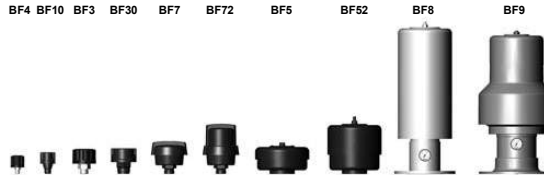


# HYDAC INTERNATIONAL



## Tank Breather Filter BF up to 11000 l/min



### 1. TECHNICAL SPECIFICATIONS

#### 1.1 FILTER HOUSING

##### Construction

Breather filter sizes 4, 10, 3 and 30 consist of a housing which is screwed onto the oil tank, and a built-in filter element.

Sizes 5, 52, 7 and 72 have housings which are screwed onto the oil tank and have one or two exchangeable filter element(s).

BF 5 and 52 are fitted with a built-in oil mist trap as standard.

Sizes 8 and 9 consist of a flange for mounting to the tank, an exchangeable element and a cap. The BF 9 also has an oil mist trap which allows the oil to be drained via an oil drain plug.

#### 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

BF	Paper	
	3 µm	10 µm
4	2.9	4.1
10	2.9	—
3	6.2	8.7
30	6.2	8.7
7	26.1	36.7
72	52.2	73.4
5	85.1	119.6
52	170.2	239.2

The filter elements are made from phenolic resin impregnated paper and cannot therefore be cleaned!

#### 1.3 FILTER SPECIFICATIONS

Temperature range	-30 °C to +100 °C	
Material of housing	Steel, zinc-plated/plastic coated (BF 4, 3) Steel (BF 5, 52) Steel, galvanised (BF 8) Aluminium (BF 9) Glass fibre reinforced synthetic material (BF 10, 30, 7, 72)	
Type of clogging indicator	VMF (return line indicator)	
Pressure setting of clogging indicator	0.6 bar	K pressure gauge
	0.035 bar	UBM indicator (others on request)

#### 1.4 SEALS

NBR (= Perbunan) on filter  
Polyurethane on element  
Cardboard on mounting flange

#### 1.5 SPECIAL MODELS AND ACCESSORIES

- with check/bypass valve to support the suction characteristics of the pump  
Not 100% air-tight or leakage-free!  
(only BF 10 (but not G¼), 3, 30, 5 and 52)
- with anti-splash device  
(only BF 10, 3, 30, 7, 72)
- with connection for a clogging indicator  
(only BF 7, 72, 8, 9)

#### 1.6 SPARE PARTS

See Original Spare Parts List

#### 1.7 CERTIFICATES, APPROVALS, STANDARDS

BF 7, 72 to Renault specification; others on request

#### 1.8 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

The standard models are suitable for use with mineral and lubrication oils. For non-flam and biodegradable oils, see tables:

##### Non-flam fluids

BF	HFA	HFC	HFD-R
4, 10, 3, 30	—	—	—
7, 72, 5, 52	●	●	—
8, 9	●	●	●

- HFA oil in water emulsion (H<sub>2</sub>O content ≥ 80%)
- HFC water polyglycol solution (H<sub>2</sub>O content 35-55%)
- HFD-R synthetic, water free phosphate ester

##### Biodegradable fluids

BF	HTG	HE	HPG	
			PAG	PRG
4, 10, 3, 30,	+	+	●	●
7, 72, 5, 52	+	+	●	●
8, 9	+	+	●	●

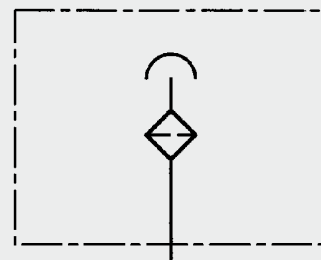
- + suitable for all
- contact our Technical Sales Department
- not suitable

- HTG vegetable oil based hydraulic fluids
- HE ester-based synthetic hydraulic fluids
- HPG polyglycol-based synthetic hydraulic fluids
- PAG sub-group HPG: polyalkalene glycol
- PEG sub-group HPG: polyethylene glycol

#### 1.9 CHANGING INTERVALS

The breather filter elements or filters must be replaced as frequently as the fluid filters, but at least once a year.

#### Symbol



E 7.408.0/02.08

## 2. MODEL CODE (also order example)

### 2.1 COMPLETE FILTER

#### 2.1.1 BF 4 and 3

Filter type **BF** **P** **3** **G** **10** **W** **4** **.X** **/RV**

Filter material  
P Paper

Size  
BF 4, 3

#### Type and size of connection

Desig.	Type	Connection	Filter size	
			BF4	BF3
G	Thread ISO 228	G ¼	•	
		G ½		•
		G ¾		•
		G 3/8		•

#### Filtration rating in µm

P 3, 10 (absolute)

#### Type of clogging indicator

W no port for clogging indicator

#### Type code

Size	Code	Connection	Δp [bar]
BF 3	1.X	G ¾	-
BF 3	2.X	G 3/8	-
BF 3	3.X	G ½	-
BF 3../RV	4.X	G ¾	0.4
BF 3../RV	5.X	G ¾	0.7
BF 3../RV	6.X	G ¾	0.2
BF 3../RV	7.X	G ¾	1.0
BF 4	1.X	G ¼	-

#### Modification number

X the latest version is always supplied

#### Supplementary details

RV check/bypass valve (not for BF 4)

#### 2.1.2 BF 10 and 30

Filter type **BF** **P** **30** **G** **10** **W** **4** **.X** **/RV**

Filter type  
BF

Filter material  
P Paper

Size  
BF 10, 30

#### Type and size of connection

Desig.	Type	Connection	Filter size	
			BF10	BF30
G	Thread ISO 228	G ¼	•	
		G ¾		•
M	metr. connection	M 42x2		•
		M 30x1.5		•
		M 22x1.5	•	
N	NPT thread	½	•	
		¾		•
U	UNF thread	1 1/16-12UN-2A		•

#### Filtration rating in µm

P 3, 10 (absolute) -10 µm only for BF 30

#### Type of clogging indicator

W no port for clogging indicator

#### Type code

Size	Code	Connection
BF 30 G...	1.X	G ¾
BF 30 M...	1.X	M 42x2
BF 30 M...	2.X	M 30x1.5
BF 30 N...	1.X	NPT ¾
BF 30 U...	1.X	1 1/16-12UN-2A
BF 10 G...	1.X	G ¼
BF 10 M...	1.X	M 22x1.5
BF 10 N	1.X	NPT ½

#### Modification number

X the latest version is always supplied

#### Supplementary details

AS anti-splash without check/bypass valve

RV0.2  
RV0.4  
RV0.7 ] valve with relevant pressure setting

#### 2.1.3 BF 7 and 72

Filter type **BF** **P** **72** **G** **3** **W** **1** **.X** **/AS**

Filter type  
BF

Filter material  
P Paper

Size  
BF 7, 72

#### Type and size of connection

Desig.	Type	Connection	Filter size	
			7	72
G	Thread ISO 228	G 1	•	•

#### Filtration rating in µm

P 3, 10 (absolute)

#### Type of clogging indicator

W no port for clogging indicator  
K pressure gauge  
(measuring range: -1 to +0.6 bar)

UBM visual/analogue vacuum gauge  
with manual reset  
(pressure setting: -0.035 bar)

#### Type code

0 for type UBM  
1 for types W and K

#### Modification number

X the latest version is always supplied

#### Supplementary details

AS anti-splash device (only BF 7, 72)

#### 2.1.4 BF 5 and 52

Filter type **BF** **P** **52** **G** **3** **W** **1** **.X** **/RV0.4**

Filter type  
BF

Filter material  
P Paper  
BN Betamicron®

Size  
BF 5, 52

#### Type and size of connection

Desig.	Type	Connection	Filter size	
			5	52
G	Thread ISO 228	G 2½	•	•

#### Filtration rating in µm

BN, P 3, 10 (absolute)

#### Type of clogging indicator

W no port for clogging indicator

#### Type code

1

#### Modification number

X the latest version is always supplied

#### Supplementary details

RV0.4 check/bypass valve 0.4 bar pressure setting

**2.1.5 BF 8 and 9**

**Filter type** \_\_\_\_\_ **BF P 8 F 10 W 1 . X**

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

BN Betamicon®  
 BN/AM Betamicon®/Aquamicron®

**Size** \_\_\_\_\_

BF 8, 9

**Type and size of connection** \_\_\_\_\_

Desig.	Type	Filter size
		8      9
F	Flange	•      •

**Filtration rating in µm** \_\_\_\_\_

BN 3, 10, 20 - for BF 8  
 BN 2 - for BF 9  
 BN/AM 10 - for BF 8

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

A blanking plug in indicator port  
 K pressure gauge (measuring range: -1 to +0.6 bar)

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

1

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

X the latest version is always supplied

**2.2 REPLACEMENT ELEMENT**

**Size** \_\_\_\_\_ **0005 L 003 P**

0005 for BF 5, 52  
 0007 for BF 7  
 0072 for BF 72  
 0008 for BF 8  
 0009 for BF 9

**Type** \_\_\_\_\_

L

**Filtration rating in µm** \_\_\_\_\_

P: 003, 010 (BF 5, 52, 7, 72)  
 BN: 001, 002 (BF 8)  
 BN: 002 (BF 9)  
 BN: 003, 010 (BF 5, 52)  
 BN4AM: 001 (BF 8)

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

P Paper (BF 5, 52, 7, 72)  
 BN Betamicon® (BF 5, 52, 8, 9)  
 BN4AM Betamicon®/Aquamicron® (BF 8)

Replacement elements cannot be ordered for BF 4, 10, 3, 30 .  
 These filters are only available complete !

**2.3 REPLACEMENT CLOGGING INDICATOR**

**Type** \_\_\_\_\_ **VMF 0.6 K . X**

VMF Return line indicator

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

0.6 -1 to +0.6 bar  
 0.035 -0.035 bar

**Type** \_\_\_\_\_

K pressure gauge  
 UMB visual/analogue vacuum gauge

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

X the latest version is always supplied

**2.4 MODEL CODE FOR BF 7 AND 72 TO RENAULT SPECIFICATION**

**BF P 7 F 10 UBM 0 . X**

**Size** \_\_\_\_\_

7 Tank volume from 20 to 400 litre  
 72 Tank volume over 400 litre

**Type and size of connection**

Desig.	Type	Filter size	
		7	72
G	with threaded adaptor	•	•
F	with flange adaptor	•	•
S	with weld adaptor	•	•

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

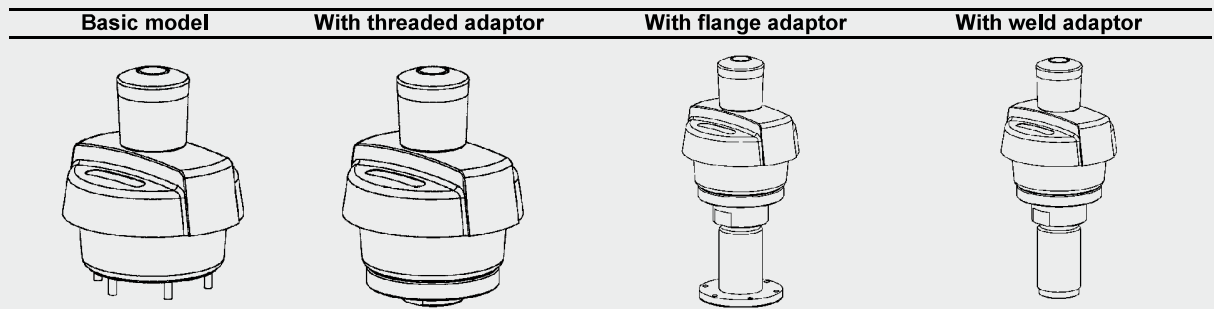
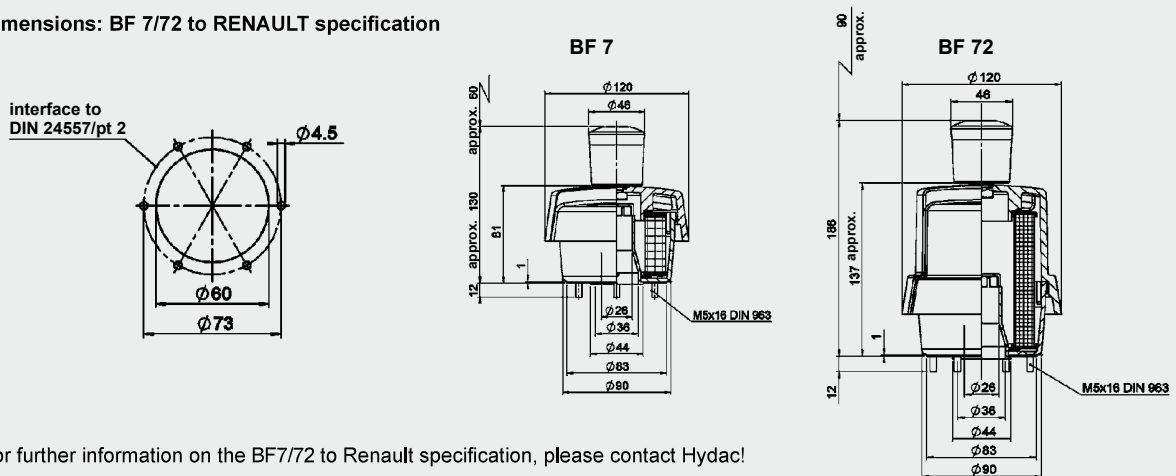
UBM visual analogue vacuum pressure gauge with manual reset, measuring range 0 to +0.035 bar

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

0 without adaptor (basic model)  
 2 incl. adaptor with male thread G 3/4  
 3 incl. adaptor with female thread 1 1/2-16 UNC  
 4 incl. adaptor with female thread G 3/4  
 5 incl. flange adaptor (1 1/2-16 UNC)  
 6 incl. flange adaptor (G 3/4)  
 7 incl. weld adaptor (1 1/2-16 UNC)  
 8 incl. weld adaptor (G 3/4)  
 9 incl. adaptor with male thread G 1 1/4

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

X the latest version is always supplied


**Dimensions: BF 7/72 to RENAULT specification**


For further information on the BF7/72 to Renault specification, please contact Hydac!

E 7.408.0/02.08



### 3. FILTER CALCULATION / SIZING

#### 3.1 SINGLE PASS FILTRATION PERFORMANCE DATA FOR AIR FILTER ELEMENTS

The following separation values were established under real-life simulated conditions. This means that the selected velocity of the flow against the filter mesh was 20 cm/s and the contamination added was 40 mg/m<sup>3</sup> of ISO MTD test dust.

Filtration rating	Retention value d..	For particle size	Filter material
3 µm	d 80	0.74 µm	Paper
	d 100	2.64 µm	
10 µm	d 80	1.49 µm	BN
	d 100	9.56 µm	
10 µm	d 80	0.25 µm	BN
	d 100	0.84 µm	

The d 80 value refers to the particle size which is filtered out at a rate of 80% during the retention test. The particle size determined by this method is called the nominal filtration rating of the air filter. The d 100 value therefore refers to the particle size which is filtered out at a rate of 100% during the single-pass test. The particle size determined by this method is called the absolute filtration rating of the air filter.

Table of average dust concentrations in real life:

Urban regions with a low level of industry	3-7 mg/m <sup>3</sup> air
General mechanical engineering	9-23 mg/m <sup>3</sup> air
Construction industry (wheeled vehicles)	8-35 mg/m <sup>3</sup> air
Construction industry (tracked vehicles)	35-100 mg/m <sup>3</sup> air
Heavy industry	50-70 mg/m <sup>3</sup> air

#### 3.2 DIFFERENTIAL PRESSURE ACROSS BREATHER FILTER

The differential pressure (with clean element) for the various filter sizes is shown in the graphs under point 3.4.

#### 3.3 SIZING GUIDELINES

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)

The rate at which contamination enters a hydraulic system can be considerably reduced by using efficient tank breather filtration.

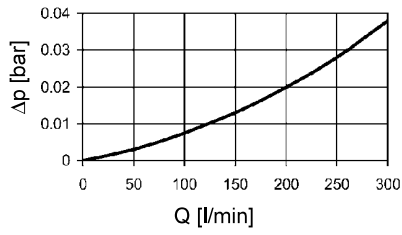
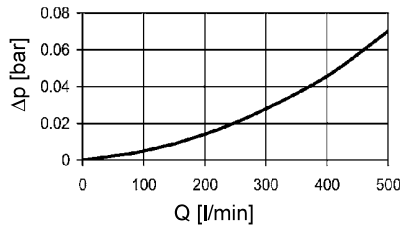
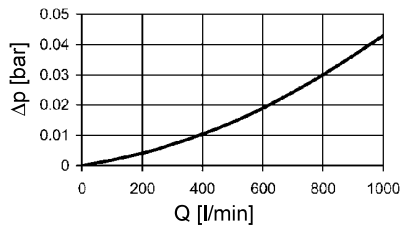
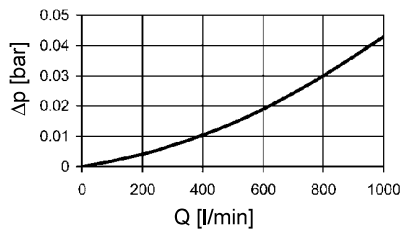
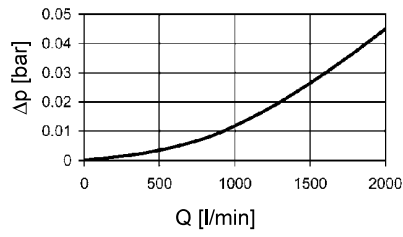
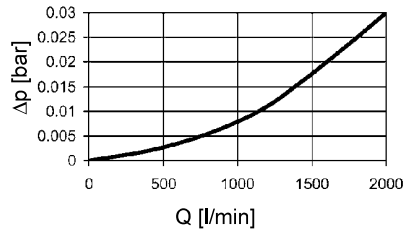
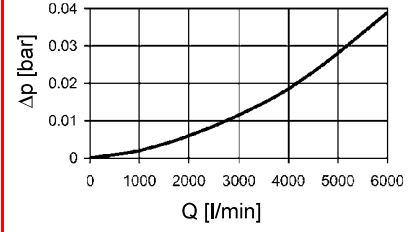
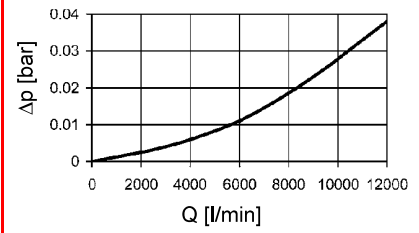
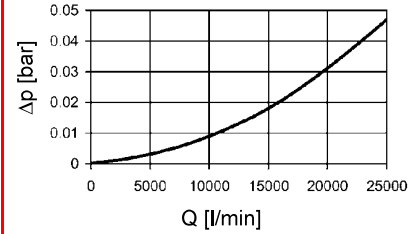
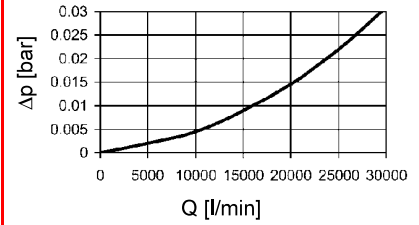
**NOTE:**

Incorrectly sized breather filters can place additional strain on the system and reduce the service life of hydraulic filter elements.

For optimum sizing the following should therefore be observed:

- Filtration rating of air breather filter ≤ filtration rating of hydraulic filter
- Only use air breather filters with an absolute retention rate (d100 ≤ x µm; x = given filtration rating)
- Max. permissible initial pressure loss: 0.05 bar, optionally 0.01 bar (with a clean filter element and calculated air flow rate)
- Determination of the calculated air flow rate:  
 $QA = f5 \times Qp$   
 QA = air flow rate for sizing purposes in l<sub>v</sub>/min  
 f5 = factor for operating conditions  
 Qp = max. flow rate of the hydraulic pump in l/min

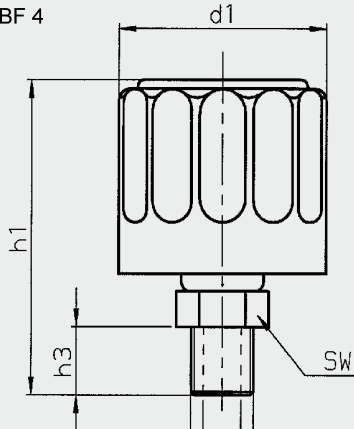
For Factor f5, see table on p. 275, ELF Tank Breather Filter, E 7.404.0/06.07.

**3.4 AIR FLOW RATE**
**BF 4**

**BF 10**

**BF 3**

**BF 30**

**BF 7**

**BF 72**

**BF 5**

**BF 52**

**BF 8**

**BF 9**


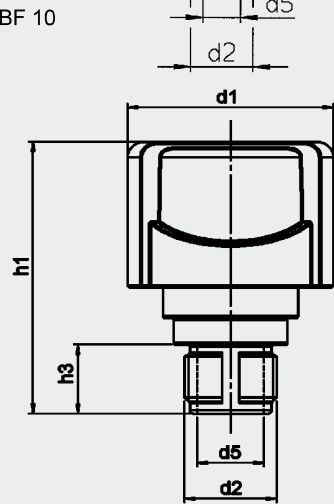


## 4. DIMENSIONS

BF 4



BF 10

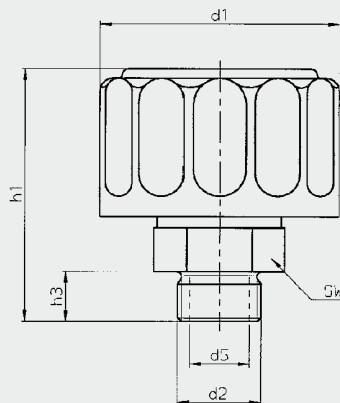


Type	BF 4...
d1	44
d2	G ¼
d5	8
h1	62
h3	13,5
SW	17
Weight	0.08 kg

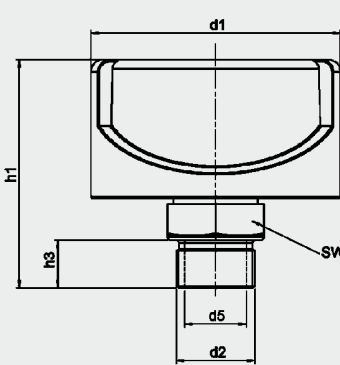
Type	BF 10 "G"...	BF 10 "M"...
d1	49	49
d2	G ¼	M22x1.5
d5	7	16
h1	64	71
h3	13,5	18
Weight	0.047 kg	0.052 kg

Type	BF 10 "U"...	BF 10 "N"...
d1	49	49
d2	1 1/16-12 UN	NPT ½
d5	16	14
h1	71	71
h3	18	18
Weight	0.059 kg	0.049 kg

BF 3



BF 30

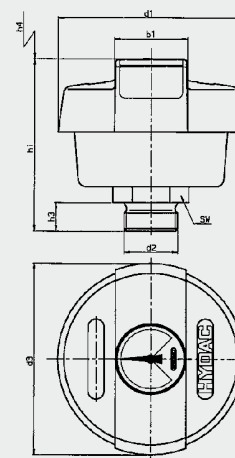


Type	BF 3 ...1.X	BF 3 ...2.X	BF 3 ...3.X
d1	76	76	76
d2	G ¾	G 3/8	G ½
d5	19	12	15
h1	79	72	76
h3	16	12	14
SW	36	22	27
Weight	0.33 kg		

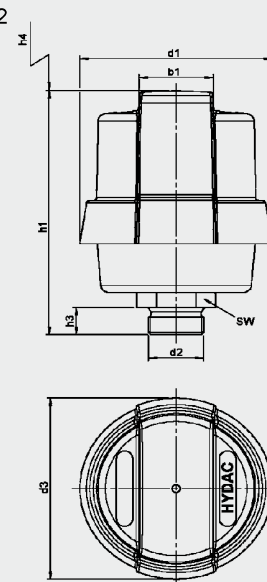
Type	BF 30 "G"...1.X	BF 30 "M"...1.X	BF 30 "M"...2.X
d1	83	83	83
d2	G ¾	M42x2	M30x1.5
d5	20,5	34,5	20,5
h1	76	76	76
h3	16	16	16
SW	32	46	32
Weight	0.12 kg	0.13 kg	0.12 kg

Type	BF 30 "N"...1.X	BF 30 "U"...1.X
d1	83	83
d2	NPT ¾	1 1/16-12 UN
d5	20,5	20,5
h1	76	76
h3	16	16
SW	32	32
Weight	0.12 kg	0.12 kg

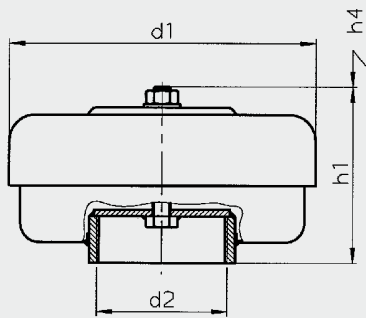
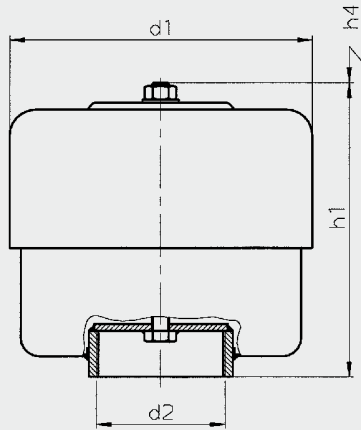
BF 7



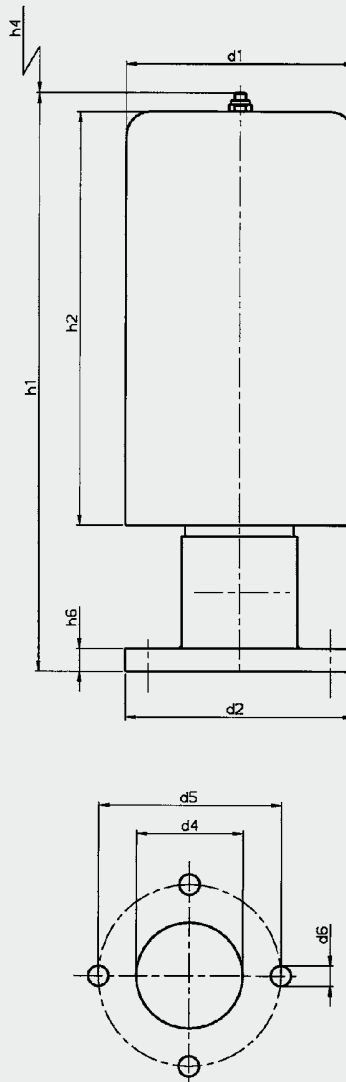
BF 72



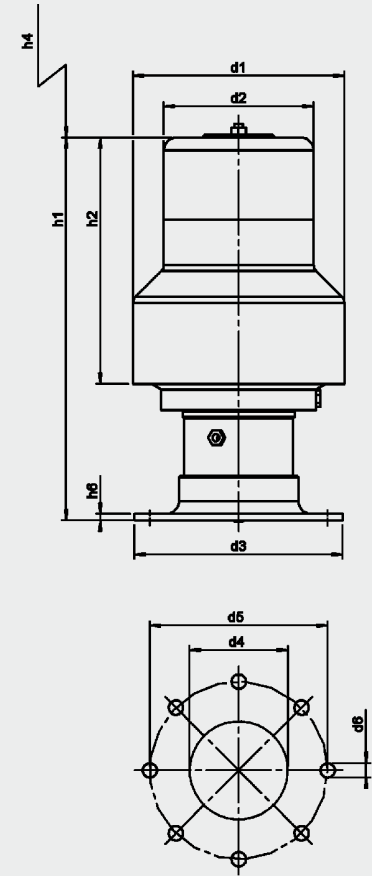
Type	BF 7...	BF 72...
d1	116	116
d2	G 1	G 1
d3	120	120
h1	110	162
h3	18	18
h4	60	90
b1	44	44
SW	41	41
Weight	0.40 kg	0.65 kg

**BF 5**

**BF 52**


Type	BF 5...	BF 52...
d1	177	177
d2	G 2½	G 2½
h1	107	173
h4	90	90
Weight	2.00 kg	2.60 kg

**BF 8**


Type	BF 8...
d1	200
d2	200
d4	93
d5	160
d6	18
h1	510
h2	365
h4	400
h6	20
Weight	12.4 kg

**BF 9**


Type	BF 9...
d1	250
d2	177
d3	246
d4	116
d5	210
d6	17
h1	455
h2	290
h4	330
h6	8
Weight	6.2 kg

**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.

**HYDAC Filbertechnik GmbH**

Industriegebiet

**D-66280 Sulzbach/Saar**

Tel.: 0 68 97 / 509-01

Fax: 0 68 97 / 509-300

 Internet: [www.hydac.com](http://www.hydac.com)

 E-Mail: [filter@hydac.com](mailto:filter@hydac.com)