

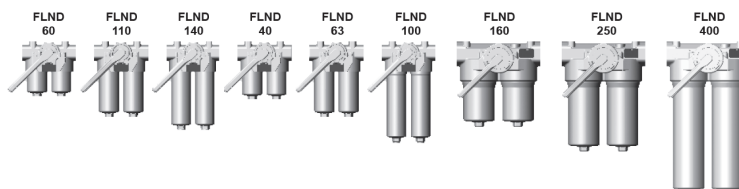
HYDAC INTERNATIONAL



Change-Over Inline Filter FLND

to DIN 24550*, up to 400 l/min, up to 63 bar

*Filters and filter elements also available in HYDAC dimensions



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. They consist of a filter head with built-in change-over valve and screw-in filter bowls.

Standard equipment:

- without bypass valve
- connection for a clogging indicator
- oil drain plug (FLND 160 to 400)

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

Filter elements are available with the following pressure stability values:

Optimicron® (ON) ¹⁾ :	20 bar
Betamicon® (BN4HC) ²⁾ :	20 bar
Betamicon® (BH4HC):	210 bar
Wire mesh (W/HC, W) ³⁾ :	20 bar

¹⁾ only for FLND 60, 110, 140

²⁾ only for FLND 40, 63, 100, 160, 250, 400

³⁾ only for FLND 40–140

1.3 FILTER SPECIFICATIONS

Nominal pressure	25 bar (FLND 160 to 400) 63 bar (FLND 40 to 140)
Fatigue strength	At nominal pressure 10 ⁶ cycles from 0 to nominal pressure
Temperature range	-10 °C to +100 °C
Material of filter head	Aluminium
Material of filter bowl	Aluminium (FLND 100 and 140: Steel)
Type of clogging indicator	VM (differential pressure measurement up to 210 bar operating pressure)
Pressure setting of the clogging indicator	2.5 bar or 5 bar (others on request)
Bypass cracking pressure (optional)	3.5 bar or 7 bar (others on request)

1.4 SEALS

NBR (=Perbunan)

1.5 INSTALLATION

Inline filter

1.6 SPECIAL MODELS AND ACCESSORIES

- With bypass valve
- With oil drain plug for FLND 40 to 140 (SO184)
- Seals in FPM, EPDM
- Reverse flow "RL" for FLND 160 and above on request

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

These filters can be supplied with manufacturer's test certificates O and M to DIN 55350, Part 18. Test certificates 3.1 to DIN EN 10204 and approval certificates (Type Approval) for different approval authorities.

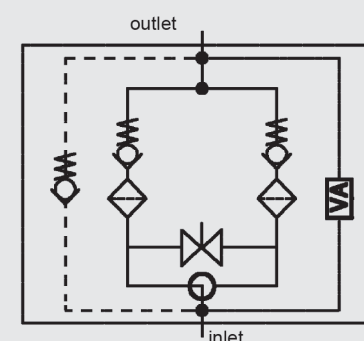
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- 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.
- Filters with switching valve are designed to have a permissible leakage depending on the operating medium.

Symbol for hydraulic systems



VA = clogging indicator

2. MODEL CODE (also order example)

2.1 COMPLETE FILTER

Filter type

FLND

Filter material

ON Optimicron® (BG 60, 110, 140 only) BN/HC Betamicon® (BN4HC) (BG 40, 63, 100, 160, 250, 400 only)
BH/HC Betamicon® (BH4HC) W/HC, W* Wire mesh

Size of filter or element

FLND: 40, 60, 63, 100, 110, 140, 160, 250, 400

Operating pressure

D = 25 bar (FLND 160 to 400)

F = 63 bar (FLND 40 to 140)

Type of change-over

D single switching valve and check valve

Type and size of port

to DIN 24550 (●), possible ports (X)

Type	Port	Filter size ... not to DIN 24550			... to DIN 24550					
		60	110	140	40	63	100	160	250	400
B	G ½	X	X	X	●	X	X			
C	G ¾	X	X	X	X	●	X			
D	G 1	X	X	X	X	X	●			
E	G 1¼							●	X	X
F	G 1½							X	●	X
I	DN 25**	X	X	X	X	X	X			
K	DN 38**							X	X	●

** Flange SAE, 3000 PSI

Filtration rating in µm

ON: 1, 3, 5, 10, 15, 20

BN/HC, BH/HC to DIN 24550: 3, 6, 10, 25

BH/HC: 3, 5, 10, 20

W/HC, W*: 25, 50, 100, 200

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

B. bypass cracking pressure (e.g. B3.5 = 3.5 bar); without details = without bypass valve

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

LED 2 light emitting diodes up to 24 Volt

only for clogging
indicators type D

AV LZ indicator with plug to AUDI and VW specification

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

BO-LED as for BO, but with diode strip

SO184 oil drain plug (FLND 40 to 140)

V FPM seals

W suitable for HFA and HFC emulsions

2.2 REPLACEMENT ELEMENT

Size

0040, 0060, 0063, 0100, 0110, 0140, 0160, 0250, 0400

Type

D 0060, 0110, 0140

DN to DIN 24550: 0040, 0063, 0100, 0160, 0250, 0400

Filtration rating in µm

ON 001, 003, 005, 010, 015, 020

BN4HC, BH4HC to DIN 24550: 003, 006, 010, 025

BH4HC: 003, 005, 010, 020

W/HC, W*: 025, 050, 100, 200

Filter material

ON, BN4HC, BH4HC, W/HC, W*

Supplementary details

V, W (for descriptions, see Point 2.1)

2.3 REPLACEMENT CLOGGING INDICATOR

Type

VM differential pressure measurement up to 210 bar operating pressure

Pressure setting

5 standard 5 bar, others on request

Type of clogging indicator (see Point 2.1)

Modification number

X the latest version is always supplied

Supplementary details

L..., LED, V, W, AV, BO, CN, DB, D4C, BO-LED (for descriptions see Point 2.1)

* only for FLND 40 - 140

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:

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

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

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

(*see Point 3.2)

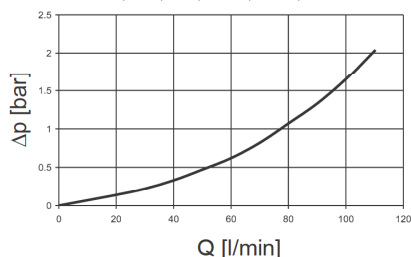
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

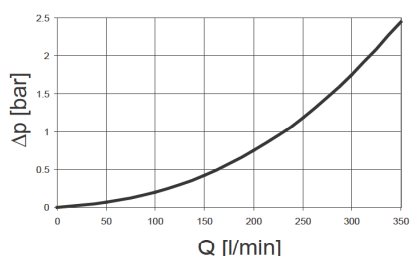
3.1 Δp -Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30 mm²/s. In this case, the differential pressure changes proportionally to the density.

FLND 40, 60, 63, 100, 110, 140



FLND 160, 250, 400



3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

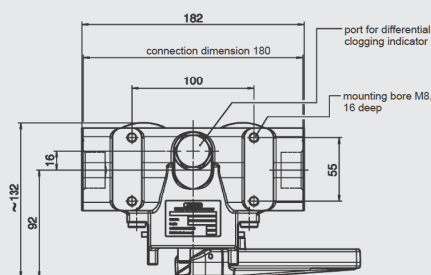
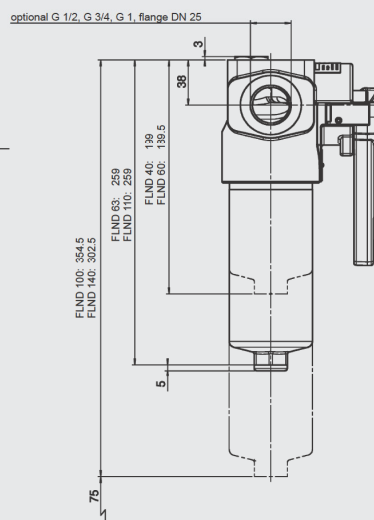
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

FLND	... D ... ON					
	1 μm	3 μm	5 μm	10 μm	15 μm	20 μm
60	53.5	26.0	18.3	12.1	9.78	6.32
110	25.8	13.4	9.61	6.06	4.63	2.99
140	19.9	11.5	7.39	4.38	3.54	2.29

FLND	... DN ... BN4HC			
	3 μm	6 μm	10 μm	25 μm
40	40.4	24.8	16.4	10.9
63	29.0	18.2	11.7	7.6
100	19.0	11.7	7.7	5.3
160	8.0	5.1	3.8	2.5
250	5.4	3.4	2.8	1.9
400	3.4	2.1	1.7	1.1

FLND	... D ... BH4HC				W/HC-W	... DN ... BH4HC			
	3 μm	5 μm	10 μm	20 μm		3 μm	6 μm	10 μm	25 μm
60	58.6	32.6	18.1	12.2	0.757	-	-	-	-
110	25.4	14.9	8.9	5.6	0.413	-	-	-	-
140	19.9	11.3	8.1	4.3	0.324	-	-	-	-
40	-	-	-	-	0.966	40.4	24.8	16.4	10.9
63	-	-	-	-	0.540	29.0	18.2	11.7	7.6
100	-	-	-	-	0.325	19.0	11.7	7.7	5.3
160	-	-	-	-	0.168	8.0	5.1	3.8	2.5
250	-	-	-	-	0.101	5.4	3.4	2.8	1.9
400	-	-	-	-	0.068	3.4	2.1	1.7	1.1

FLND 40 - 140



Technical drawing of the G1/8 SW 5 pressure equalizing valve, showing two views: front view (top) and side view (bottom).

Front View Dimensions and Labels:

- connection dimension 280
- inlet
- outlet
- change-over with built-in pressure equalization
- drain G3/8
- SW 32
- size 400 534
- size 250 384
- size 160 294
- 35.90
- 9
- 110.6
- 130
- 60.85

Side View Dimensions and Labels:

- 210
- 56
- OD mounting bore
- 62.5
- 37.50
- 125.50
- 28
- 19
- 114
- port for differential clogging indicator
- vent on left G 1/8, SW 5
- vent on right G 1/8, SW 5

A	B	C	D
G 1 1/4	95	43	M10 x 19/22 deep
G 1 1/2	98	40	M10 x 19/22 deep
DN 38	95	43	M10 x 19/22 deep

FLND	Weight incl. element [kg]	Vol. of pressure chamber [l]
40	6.73	2x 0.26
60	6.83	2x 0.25
63	7.10	2x 0.40
100	11.33	2x 0.50
110	7.32	2x 0.40
140	11.78	2x 0.40
160	9.1	2x 1.40
250	9.6	2x 2.00
400	12.0	2x 3.10

Subject to technical modifications.