, 010, 020

Filter material of element
BN4HC Collapse stability up to 20 bar
BH4HC Collapse stability up to 210 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.2 MODEL CODE FOR PRESSURE FILTER ELEMENTS TO DIN 24550

(Can be used in the following filters: FLN, LFN, LFNF, DFN, DFNF, FLND, FMND, DFDKN)

0100 DN 010 BN4HC /-V

Size
0040, 0063, 0100, 0160, 0250, 0400

Type
DN Pressure filter element to DIN 24550

Filtration rating in µm
003, 006, 010, 025

Filter material of element
BN4HC Collapse stability up to 20 bar
BH4HC Collapse stability up to 210 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.3 MODEL CODE FOR PRESSURE FILTER ELEMENTS IN MFX FILTERS

0100 MX 010 BN4HC /-V

Size
0100, 0200

Type
MX Pressure filter element for MFX filter

Filtration rating in µm
003, 005, 010, 020

Filter material of element
BN4HC Collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal

2.4 MODEL CODE FOR STANDARD RETURN LINE FILTER ELEMENTS

(Can be used in the following filters: RFM, RF, RFD, RFL, RFLD, NF, NFD)

0600 R 010 BN4HC /-V

Size
0030, 0060, 0075, 0090, 0110, 0150, 0160, 0165, 0185, 0195, 0210, 0240, 0260, 0270, 0280, 0330, 0450, 0500, 0580, 0600, 0660, 0750, 0850, 0950, 1300, 1700, 2600, 2700

Type
R Return line filter element

Filtration rating in µm
003, 005, 010, 020

Filter material of element
BN4HC Collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.5 MODEL CODE FOR RETURN LINE FILTER ELEMENTS TO DIN 24550

(Can be used in the following filters: RFN, RFND, RFLN, RFLND)

0100 RN 010 BN4HC /-V

Size
0040, 0063, 0100, 0160, 0250, 0400, 0630, 1000

Type
RN Return line filter element to DIN 24550

Filtration rating in µm
003, 006, 010, 025

Filter material of element
BN4HC Collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal
SFREE Stat-Free® element technology

2.6 MODEL CODE FOR RETURN LINE FILTER ELEMENTS IN PRESSURE FILTERS

(Can be used in the following filters: LPF…/-TH, LPF…GGA)

0241 RD 010 BN4HC /-V

Size
0161, 0241, 0261, 0281

Type
RD Return line filter element for pressure filters

Filtration rating in µm
003, 005, 010, 020

Filter material of element
BN4HC Collapse stability up to 20 bar

Supplementary details
V FPM (Viton) seal

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 4.1)

4. ELEMENT CHARACTERISTICS

4.1 GRADIENT COEFFICIENTS 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.

Pressure filter element "D"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0030	63.9	43.3	22.8	11.3
0035	23.6	19.0	14.8	9.3
0055	13.7	11.0	8.1	4.8
0060	28.9	20.4	13.2	7.9
0075	9.3	7.5	5.3	3.1
0095	7.5	6.0	4.1	2.4
0110	14.9	10.7	6.6	3.7
0140	12.8	8.2	4.8	2.9
0160	13.1	8.8	4.6	3.5
0240	8.2	6.1	3.6	2.3
0260	5.9	4.4	2.6	1.6
0280	4.0	3.1	1.7	1.3
0300	10.6	8.1	5.3	2.9
0330	5.4	3.9	3.0	1.7
0450	5.3	4.0	2.6	1.4
0500	3.3	2.4	1.5	1.1
0650	3.2	2.5	1.6	0.9
0660	2.5	1.8	1.1	0.8
0900	2.5	1.9	1.2	0.7
0990	1.6	1.2	0.7	0.5
1320	1.2	0.9	0.5	0.4
1500	1.1	0.8	0.6	0.4

Pressure filter element "D"...BH4HC				
Size	3 µm	5 µm	10 µm	20 µm
0030	91.2	50.7	36.3	19.0
0035	47.8	28.1	16.8	10.5
0055	24.2	14.2	8.5	5.3
0060	58.6	32.6	18.1	12.2
0110	25.4	14.9	8.9	5.6
0140	19.9	11.3	8.1	4.3
0160	16.8	10.4	5.9	4.4
0240	10.6	6.8	3.9	2.9
0260	8.1	4.8	3.3	1.9
0280	5.7	3.4	1.8	1.6
0300	16.0	8.9	7.1	3.3
0330	7.7	4.5	2.8	2.0
0450	7.8	4.3	3.4	1.6
0500	4.2	2.6	1.5	1.2
0650	4.7	2.6	2.1	1.0
0660	3.3	1.9	1.0	0.9
0900	3.5	2.0	1.6	0.7
0990	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

Pressure filter element "DN"...BN4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	23.9	14.9	8.6	6.6
0063	16.3	9.9	6.0	4.6
0100	11.9	6.6	4.0	3.2
0160	7.9	5.1	3.4	2.6
0250	5.1	3.2	2.1	1.8
0400	3.2	2.0	1.3	1.0

Pressure filter element "DN"...BH4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	40.4	24.8	16.4	10.9
0063	29.0	18.2	11.7	7.6
0100	19.0	11.7	7.7	5.3
0160	8.0	5.1	3.8	2.5
0250	5.4	3.4	2.8	1.9
0400	3.4	2.1	1.7	1.1

Pressure filter element "MX"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0100	12.0	9.0	4.6	3.4
0200	7.0	5.3	2.7	2.0

Return line filter element "R"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0030	68.4	43.9	26.8	14.7
0060	26.8	18.3	10.9	6.9
0075	22.0	14.2	8.1	4.4
0090	14.9	10.1	6.7	3.2
0110	14.9	9.4	6.0	3.2
0150	8.9	6.0	4.0	1.9
0160	9.5	5.9	3.8	2.9
0165	11.2	7.8	4.5	2.4
0185	8.9	6.1	3.3	1.8
0195	4.9	4.4	2.1	1.2
0210	3.9	2.6	1.8	1.1
0240	6.2	3.8	2.6	1.8
0260	5.4	4.0	2.7	1.5
0270	2.5	1.7	1.1	0.7
0280	3.1	2.2	1.6	1.0
0330	4.2	2.7	1.7	1.2
0450	3.6	2.3	1.6	1.0
0500	3.0	1.9	1.3	0.8
0580	1.4	0.9	0.6	0.4
0600	1.4	1.1	0.7	0.4
0660	1.9	1.2	0.8	0.5
0750	1.3	0.9	0.6	0.4
0850	1.5	1.0	0.7	0.4
0950	1.2	0.8	0.5	0.4
1300	0.8	0.6	0.4	0.3
1700	0.7	0.5	0.3	0.2
2600	0.4	0.3	0.2	0.1
2700	0.4	0.3	0.2	0.1

Return line filter element "RN"...BN4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	14.2	7.8	4.8	2.6
0063	9.5	5.2	3.4	1.8
0100	6.8	3.3	2.3	1.2
0160	3.6	1.8	1.2	0.5
0250	2.8	1.4	0.9	0.4
0400	2.2	1.6	1.3	1.0
0630	2.1	1.2	0.9	0.7
1000	0.7	0.5	0.4	0.3

Return line filter element "RD"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0161	13.4	10.4	6.5	3.5
0241	8.1	6.3	3.9	2.1
0261	5.2	4.1	2.5	1.4
0281	3.3	2.5	1.6	0.9

4.2 CONTAMINATION RETENTION CAPACITY IN G

The contamination retention and particle filtration performance of an element are established in the multipass test to ISO 16889. This procedure with its precisely defined test conditions and a standard test dust (ISO MTD) enables the performance data of different elements to be compared.

Pressure filter element "D"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0030	4.6	5.1	5.4	5.6
0035	7.2	8.1	8.6	8.8
0055	14.0	15.8	16.6	17.2
0060	6.5	7.3	7.8	8.0
0075	21.6	24.3	25.7	26.5
0095	27.5	30.9	32.7	33.7
0110	13.8	15.5	16.4	16.9
0140	18.1	20.3	21.5	22.2
0160	19.8	22.2	23.5	24.3
0240	32.3	36.3	38.4	39.6
0260	70.6	79.3	83.9	86.6
0280	70.6	79.3	83.9	86.6
0300	26.1	29.3	31.0	32.0
0330	47.2	53.1	56.1	57.9
0450	52.1	58.7	62.0	63.9
0500	76.9	86.5	91.5	94.4
0650	85.4	96.1	101.5	104.7
0660	102.2	114.9	121.5	125.4
0900	112.8	127.0	134.1	138.3
0990	154.5	173.7	183.7	189.5
1320	209.9	236.0	249.6	257.5
1500	200.9	226.2	238.9	246.4

Pressure filter element "D"...BH4HC				
Size	3 µm	5 µm	10 µm	20 µm
0030	3.0	2.9	3.2	3.7
0035	5.3	5.2	5.8	6.6
0055	10.5	10.3	11.5	13.0
0060	4.6	4.5	5.0	5.7
0110	10.1	9.9	10.9	12.4
0140	13.3	13.0	14.3	16.3
0160	12.9	12.6	13.9	15.9
0240	21.6	21.1	23.2	26.5
0260	48.1	47.1	51.8	59.1
0280	48.1	47.1	51.8	59.1
0300	17.0	16.6	18.3	20.9
0330	34.6	33.9	37.2	42.5
0450	35.0	34.2	37.6	42.9
0500	57.5	56.3	61.8	70.5
0650	58.3	57.1	62.8	71.6
0660	76.8	75.2	82.6	94.3
0900	77.3	75.7	83.1	94.8
0990	111.8	109.4	120.2	137.2
1320	153.8	150.7	165.5	188.8
1500	164.5	161.1	177.0	202.0

Pressure filter element "DN"...BN4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	5.2	5.6	6.3	7.0
0063	7.3	7.9	9.2	11.2
0100	15.4	16.5	18.6	20.6
0160	27.5	29.3	33.1	36.7
0250	38.1	41.7	48.6	59.0
0400	76.2	81.3	91.4	101.5

Pressure filter element "DN"...BH4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	4.1	4.4	5.2	6.2
0063	7.3	7.9	9.2	11.2
0100	12.2	13.2	15.5	18.9
0160	21.8	23.9	27.8	33.8
0250	38.1	41.7	48.6	59.0
0400	63.6	69.5	81.0	98.3

Pressure filter element "MX"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0100	24.2	27.8	27.8	28.8
0200	41.3	47.4	47.4	49.4

Return line filter element "R"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0030	2.6	2.9	3.5	4.0
0060	5.7	6.3	7.6	8.6
0075	10.3	11.4	13.7	15.5
0090	12.2	13.5	16.2	18.3
0110	12.0	13.3	16.0	18.1
0150	20.4	22.6	27.2	30.8
0160	18.6	20.7	24.9	28.1
0165	18.7	20.7	24.9	28.2
0185	25.8	28.4	34.1	38.6
0195	34.4	38.2	45.9	51.9
0210	50.7	56.2	67.6	76.5
0240	29.3	32.5	39.1	44.2
0260	39.6	43.9	52.8	59.8
0270	78.4	86.9	104.5	118.2
0280	62.3	69.0	83.0	93.9
0330	38.4	42.6	51.2	57.9
0450	49.1	54.4	65.5	74.1
0500	58.9	65.3	78.6	88.9
0580	124.7	138.2	166.3	188.1
0600	145.5	161.3	194.0	219.4
0660	87.1	96.5	116.1	131.3
0750	147.1	163.0	196.1	221.9
0850	112.1	124.2	149.5	169.1
0950	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
2700	374.1	414.6	498.8	564.3

Return line filter element "RN"...BN4HC				
Size	3 µm	6 µm	10 µm	25 µm
0040	7.1	8.0	8.9	10.6
0063	13.0	14.7	16.3	19.6
0100	22.0	24.7	27.5	33.0
0160	36.2	40.7	45.3	54.2
0250	61.4	69.1	76.8	92.1
0400	88.2	99.2	110.2	132.3
0630	148.6	167.3	185.8	222.9
1000	151.8	170.8	189.8	227.8

Return line filter element "RD"...BN4HC				
Size	3 µm	5 µm	10 µm	20 µm
0161	15.2	16.8	20.2	22.9
0241	25.1	27.8	33.5	37.5
0261	38.8	43.0	51.7	58.5
0281	62.4	69.2	83.2	94.1

For information on bypass valve curves, please see Filter Element (Quick Selection) brochure no.: E 7.221../..