



## 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  $\Delta p/Q$  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<br>BH4HC: 210 bar  |
| Temperature range          | -30 °C to +100 °C<br>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<br>Pressure filter element to DIN 24550 ("DN"): Without bypass valve as standard<br>Pressure filter element for MFX filter ("MX"): standard 3.5 bar<br>Return line filter element to DIN 24550 ("RN"): standard 3.5 bar<br>(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: DFM, LPF, LF, LFF, MDF, HDF, HDFF, DF, DFF, DFFX, FLND, FMND, DFDK, DF...MHA, DF...MHE, DF...M A, DF...M P, DFZ, DF...Q E, DFP, DFPF)

|  | 0660   | D | 010 | BH4HC | /-V |
|--|--|---|-----|-------|-----|
| <b>Size</b>  | 0030, 0035, 0055, 0060, 0075, 0095, 0110, 0140, 0160, 0240, 0260, 0280, 0300, 0330, 0450, 0500, 0650, 0660, 0900, 0990, 1320, 1500 |   |     |       |     |
| <b>Type</b>  | D Pressure filter element  |   |     |       |     |
| <b>Filtration rating in <math>\mu\text{m}</math></b> | 003, 005, 010, 020   |   |     |       |     |
| <b>Filter material of element</b>                    | BH4HC Collapse stability up to 210 bar   |   |     |       |     |
| <b>Supplementary details</b>                         | V FPM (Viton) seal<br>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 |
|--|---|----|-----|-------|-----|
| <b>Size</b>  | 0040, 0063, 0100, 0160, 0250, 0400  |    |     |       |     |
| <b>Type</b>  | DN Pressure filter element to DIN 24550   |    |     |       |     |
| <b>Filtration rating in <math>\mu\text{m}</math></b> | 003, 006, 010, 025  |    |     |       |     |
| <b>Filter material of element</b>                    | BN4HC Collapse stability up to 20 bar<br>BH4HC Collapse stability up to 210 bar |    |     |       |     |
| <b>Supplementary details</b>                         | V FPM (Viton) seal<br>SFREE Stat-Free® element technology                       |    |     |       |     |

### 2.3 MODEL CODE FOR PRESSURE FILTER ELEMENTS IN MFX FILTERS

|  | 0100                                      | MX | 010 | BN4HC | /-V |
|--|---|----|-----|-------|-----|
| <b>Size</b>  | 0100, 0200                                |    |     |       |     |
| <b>Type</b>  | MX Pressure filter element for MFX filter |    |     |       |     |
| <b>Filtration rating in <math>\mu\text{m}</math></b> | 003, 005, 010, 020                        |    |     |       |     |
| <b>Filter material of element</b>                    | BN4HC Collapse stability up to 20 bar     |    |     |       |     |
| <b>Supplementary details</b>                         | V FKM (Viton) seal                        |    |     |       |     |

### 2.4 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 |
|--|--|----|-----|-------|-----|
| <b>Size</b>  | 0040, 0063, 0100, 0160, 0250, 0400, 0630, 1000 |    |     |       |     |
| <b>Type</b>  | RN Return line filter element to DIN 24550     |    |     |       |     |
| <b>Filtration rating in <math>\mu\text{m}</math></b> | 003, 006, 010, 025                             |    |     |       |     |
| <b>Filter material of element</b>                    | BN4HC Collapse stability up to 20 bar          |    |     |       |     |
| <b>Supplementary details</b>                         | 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

(\*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 mm<sup>2</sup>/s. The pressure drop changes proportionally to the change in viscosity.

| 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 "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   |

### 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"...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 "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 |

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