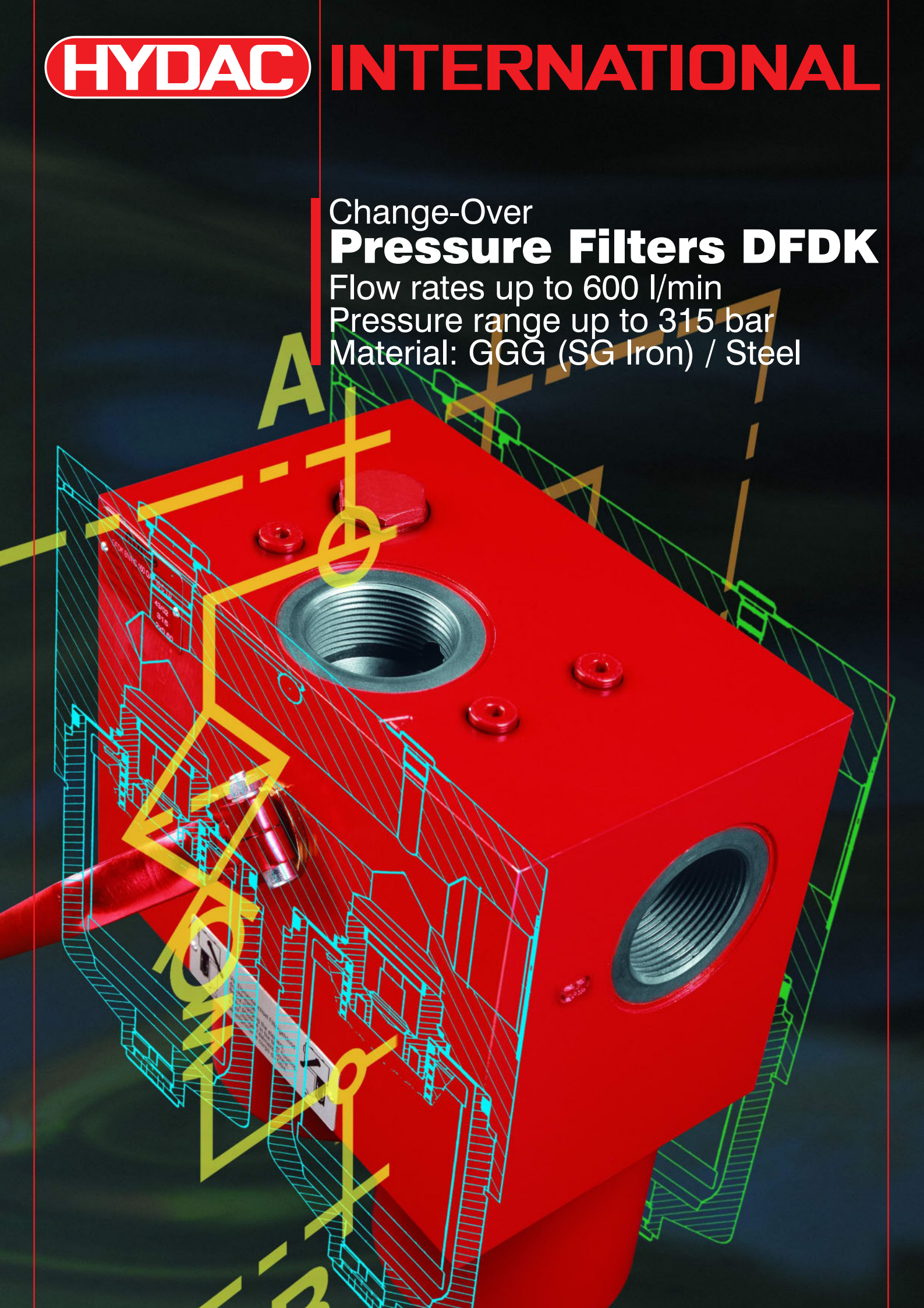
HYDAC INTERNATIONAL

Change-Over

# Pressure Filters DFDK

Flow rates up to 600 l/min
Pressure range up to 315 bar
Material: GGG (SG Iron) / Steel



# 1. DESCRIPTION

## 1.1. FILTER HOUSING

**Construction**
The DFDK filters consist of a filter head and a screw-in filter bowl.

The standard model has a ball change-over valve and a connection for a clogging indicator.

## 1.2. FILTER ELEMENTS

Original HYDAC filter elements guarantee reliable function and protect hydraulic components and systems which are sensitive to contamination from wear and tear.

Performance and quality tests in accordance with international standards guarantee reliable operation of the filter.

Hydac filters are validated and their quality is continuously monitored according to the following standards.

– DIN ISO 2941:
Verification of collapse/burst resistance

– DIN ISO 2942:
Verification of fabrication integrity and determination of first bubble point test

– DIN ISO 2943:
Verification of material compatibility with fluids

– ISO 3724:
Verification of flow fatigue characteristics

– ISO 3968:
Evaluation of differential pressure versus flow characteristics

– ISO 16889:
Multi-pass method for evaluating filtration performance of a filter element

In addition to guaranteeing retention and flow rate characteristics, the filter elements have excellent structural stability.

The careful construction and mechanically stable support of the filter media guarantee above-average beta value stability and flow fatigue characteristics of the filter elements.

The filter elements are available with the following collapse/burst stability values:

| | |
|---|---|
| Betamicron® (BN3HC): | 25 bar |
| Betamicron® (BH3HC): | 210 bar |
| Stainless steel wire mesh (W/HC): | 30 bar |
| Stainless steel metal fibre (V): | 210 bar |

## 1.3. CLOGGING INDICATORS

**VD 8 D . X /-V-L220**

**Type of indicator**
VD differential pressure indicator

**Pressure setting**
8 = 8 bar standard (others on request)

**Type of clogging indicator**
B. = visual
C. = electrical
D. = visual/electrical

**Modification number**
X the latest version is always supplied

**Supplementary details**
-V Viton
-LED 2 light-emitting diodes up to 24 volt
-L.. light with corresponding voltage (24, 48, 110, 220 Volt)
-W filter suitable for oil-water emulsions (HFA, HFC), NBR seals

For further details on clogging indicators, please see:
**brochure no.: E 7.050../..**

## 1.4. SEALS

NBR (Perbunan) or FPM (Viton)

## 1.5. SPECIAL MODELS AND ACCESSORIES

– On request

## 1.6. SPARE PARTS

See Original Spare Parts List and Maintenance Instructions.

## 1.7. COMPATIBILITY WITH OPERATING FLUIDS TO DIN ISO 2943:

– Hydraulic oils H to HLPD to DIN 51524

– Lubrication oils to DIN 51517, APJ, ACEA, DIN 51515, ISO 6743

– Compressor oils to DIN 51506

– Rapidly biodegradable operating fluids to VDMA 24568 HETG, HEES, HEPG

– Non-flam operating fluids HFC and HFD

– Operating fluids with high water content (>50% water content) on request

For further details on filter elements:
**Brochure no.: E 7.200../..**

# 2. GENERAL

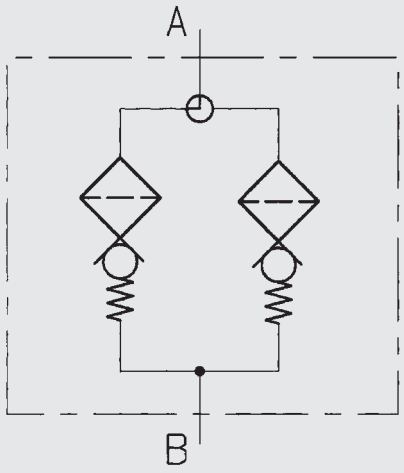
**Mounting**
Inline filter

**Temperature range**
-10 °C to +100 °C

**Pressure setting of the clogging indicator**
$\Delta p_a$ = 8 bar -10 %

Other pressure settings on request

**Circuit diagram (Symbol)**



## 3. MODEL CODE (also order example)

DFDK BN/HC 160 Q A F 10 A 1 . X /-V

### 3.1. COMPLETE FILTER

**Filter type**
DFDK

**Filter material of element**
BN/HC Betamicron®
BH/HC Betamicron®
V Stainless steel metal fibre
W/HC, W Stainless steel wire mesh

**Housing material/Size**
GGG (SG iron)/Steel: 30, 60, 110, 140, 160, 240, 280, 330, 500, 660, 990, 1320

**Operating pressure**
Q = 315 bar

**Type of change-over**
A = ball change-over

**Type of connection / Connection size**

| Type of connection | | Filter size | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 30 | 60 | 110 | 140 | 160 | 240 | 280 | 330 | 500 | 660 | 990 | 1320 |
| B | G ½ | ● | | | | | | | | | | | |
| C | G ¾ | | ● | ● | ● | | | | | | | | |
| F | G1½ | | | | | ● | ● | ● | | | | | |
| L | DN 50* | | | | | | | | ● | ● | ● | ● | ● |
| Z | | According to customer specification | | | | | | | | | | | |

*DIN ISO 228 (6000 PSI)

**Filtration rating in µm**
BN/HC, BH/HC, V: 3, 5, 10, 20
W/HC, W: 25, 50, 100, 200 (on request)

**Type of clogging indicator**
Y plastic blanking plug in indicator port
A steel blanking plug in indicator port
B visual indicator
C electrical indicator
D combined visual/electrical indicator
] for other clogging indicators see brochure no. E 7.050../..
LE visual-mechanical/electrical
LZ visual-mechanical/electrical with switching contacts at 75% and 100%

**Type code**
1 version with 1-piece filter bowl
2 version with 2-piece filter bowl (only for sizes 990 and 1320)

**Modification number**
X the latest version is always supplied

**Supplementary details**
No details = standard (NBR seals)
L... light with corresponding voltage (24V, 48V, 110V, 220V)
LED 2 light-emitting diodes up to 24 volt
] only on clogging indicators type D
V FPM seals, filter suitable for rapidly biodegradable oils and phosphate ester (HFD-R)
W NBR seals, filter suitable for oil-water emulsions (HFA, HFC)

### 3.2. REPLACEMENT ELEMENT

0160 D 010 BN3HC /-V

**Size**
0030, 0060, 0110, 0140, 0160, 0240,
0280, 0330, 0500, 0660, 0990, 1320

**Type**
D

**Filtration rating in µm**
BN3HC, BH3HC, V: 3, 5, 10, 20
W/HC, W: 25, 50, 100, 200 (on request)

**Filter material**
BN3HC, BH3HC, V, W/HC, W

**Supplementary details**
V = FPM seals, element suitable for rapidly biodegradable oils and phosphate ester (HFD-R)
W = NBR seals, element suitable for oil-water emulsions (HFA, HFC) (only necessary for W/HC, W and V elements)

## 4. FILTER SPECIFICATIONS

| Filter type | Connection | Element size and no. per filter side | Weight [kg] incl. element |
|---|---|---|---|
| 30 | G ½ | 1 x 0030 D... | 7.4 |
| 60 | G ¾ | 1 x 0060 D... | 15.0 |
| 110 | G ¾ | 1 x 0110 D... | 17.0 |
| 140 | G ¾ | 1 x 0140 D... | 18.9 |
| 160 | G 1½ | 1 x 0160 D... | 33.0 |
| 240 | G 1½ | 1 x 0240 D... | 36.0 |
| 280 | G 1½ | 1 x 0280 D... | 45.0 |
| 330 | SAE DN 50 | 1 x 0330 D... | 154.0 |
| 500 | SAE DN 50 | 1 x 0500 D... | 163.0 |
| 660 | SAE DN 50 | 1 x 0660 D... | 170.0 |
| 990 | SAE DN 50 | 1 x 0990 D... | 184.4 |
| 1320 | SAE DN 50 | 1 x 1320 D... | 202.4 |

### 4.1. FATIGUE STRENGTH

$10^6$ cycles from 0 to nominal pressure.

## 5. FILTER CALCULATION/ SIZING

The total pressure drop of a filter at a certain flow rate is the sum of the housing Δp (including change-over valve!) and the element Δp.

The pressure drop can either be determined with the aid of our HFS Filter Sizing Program, or by using the following graphs.

It must be stressed that all of the technical documentation from HYDAC Filtertechnik always states the total housing pressure drop, i.e. including change-over valve.

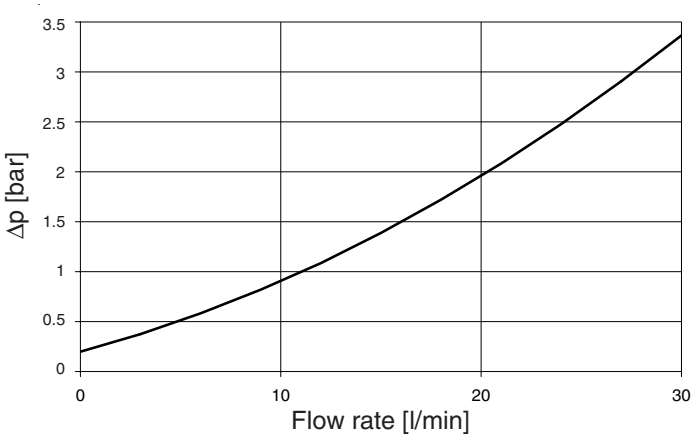
Please note: we recommend that the filter is calculated with a max. total pressure drop of 1.6 bar (20% of the standard indicator pressure setting).

If this value is exceeded, please contact the specialist department at HYDAC Filtertechnik GmbH to check the flow rate.

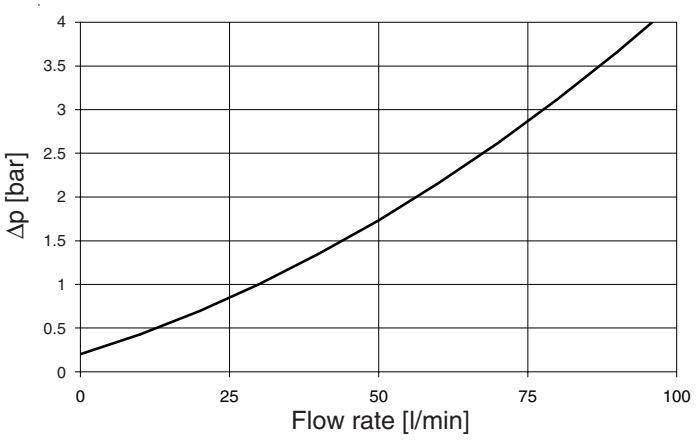
### 5.1. Δp-Q HOUSING GRAPHS BASED ON ISO 3968

The housing graphs apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30 mm²/s for the largest possible width per size.
In this case, the differential pressure changes proportionally to the density.

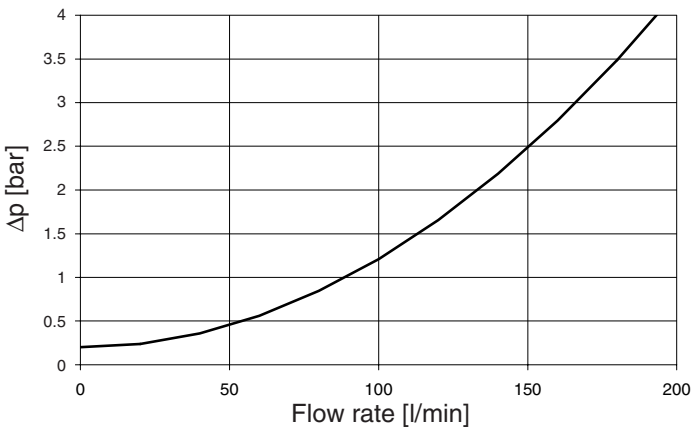
**DFDK 30**



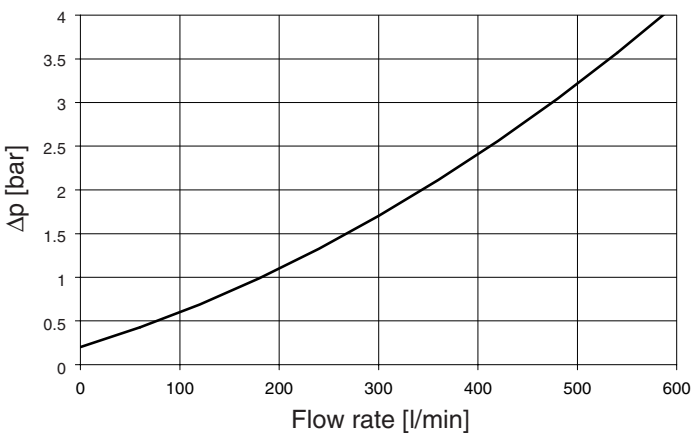

**DFDK 60, 110, 140**




**DFDK 160, 240 280**



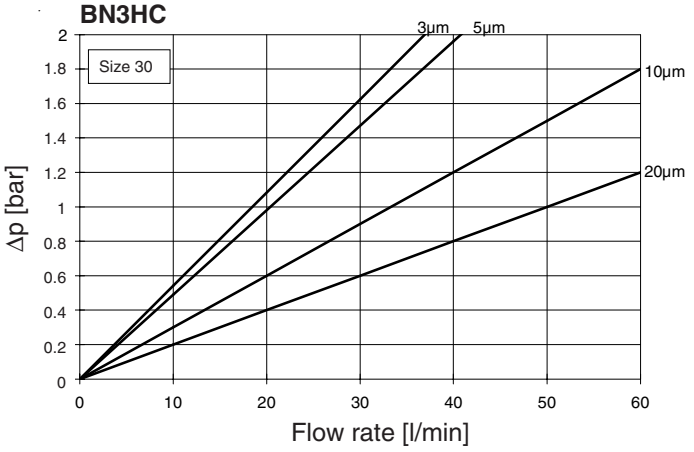

**DFDK 330, 500, 660, 990, 1320**

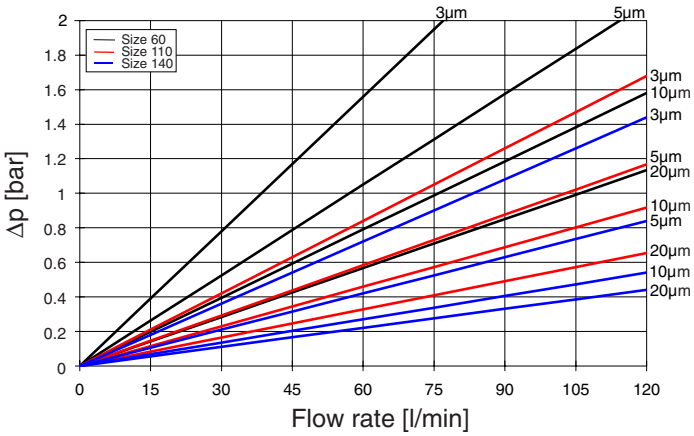


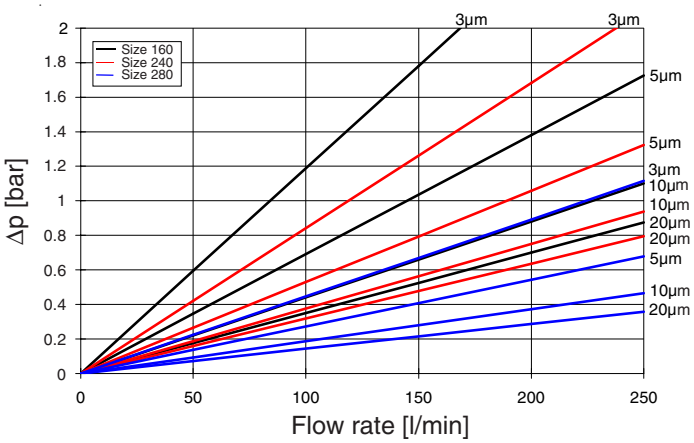
## 5.2. Δp-Q-GRAPHS - FILTER ELEMENTS

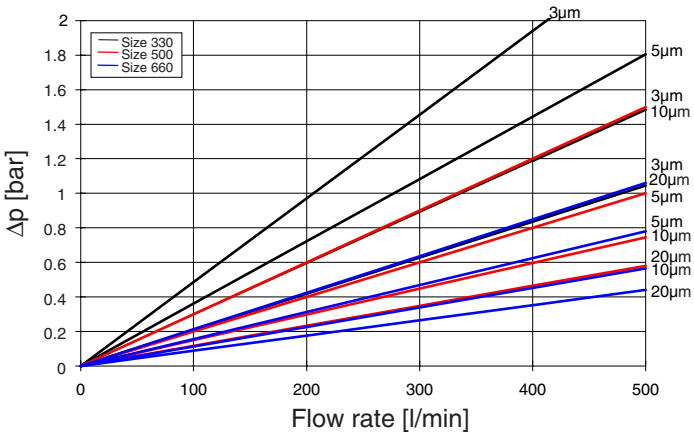
The element graphs apply to mineral oil with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity (see Example 5.3.).

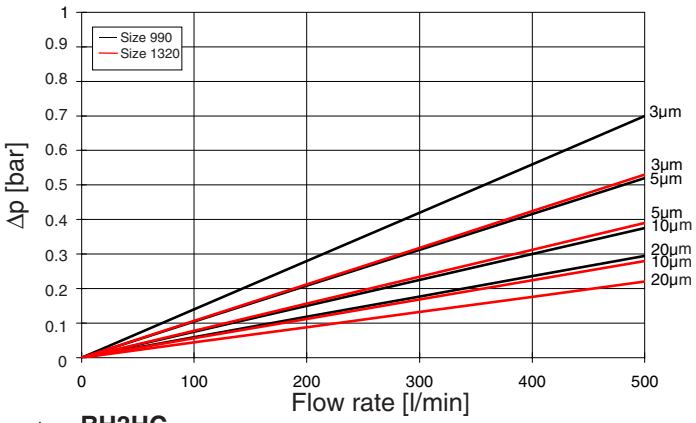
**BN3HC**



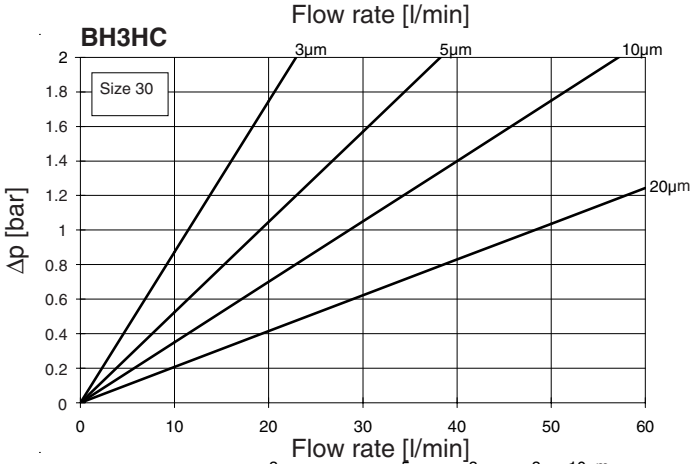



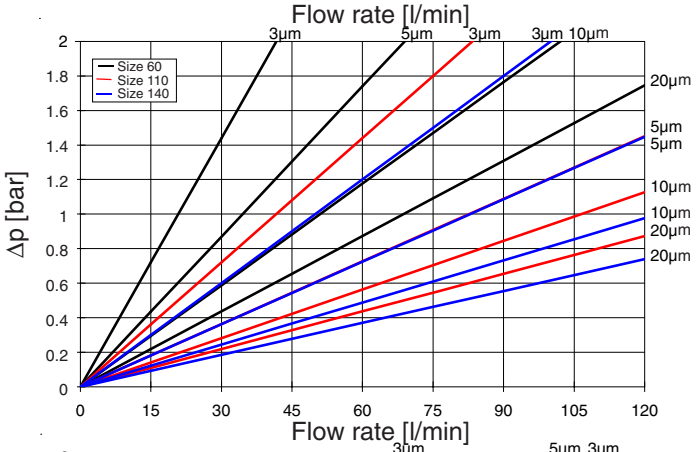



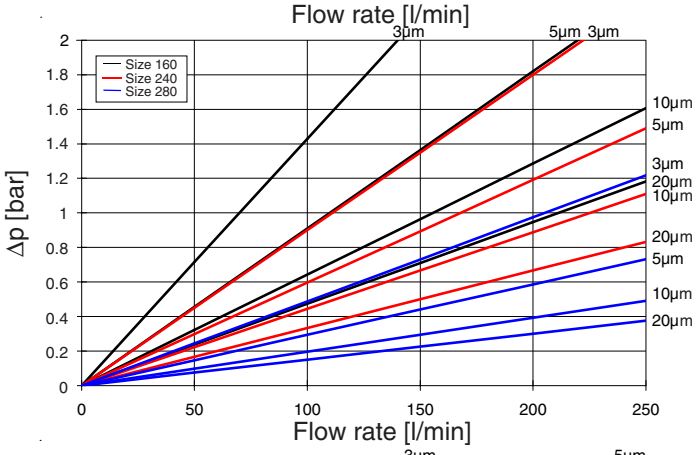



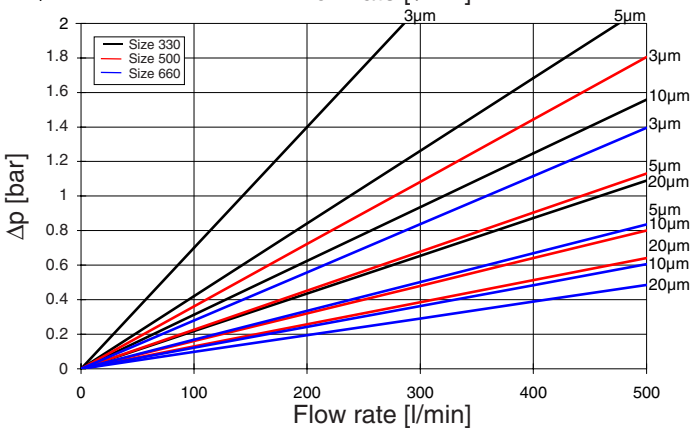



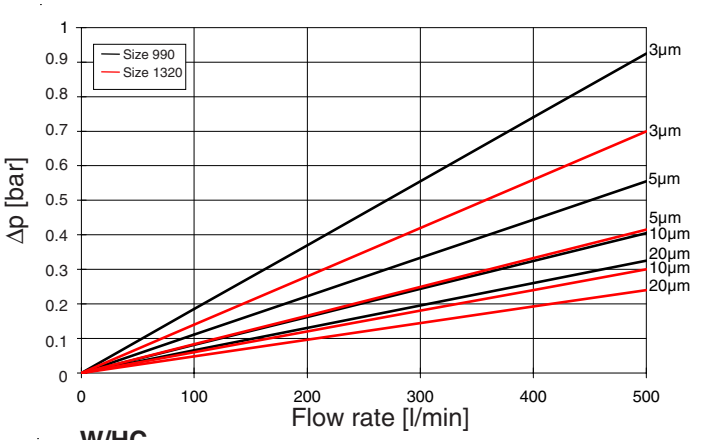

**BH3HC**



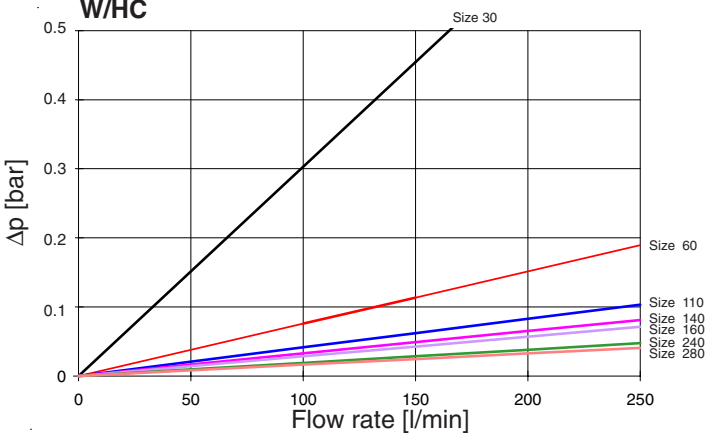



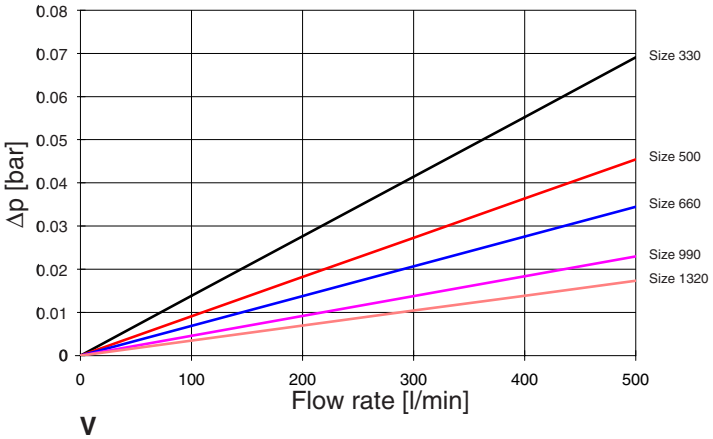



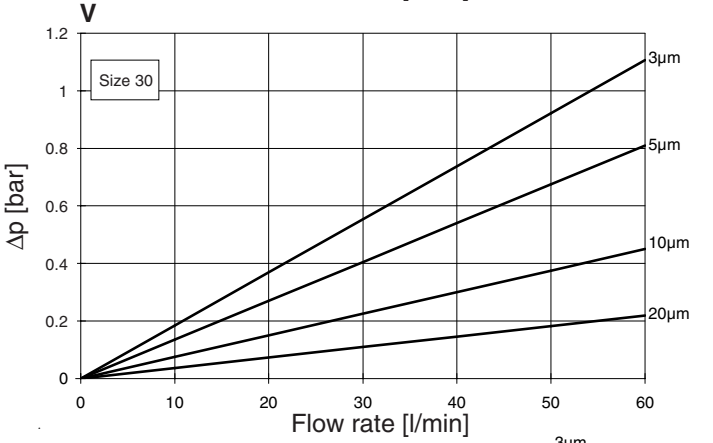


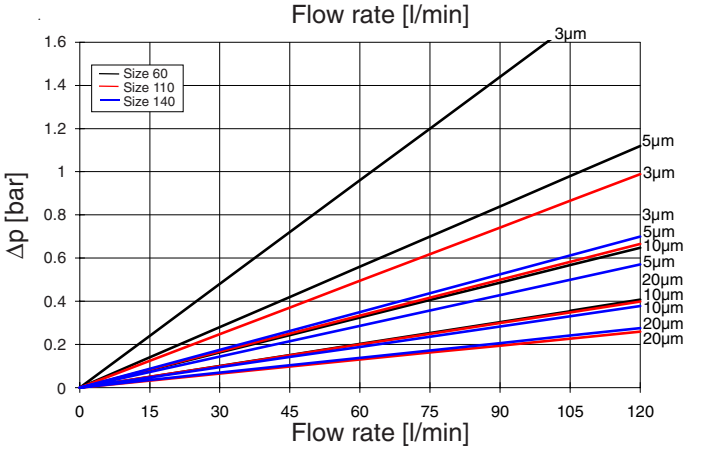

**W/HC**

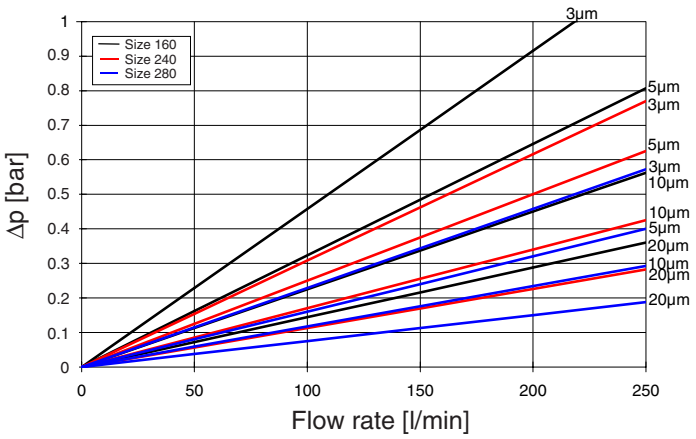


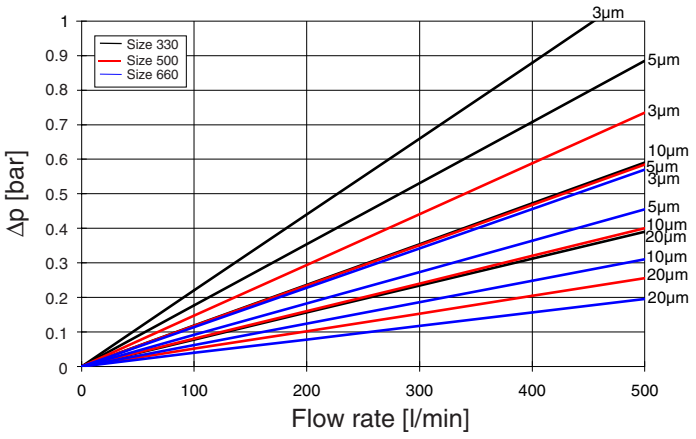



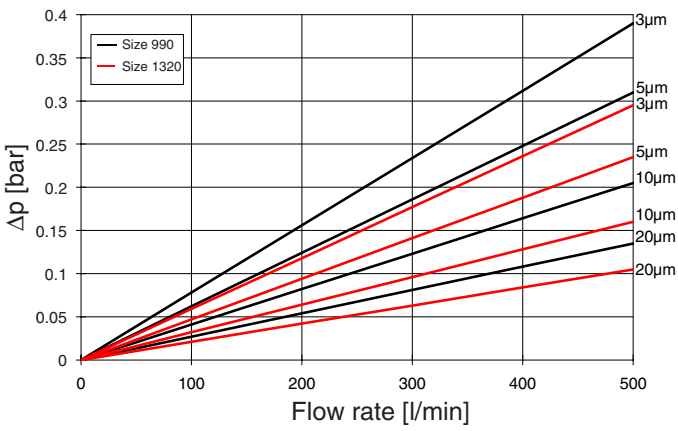

**V**




## 5.3. EXAMPLE

**General**

$$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element} \bullet \frac{\text{viscosity (mm²/s)}}{30\ \text{mm²/s}}$$

$\Delta p_{housing}$ = see point 5.1.
$\Delta p_{element}$ = see point 5.2.

**Example**

System data:
Q = 150 l/min; DFDK 330 with BH3HC element (10µm); viscosity = 46 mm²/s

$$\Rightarrow \Delta p_{housing} = 0.84\ \text{bar}$$

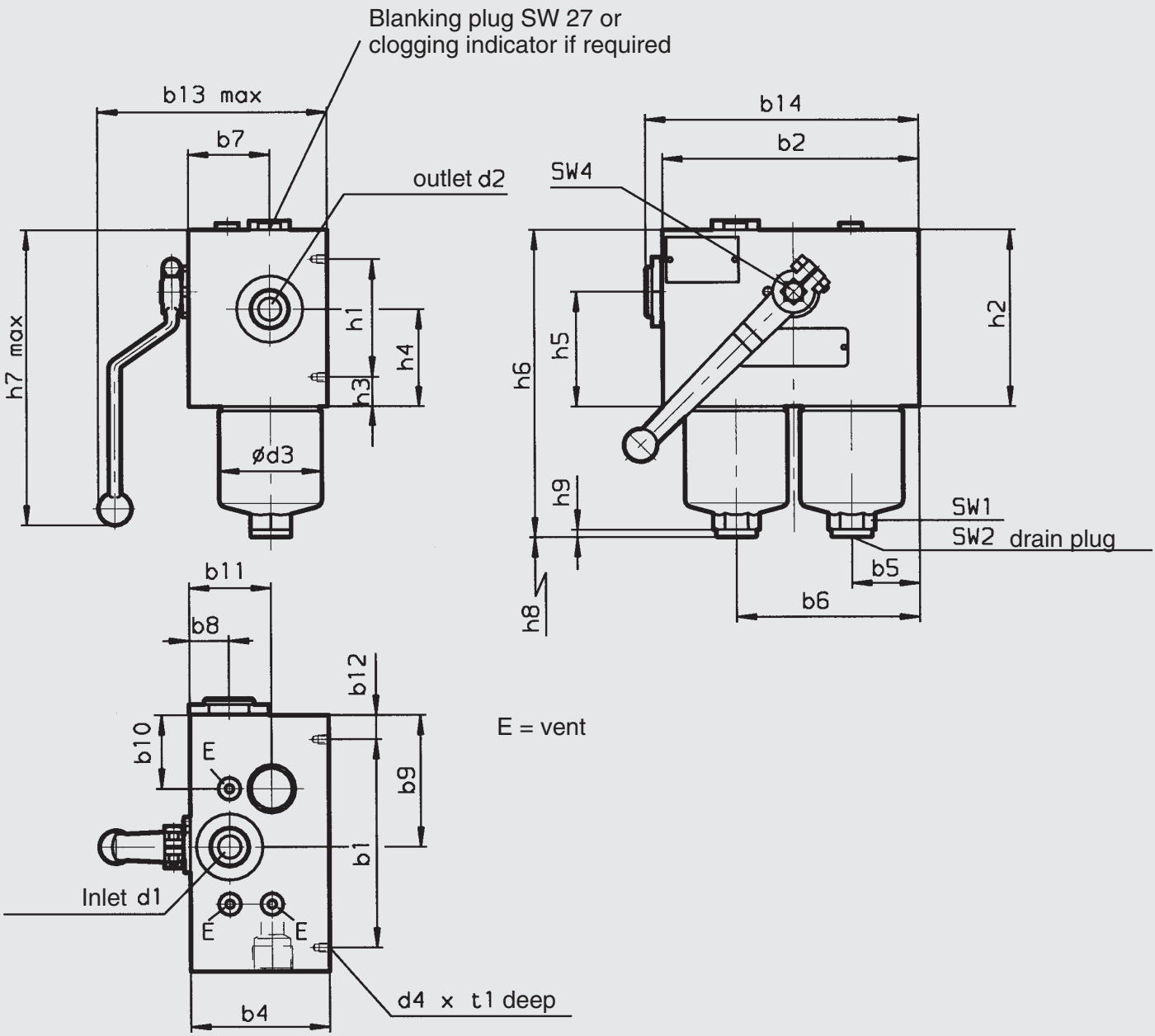
$$\Delta p_{element} = 0.44 \bullet \frac{46\ \text{mm²/s}}{30\ \text{mm²/s}} = 0.68\ \text{bar}$$

$$\Delta p_{total} = \underline{\underline{1.52\ \text{bar}}}$$

**For ease of calculation, our HFS Filter Sizing Program is available, and can be ordered via our website www.hydac.com.**

## 6. DIMENSIONS

6.1. DFDK 30-280

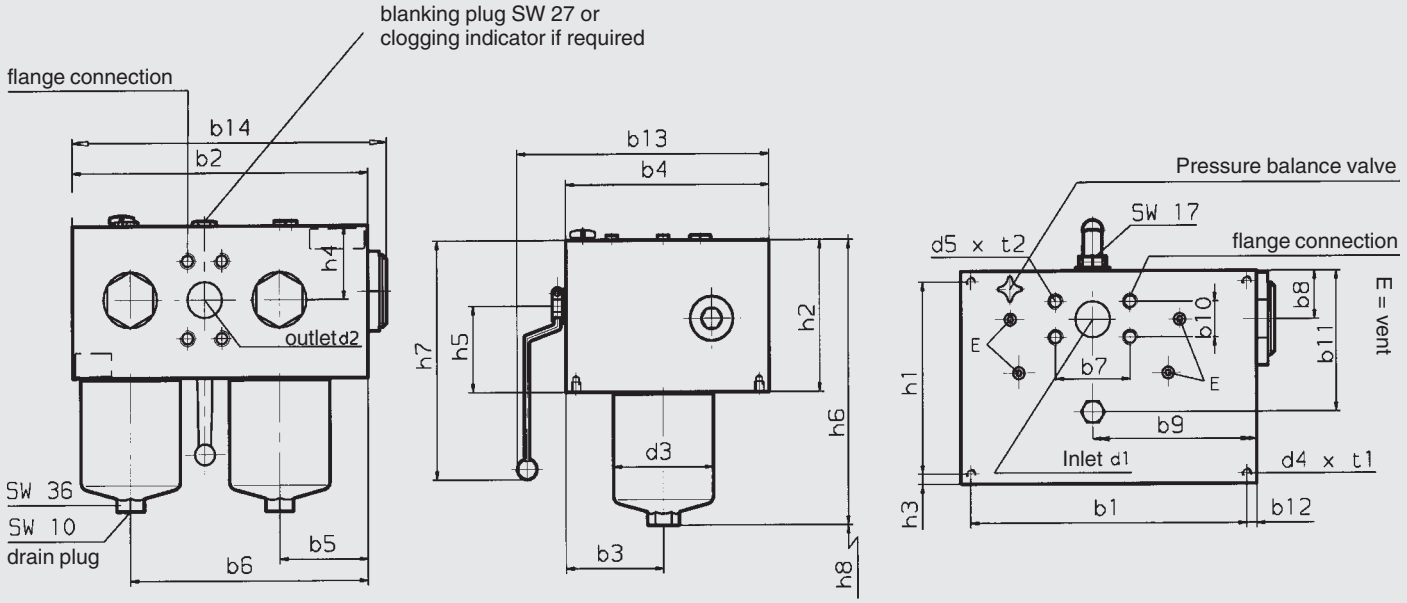



| Size | b1 | b2 | b4 | b5 | b6 | b7 | b8 | b9 | b10 | b11 | b12 | b13 | b14 | d1* | d2* | d3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 130 | 145 | 80 | 35 | 96 | 47 | 22.8 | 81 | 49 | 59 | 7.5 | 131 | 155 | G½ | G½ | 52.2 |
| 60<br>110<br>140 | 138 | 170 | 92 | 45 | 121.5 | 54 | 26 | 87 | 48.5 | 54 | 16 | 150 | 181 | G¾ | G¾ | 68.2 |
| 160<br>240<br>280 | 190 | 210 | 128 | 52.5 | 157.5 | 75.5 | 35.5 | 105 | 52.5 | 75.5 | 10 | 193 | 221 | G1½ | G1½ | 95.2 |

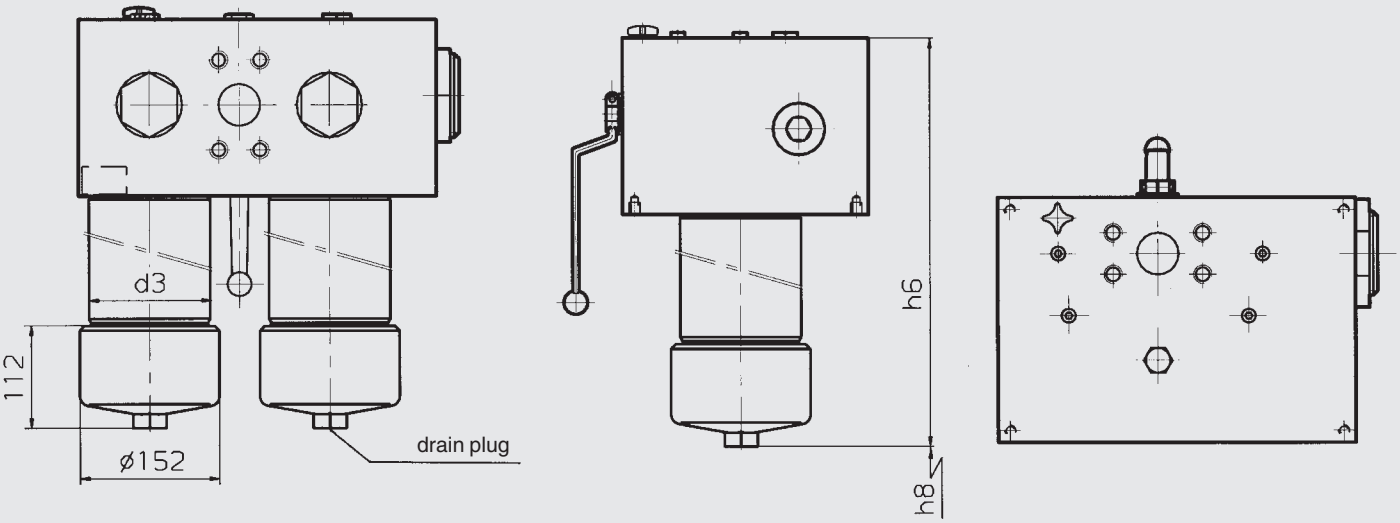
| Size | d4 | h1 | h2 | h3 | h4 | h5 | h6 | h7 | h8 | h9 | t1 | SW1 | SW2 | SW4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | M6 | 64 | 80 | 8 | 47 | 43 | 171 | 180 | 75 | 5 | 7 | 24 | 6 | 9 |
| 60<br>110<br>140 | M6 | 78 | 117 | 19.5 | 64.5 | 76 | 204.5<br>272.0<br>315.5 | 205 | 75 | 5 | 7 | 27 | 10 | 12 |
| 160<br>240<br>280 | M10 | 96 | 162 | 33 | 106 | 100 | 282.5<br>342.5<br>524.5 | 245 | 85 | 5 | 11 | 32 | 10 | 14 |

* DIN ISO 228

## 6.2. DFDK 330-660




## 6.3. DFDK 990-1320




| Size | b1 | b2 | b3 | b4 | b5 | b6 | b7 | b8 | b9 | b10 | b11 | b12 | b13 | b14 | d1* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 330<br>500<br>660<br>990<br>1320 | 359 | 385 | 127 | 265 | 115 | 309 | 96.8 | 60.5 | 212 | 44.5 | 175.5 | 13 | 326 | 405 | DN 50 (2") |

| Size | d2* | d3 | d4 | d5 | h1 | h2 | h3 | h4 | h5 | h6 | h7 | h8 | t1 | t2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 330<br>500<br>660<br>990<br>1320 | DN 50 (2") | 130.2<br>130.2<br>130.2<br>130.0<br>130.0 | M12 | M20 | 239 | 190 | 13 | 92 | 108 | 357.5<br>450.5<br>527.0<br>677.5<br>843.5 | 309 | 95<br>95<br>95<br>500<br>670 | 13 | 27 |

* SAE connection 6000 psi

## 7. 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.

## NOTES