

# HYDAC INTERNATIONAL

## Tank Breather Filter with Filler Strainer ELF up to 5500 l/min



### 1. TECHNICAL SPECIFICATIONS

#### 1.1 FILTER HOUSING

##### Construction

Tank breather filters size 4, 10, 3 and 30 consist of an air filter top, which is connected to the mounting flange by a bayonet plate or a threaded boss, and a filler strainer.

Sizes 5 and 52 consist of a two-part threaded air filter top, with built-in oil mist trap, one or two exchangeable filter element(s) and a filler strainer.

Sizes 7 and 72 consist of a two-part flanged filter top, an exchangeable filter element and a filler strainer.

#### 1.2 FILTER ELEMENTS

##### Contamination retention capacities in g

	Paper
ELF	3 µm
4	2.9
10	2.9
3	6.2
30	6.2
7	26.1
72	52.2
5	85.1
52	170.2

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 (ELF 4, 3), steel (ELF 5, 52) glass fibre reinforced synthetic material (ELF 10, 30, 7, 72)
Material of filler strainer	Synthetic: ELF 10, 4, 30, 3, 7, 72 Metal: ELF 5, 52
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  
NBR / Polyurethane on element  
Cardboard on mounting flange

#### 1.5 SPECIAL MODELS AND ACCESSORIES

- lockable model (only ELFL 3)
- with check/bypass valve to support the suction characteristics of the pump  
Not 100% air-tight or leakage-free!  
(only ELF 10, 3, 30, 5 and 52)
- with anti-splash device  
(only ELF 10, 3, 30, 7, 72)
- with connection for a clogging indicator  
(only ELF 7, 72)
- with filler adapter for automotive applications  
(only ELF 7 and 72) - see Point 5.

#### 1.6 SPARE PARTS

See Original Spare Parts List

#### 1.7 CERTIFICATES AND APPROVALS

On request

#### 1.8 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

The standard models are suitable for use with mineral and lubrication oils. For fire-resistant and biodegradable oils, see table:

Fire-resistant fluids

ELF	HFA	HFC	HFD-R
4, 3, 5, 52	-	-	-
10, 30, 7, 72	●	●	-

- 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

ELF	HTG	HE	HPG
			PAG PRG

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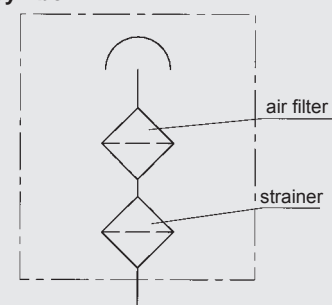
- + suitable for all
- contact our Technical Sales Department
- not suitable

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

#### 1.9 CHANGING INTERVALS

The filter elements or filters must be replaced as frequently as the fluid filters, but at least every 12 months.

#### Symbol



**2. MODEL CODE (also order example)**
**2.1 COMPLETE FILTER**
**2.1.1 ELF 4, 10, 3, 30 and ELFL 3**

**ELF P 30 F 3 W 1 . X /-RV0.4**

**Filter type**  
 ELF  
 ELFL (lockable)

**Filter material**  
 P Paper

**Size**  
 ELF 4, 10, 3, 30  
 ELFL 3

**Type and size of connection**

	Filter size			
	4	10	3	30
F = Flange	●	●	●	●

**Filtration rating in µm**  
 P 3 (absolute)

**Type of clogging indicator**  
 W without port, no clogging indicator

**Type code**

Filter size	Code	Δp [bar]
ELF 4	1.X	-
ELF 10	1.X	-
ELF 3	1.X	-
ELF 3.../-RV	4.X	0.4
ELF 3.../-RV	5.X	0.7
ELF 3.../-RV	6.X	0.2
ELF 3.../-RV	7.X	1.0
ELF 30	1.X	-

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

**Supplementary details**  
 AS anti-splash without check/bypass valve (not ELF 3 & 4)  
 KT for plastic tank systems (only ELF 30)  
 RV check/bypass valve (not ELF 4)  
 RV0.2 } valve with relevant cracking pressure  
 RV0.4 } (only ELF 10 and 30)  
 RV0.7 }  
 SO148 metal filler strainer, 200 mm long (only ELF 3 and 30)  
 SO175 metal filler strainer, 100 mm long (only ELF 3 and 30)  
 SO394 ELF filter without strainer

**2.1.2 ELF 7 and 72**

**ELF P 72 F 3 W 1 . X /-SO148**

**Filter type**  
 ELF

**Filter material**  
 P Paper

**Size**  
 ELF 7, 72

**Type and size of connection**

	Filter size	
	7	72
F = Flange DIN 24557/Pt 2	●	●

**Filtration rating in µm**  
 P 3 (absolute)

**Type of clogging indicator**  
 W without port, no clogging indicator  
 K pressure gauge (measuring range -1 to +0.6 bar) (not for ELF 72)  
 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 (only ELF 7, 72 without check/bypass valve)  
 SO148 metal filler strainer, 200 mm long  
 SO175 metal filler strainer, 100 mm long  
 SO394 ELF filter without strainer

**2.1.3 ELF 5 and 52**

**ELF P 52 G 3 W 2 . X /-RV0.4**

**Filter type**  
 ELF

**Filter material**  
 P Paper  
 BN Betamicron®

**Size**  
 ELF 5, 52

**Type and size of connection**

	Filter size	
	5	52
G = Thread	●	●
G1 1/2	●	●
G2	●	●
G2 1/2	●	●
G3	●	●

**Filtration rating in µm**  
 P 3 (absolute)  
 BN 3 (absolute)

**Type of clogging indicator**  
 W without port, no clogging indicator

**Type code**

Code	Connection
2.X	G 2½
3.X	G 3
4.X	G 2
5.X	G 1½

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

**Supplementary details**  
 RV0.4 check/bypass valve with 0.4 bar pressure setting  
 SO479 filter suitable for HFC fluids

**2.2 REPLACEMENT ELEMENT**

**0005 L 003 P**

**Size**  
 0005 for ELF 5, 52 (on ELF 52: 2 x 0005 L...)  
 0007 for ELF 7  
 0072 for ELF 72

**Type**  
 L

**Filtration rating in µm**  
 P 003  
 BN 003 (only for 0005)

**Filter material**  
 P Paper  
 BN Betamicron®

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

**2.3 REPLACEMENT CLOGGING INDICATOR**

**VMF 0.6 K . X**

**Type**  
 VMF Return line indicator

**Pressure setting**  
 0.6 -1 to +0.6 bar  
 0.035 -0.035 bar

**Type**  
 (see Point 2.1.2)

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

### 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-pack 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	

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

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

##### CAUTION:

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

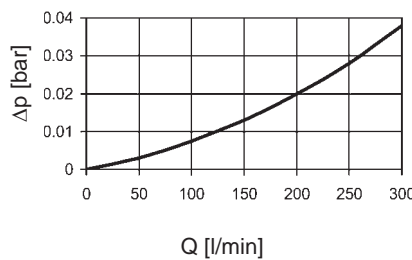
For optimum sizing the following should therefore be observed:

- Filtration rating of breather filter = filtration rating of hydraulic filter
- Only use breather filters with an absolute retention rate (d100 = x µm; x = given filtration rating)
- Max. permitted initial pressure drop: 0.01 bar (with a clean filter element and at calculated air flow)
- Determining the calculated air flow:  
 $Q_A = f5 \times Q_p$   
 $Q_A$  = calculated air flow in l<sub>N</sub>/min  
 $f5_A$  = factor for operating conditions  
 $Q_p$  = max. flow rate of the hydraulic pump in l/min

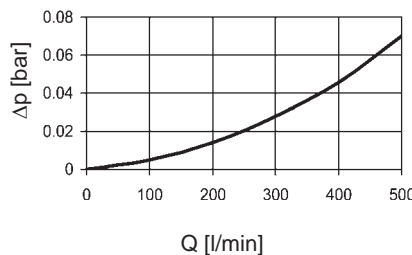
Ambient conditions	Factor f5
Low dust concentration; filter fitted with clogging indicator; continuous monitoring of the filter	1-2
Average dust concentration; filter without clogging indicator; intermittent monitoring of the filter	3-6
High dust concentration; filter without clogging indicator; infrequent or no monitoring of the filter	7-10

#### 3.4 AIR FLOW RATE

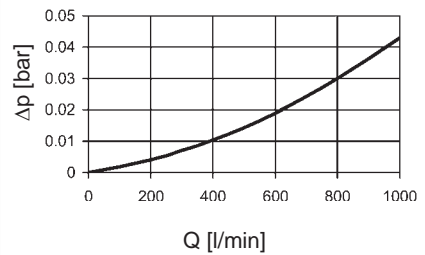
##### ELF 4



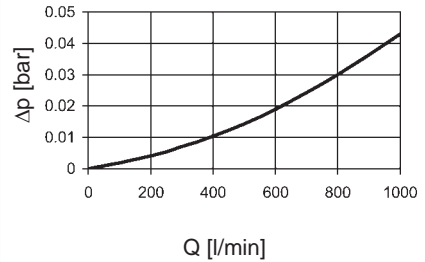
##### ELF 10



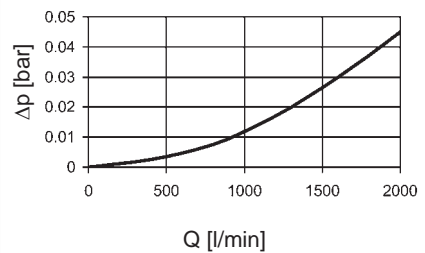
##### ELF 3



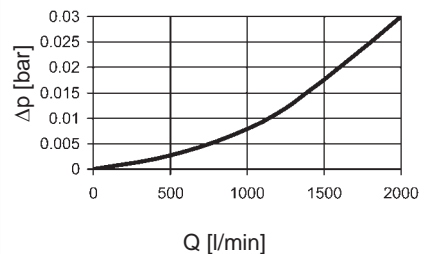
##### ELF 30



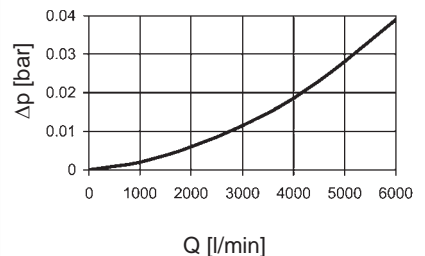
##### ELF 7



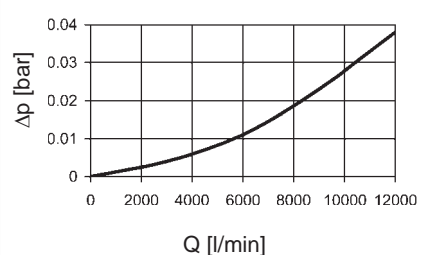
##### ELF 72



##### ELF 5



##### ELF 52



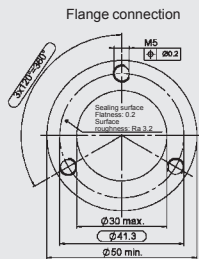
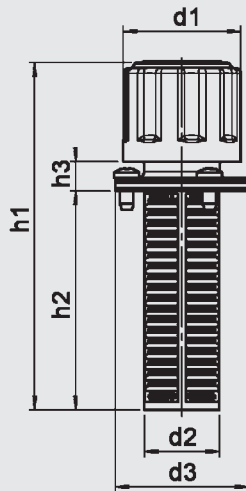


## 4. DIMENSIONS

### Tank requirements

1. In the filter mounting interface, the tank flange should have a maximum flatness of 0.2 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.
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.

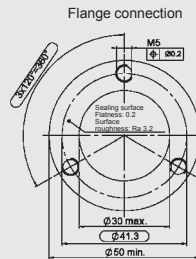
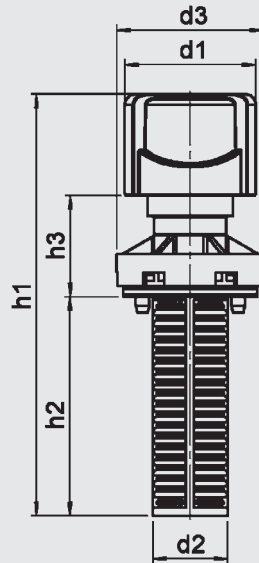
ELF 4



Interface

	ELF 4...
d1	44
d2	28
d3	50
h1	130
h2	82
h3	11
Weight	~ 0.15 kg

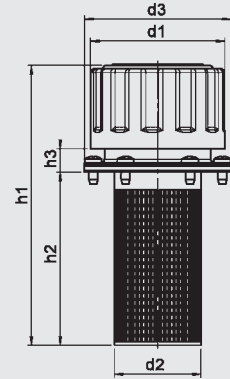
ELF 10



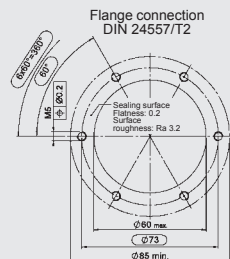
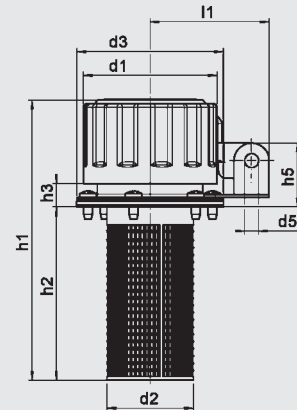
Interface

	ELF 10...
d1	49
d2	28
d3	55
h1	158
h2	82
h3	38
Weight	~ 0.10 kg

ELF 3



ELFL 3

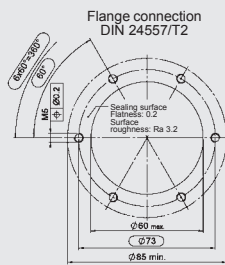
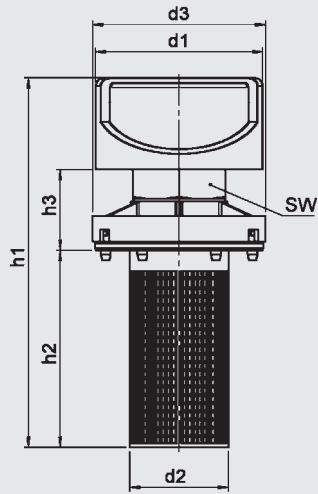


Interface to DIN 24557/Pt 2

	ELF 3.../ELFL 3...
d1	76
d2	49
d3	83
d5	8
h1	159
h2	98
h3	13
h5	36
l1	68
Weight	~ 0.30 kg

E 7.404.3/11.16

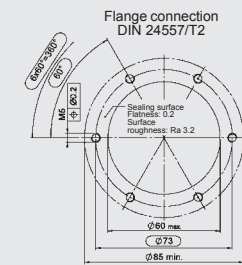
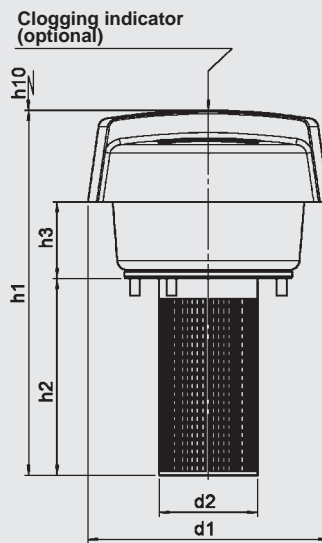
ELF 30



Interface to DIN 24557/Pt 2

	ELF 30...
d1	83
d2	49
d3	86
h1	185
h2	98
h3	40
SW	46
Weight	~ 0.25 kg

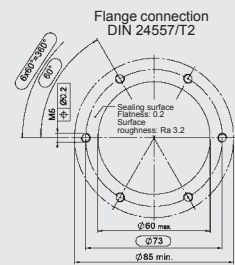
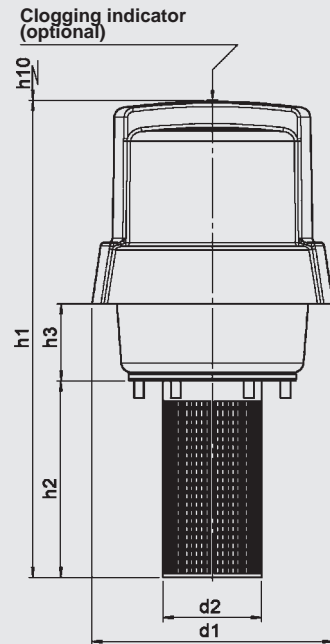
ELF 7



Interface to DIN 24557/Pt 2

	ELF 7...
d1	120
d2	49
h1	182
h2	98
h3	38
h10	60
Weight	~ 0.35 kg

ELF 72

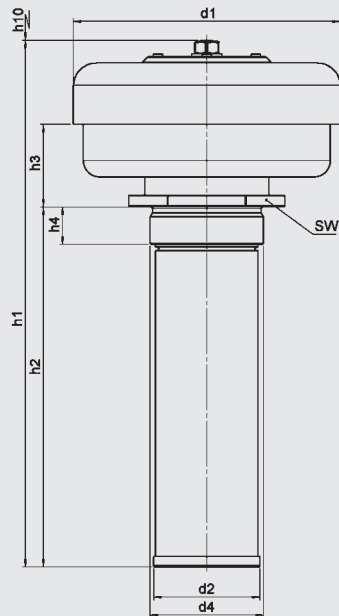


Interface to DIN 24557/Pt 2

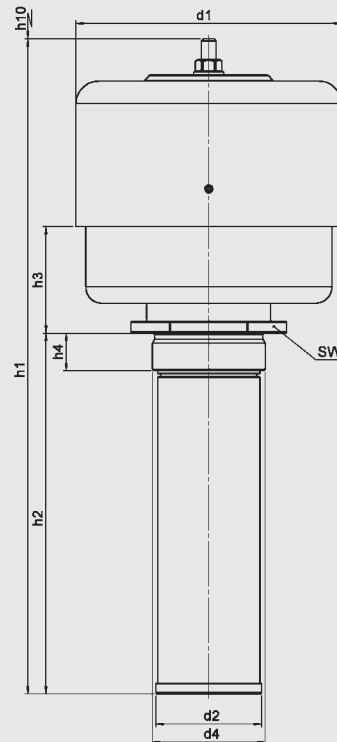
	ELF 72...
d1	120
d2	49
h1	238
h2	98
h3	38
h10	90
Weight	~ 0.45 kg



ELF 5 / ELF 5...RV

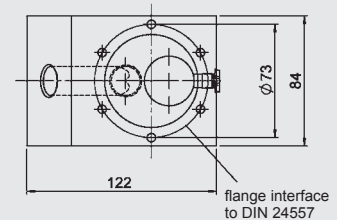
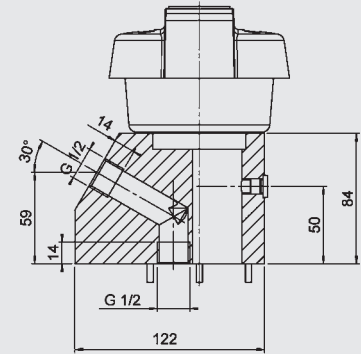


ELF 52 / ELF 52...RV



## 5. FILLER ADAPTER

This adapter can only be used on ELF 7 and ELF 72 filters!



	ELF 5...	ELF 5... /-RV	
d1	177		
d2/d4	...2.X	G 2½ / 70.5	
	...3.X	G 3 / 70.5	
	...4.X	G 2 / 51.5	
	...5.X	G 1½ / 41.5	
h1	351	369	
h2	240		
h3	55	73	
h4	25		
h10	90		
SW	90		
Weight approx.	...2.X	2.10 kg	3.20 kg
	...3.X	2.15 kg	3.25 kg
	...4.X	2.10 kg	3.20 kg
	...5.X	2.05 kg	3.15 kg

	ELF 52...	ELF 52... /-RV	
d1	177		
d2/d4	...2.X	G 2½ / 70.5	
	...3.X	G 3 / 70.5	
	...4.X	G 2 / 51.5	
	...5.X	G 1½ / 41.5	
h1	436	441	
h2	240		
h3	71	89	
h4	25		
h10	150		
SW	90		
Weight approx.	...2.X	2.30 kg	–
	...3.X	2.35 kg	3.45 kg
	...4.X	2.30 kg	3.40 kg
	...5.X	2.25 kg	3.25 kg

These filler adapters are available in the following threaded connections:

- Adapter ELF /-FA12 (G ½)  
(Part No.: 00318597)
- Adapter ELF /-FA34 (G ½)  
(Part No.: 01282563)
- Adapter ELF /-FA1 (G 1)  
(Part No.: 01274065)

### 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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