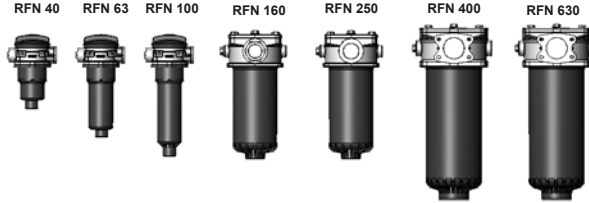




## Tank-Top Return Line Filter RFN with Elements to DIN 24550 up to 490 l/min, up to 10 bar



### 1. TECHNICAL SPECIFICATIONS

#### 1.1 FILTER HOUSING

##### Construction

The filter housings are designed in accordance with international regulations. They consist of a filter head, filter bowl and a bolt-on cover plate.

Standard equipment:

- bypass valve
- connection for a clogging indicator

#### 1.2 FILTER ELEMENTS

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

#### Contamination retention capacities in g

RFN	Betamicron BN4HC			
	3 µm	6 µm	10 µm	25 µm
40	7.1	8.0	8.9	10.6
63	13.0	14.7	16.3	19.6
100	22.0	24.7	27.5	33.0
160	36.2	40.7	45.3	54.2
250	61.4	69.1	76.8	92.1
400	88.2	99.2	110.2	132.3
630	148.6	167.3	185.8	222.9

Filter elements are available with the following pressure stability values:  
Betamicron® (BN4HC): 20 bar

#### 1.3 FILTER SPECIFICATIONS

Nominal pressure	10 bar
Temperature range	-10 °C to +100 °C
Material of filter head	Aluminium
Material of filter bowl	Polyamide
Material of cover plate	Polyamide (RFN 40 to 100) Aluminium (RFN 160 to 630)
Type of clogging indicator	VR Connection thread G 1/2 VMF Connection thread G 1/8
Pressure setting of the clogging indicator	2.5 bar (others on request)
Bypass cracking pressure	3.5 bar (others on request)

#### 1.4 SEALS

NBR (=Perbunan)

#### 1.5 INSTALLATION

Tank-top filter

#### 1.6 SPECIAL MODELS AND ACCESSORIES

On request

#### 1.7 SPARE PARTS

See Original Spare Parts List

#### 1.8 CERTIFICATES AND APPROVALS

On request

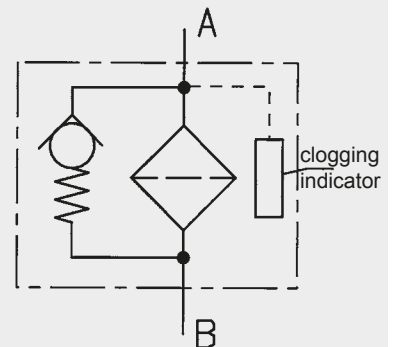
#### 1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- 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

#### 1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.

#### Symbol for hydraulic systems



## 2. MODEL CODE (also order example)

RFN BN/HC 250 B F 10 D 1 . X /-L24

### 2.1 COMPLETE FILTER

Filter type \_\_\_\_\_

RFN

Filter material of element \_\_\_\_\_

BN/HC Betamicron® (BN4HC)

Size of filter or element \_\_\_\_\_

RFN: 40, 63, 100, 160, 250, 400, 630

Operating pressure \_\_\_\_\_

B = 10 bar

V = 7 bar (for RFN with clogging indicator up to max. 7 bar operating pressure)

Type and size of port \_\_\_\_\_

to DIN 24550 ( ● ), possible ports ( X )

Type	Connection	Filter size						
		40	63	100	160	250	400	630
B	G ½	●	X	X				
C	G ¾	X	●	X				
D	G 1	X	X	●				
E	G1 ¼				●	X		
F	G1 ½				X	●		
M	DN 64						X	●

Filtration rating in µm \_\_\_\_\_

BN/HC: 3, 6, 10, 25

Type of clogging indicator \_\_\_\_\_

Y plastic blanking plug in indicator port

A steel blanking plug in indicator port

B visual

C electrical

D visual and electrical

LZ visual-mechanical / electrical

for other clogging indicators,  
see brochure no. 7.050../..

Type code \_\_\_\_\_

1

Modification number \_\_\_\_\_

X the latest version is always supplied

Supplementary details \_\_\_\_\_

L... light with appropriate voltage (24V, 48V, 110V, 220V)

LED 2 light emitting diodes up to 24 Volt

AV LZ indicator with plug to AUDI and VW specification

BO LZ indicator with plug and pin connection to BMW and Opel specification (M12x1)

CN LZ indicator with plug to DIN 43651 with 3 LEDs (CNOMO specification)

DB LZ indicator with plug to DIN 43651 with 3 LEDs (Daimler-Benz specification)

D4C LZ indicator with plug and connector to Daimler-Chrysler specification and cold start suppression 30°C

BO-LED as for BO, but with diode strip

GM LZ indicator with "no element" indicator

30C LZ indicator with temperature limiter (only in conjunction with type DB)

T with tank breather filter (only RFN 40, 63, 100)

BAN filling connection G¾ (from size RFN 160)

Vxxx outlet extension (xxx = corresponding length in mm)

V FPM seals

only for clogging  
indicators type D

### 2.2 REPLACEMENT ELEMENT

0250 RN 010 BN4HC /-V

Size \_\_\_\_\_

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

Type \_\_\_\_\_

RN

Filtration rating in µm \_\_\_\_\_

BN4HC: 003, 006, 010, 025

Filter material \_\_\_\_\_

BN4HC

Supplementary details \_\_\_\_\_

V (for descriptions, see Point 2.1)

### 2.3 REPLACEMENT CLOGGING INDICATOR

VR 2.5 D . X /-L24

Type of clogging indicator \_\_\_\_\_

VR connection thread G 1/2 (size 160 and above)

VMF connection thread G 1/8 (only size 40, 63, 100)

Pressure setting \_\_\_\_\_

2.5 standard 2.5 bar, others on request

Type of clogging indicator \_\_\_\_\_

D (see Point 2.1)

Modification number \_\_\_\_\_

X the latest version is always supplied

Supplementary details \_\_\_\_\_

L..., LED, V (for descriptions, see Point 2.1)

### 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:

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

$$\Delta p_{\text{housing}} = (\text{see Point 3.1})$$

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

(\*see point 3.2)

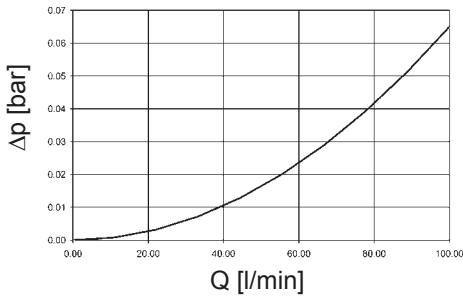
For ease of calculation, our Filter Sizing Program is available on request free of charge.

**NEW:** Sizing online at [www.hydac.com](http://www.hydac.com)

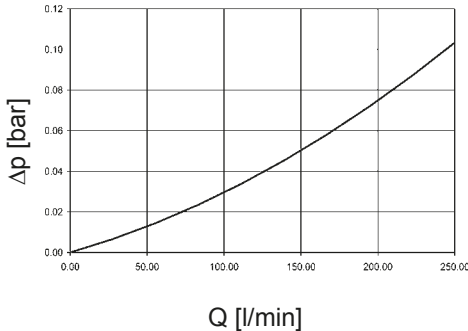
#### 3.1 $\Delta p$ -Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm<sup>3</sup> and a kinematic viscosity of 30 mm<sup>2</sup>/s. In this case, the differential pressure changes proportionally to the density.

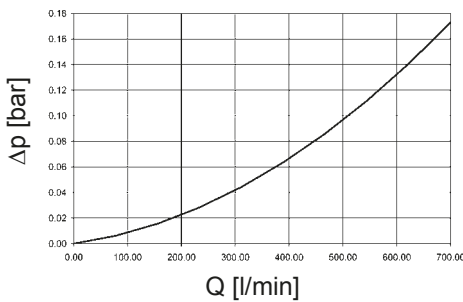
##### RFN 40/63/100



##### RFN 160/250



##### RFN 400/630

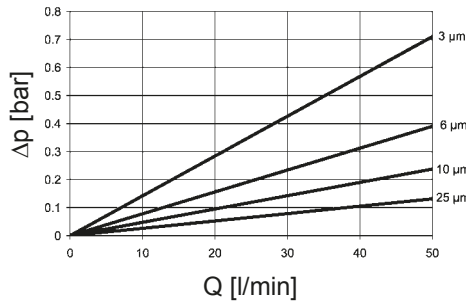


### 3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

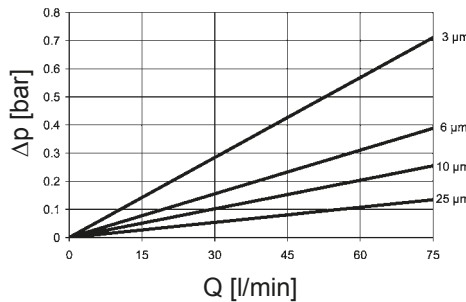
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm<sup>2</sup>/s. The pressure drop changes proportionally to the change in viscosity.

RFN	BN4HC			
	3 μm	6 μm	10 μm	25 μm
40	14.2	7.8	4.8	2.6
63	9.5	5.2	3.4	1.8
100	6.8	3.3	2.3	1.2
160	3.6	1.8	1.2	0.5
250	2.8	1.4	0.9	0.4
400	2.2	1.6	1.3	1.0
630	2.1	1.6	1.3	0.9

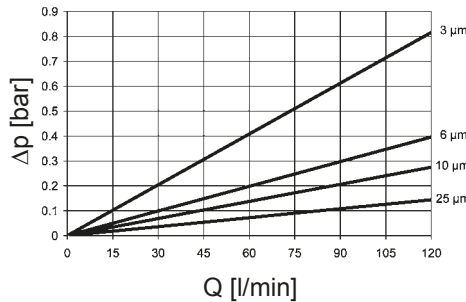
#### BN4HC: RFN 40



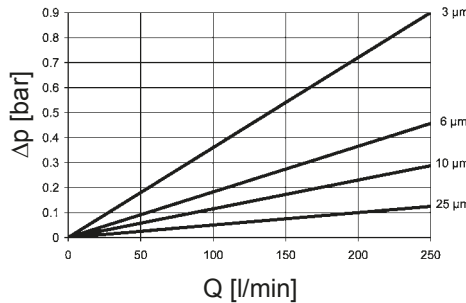
#### BN4HC: RFN 63



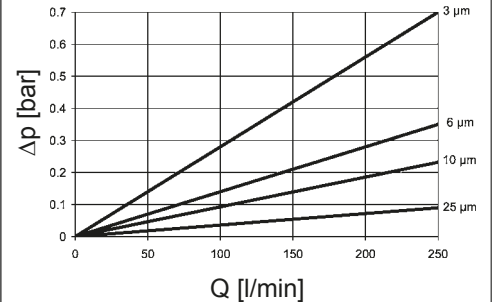
#### BN4HC: RFN 100



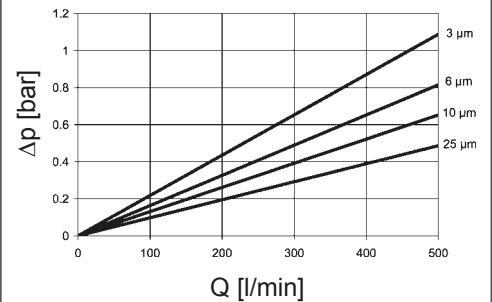
#### BN4HC: RFN 160



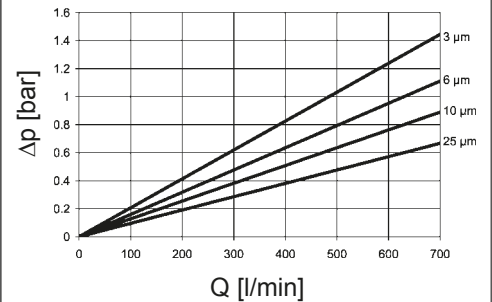
#### BN4HC: RFN 250



#### BN4HC: RFN 400



#### BN4HC: RFN 630

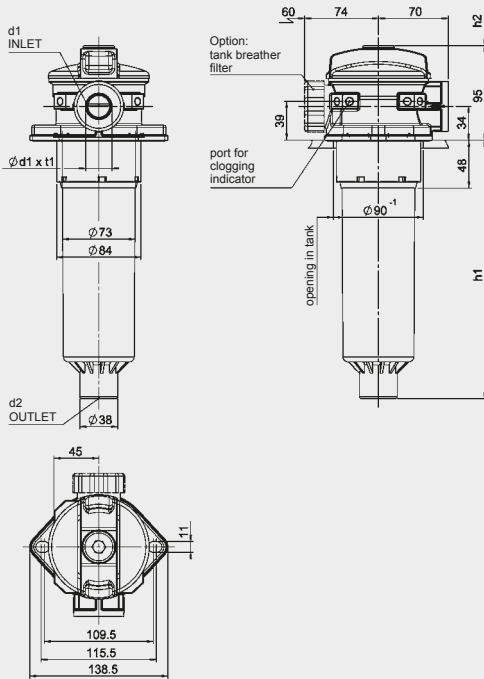


## 4. DIMENSIONS

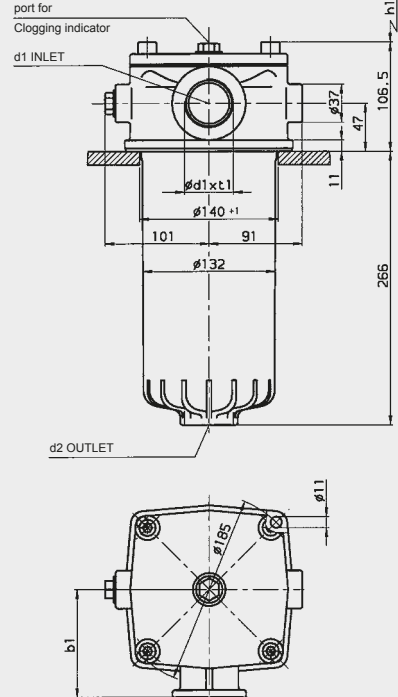
### Tank requirements

1. In the filter contact area, the tank flange should have a maximum flatness of 0.3 mm and RA 3.2 µm maximum roughness.
2. In addition, the contact area should be free of damage and scratches.
3. The fixing holes of the tank flange must be blind, or stud bolts with threadlocker must be used to fix the filter. As an alternative, the tank flange can be continuously welded from the inside.
4. Both the tank sheet metal and/or the filter mounting flange must be sufficiently robust so that neither deform when the seal is compressed during tightening.
5. When using a dipstick through a mounting screw, threadlock the screw into the thread, using Loctite 243, for example, or a similar threadlocker.

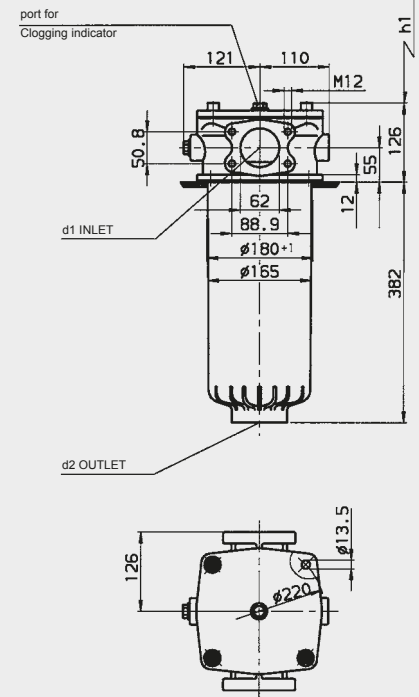
RFN 40, 63, 100



RFN 160, 250



RFN 400, 630



Flange interface / opening in tank to DIN 24550

RFN	d1 Inlet	d2 Outlet	b1	h1	h2	t1 <sup>+2</sup>	Weight including element [kg]	Volume of pressure chamber [l]
40	G ½	32	70	122	150	14	1.0	0.6
40	G ¾	32	70	122	150	16	1.0	0.6
40	G ¾	32	70	122	150	16	1.0	0.6
63	G ½	32	70	206	200	14	1.2	0.9
63	G ¾	32	70	206	200	16	1.2	0.9
63	G 1	32	70	206	200	18	1.2	0.9
100	G ½	32	70	260	290	14	1.3	1.0
100	G ¾	32	70	260	290	16	1.3	1.0
100	G 1	32	70	260	290	18	1.3	1.0
160	G 1¼	G 1½	141	210	-	20	4.6	3.5
160	G 1¼	G 1½	105	210	-	22	4.6	3.5
250	G 1¼	G 1½	141	300	-	20	6.0	3.5
250	G 1¼	G 1½	105	300	-	22	6.0	3.5
400	DN 64	G 2½	-	270	-	-	9.3	8.0
630	DN 64	G 2½	-	420	-	-	10.0	8.0

### 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.

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