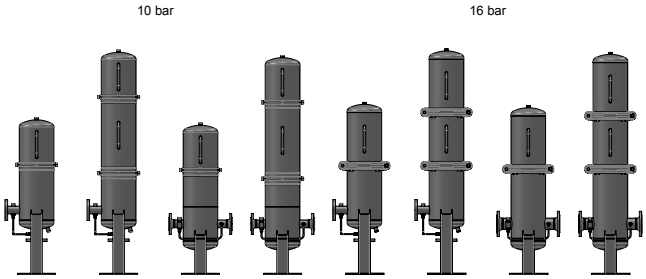
# HYDAC INTERNATIONAL

# Process inline filter
## PLF1




| Specifications | |
|---|---|
| Nominal size: | DN 50 - DN 150 |
| $Q_{s\,max}$: | 200 m³/h |
| $p_{s\,max}$: | 16 bar |
| Filter ratings: | 1 - 90 µm |

## 1. GENERAL INFORMATION

**Product description**
- Continuous separation of solids from low-viscosity fluids, such as:
  - Water
  - Coolants
  - Washing agents
  - Processing oils
  - Scrubber water

**Filter element technology**
- Processmicron® filter element model:
  - HF - HighFlow 6" or 9"
  - HLC - HighLoadCascade 9"
- Filter material: Polyester (PES) or polypropylene (PP)
- Filter element design: Pleated
- Filtration ratings: 1 to 90 µm
- Filter element length: 1-stage or 2-stage version Each 20" per filter element
- Sealing materials: FKM, NBR, EPDM or silicon

**Product advantages**
- Very large filter area per filter element
- Compact design with high flow rates
- Superior handling compared to commonly available disposable filter elements
- Protection of the clean side during filter element replacement thanks to fixed support tube
- Modular design gives optimal flexibility in catering for every application
- Low pressure drops due to large cross sections and filter areas
- Short maintenance times
- High contamination retention capacity
- High fluid compatibility
- Completely incinerable

**Technical data, filter housing**

| Size | Port dimensions | Materials Filter housing [1] | Sealing material | $p_{s\,max}$ [bar] | $T_{s\,max}$ [°C] | Empty weight [kg] | Volume [l] |
|---|---|---|---|---|---|---|---|
| 1-stage | ■ DN 50<br>■ DN 80<br>■ DN 100<br>■ DN 150 | ■ Stainless steel E1<br>■ Stainless steel E2 | ■ FKM<br>■ EPDM<br>■ NBR | ■ 10<br>■ 16 | 90 | 60 | 50 |
| 2-stage | | | | | | 95 | 90 |

**Technical data, filter elements**

| Length | Filter materials [2] | Filtration ratings [µm] | Permitted differential pressure on the filter element [bar] |
|---|---|---|---|
| 1-stage<br>2-stage | ■ Polyester (PES)<br>■ Polypropylene (PP) [3] | ■ PP = 3 / 5 / 10 / 20 / 30 / 40 / 50 / 70<br>■ PES = 1 / 3 / 5 / 10 / 20 / 30 / 40 / 50 / 70 / 90 | 2.5 |

**Key**

[1] Filter housing materials:
E1 = stainless steel 1.4301/1.4541 or similar (Group 304/321)
E2 = stainless steel 1.4571 or similar (Group 316)

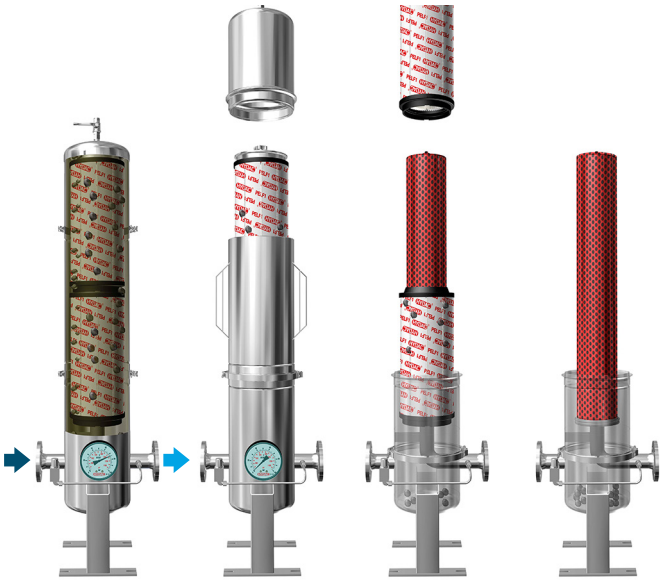
[2] End cap material:
PA = polyamide
PP = polypropylene

[3] $T_{s\,max}$ PES filter element: 90°C
$T_{s\,max}$ PP filter element: 60°C

## 2. FUNCTION AND SPECIAL FEATURES

### FUNCTIONAL PRINCIPLE

- There is flow through the filter element from the outside to the inside
- The particles are deposited on the outside of the filter element
- The filter elements should be replaced once the maximum permitted differential pressure is reached



**Functional principle**

### SEALING TECHNOLOGY

- V-clamp for 10 bar filter housing
- Clamp coupling for 10 bar filter housing or 16 bar filter housing
  - Reduced assembly time when changing filter elements
  - Convenient alignment to user's specific needs
  - Sealing materials preferably EPDM or NBR
  - Particularly suitable for use in parts cleaning systems
- Flange connection for 10 bar or 16 bar filter housing
  - Use for special design requirements (e.g. ASME design)

| Housing material/ $p_{s\ max}$ [bar] | V-clamp (2 x M8 screws) | Clamp coupling (2 x M27 screws) | Flange connection (12 x M16 screws) |
|---|---|---|---|
| 10 | E1 | ■ E1 | ■ E1 |
| 16 | – | ■ E2 | ■ E2 |

**Sealing technology**

### REPLACEABLE SUPPORT TUBE (OPTIONAL)

- More flexibility – the modular design allows for optimal expansion of the filter
- Optimal adaptation to the respective application
- Particularly suitable for the requirements of industrial parts cleaning systems
- Subsequent optimisation when upgrading the system – doubling the maximum service life

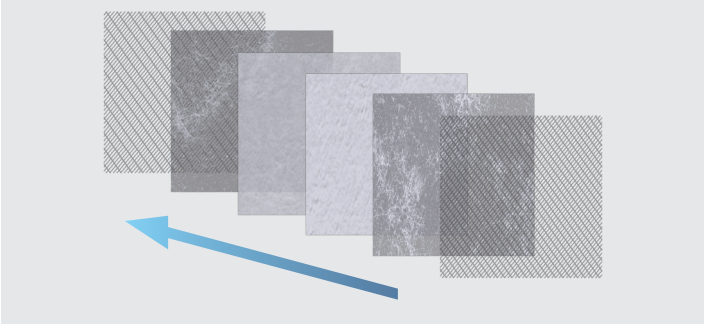
**PLF1 with clamp coupling and replaceable support tube**

## 3. FILTER ELEMENT TECHNOLOGY

All Processmicron® filter elements are generally designed as follows:

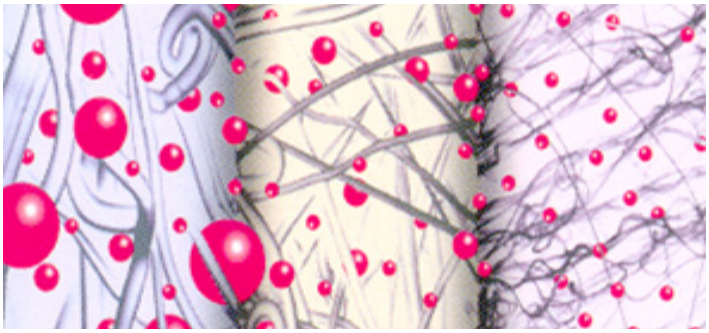
### Multi-layer filter mat construction

- Robust and high-quality layer structure
  - ➔ Filter layers do not fold over
- High contamination retention
- Low pressure loss



### Graduated depth filtration

- High level of cleanliness with a single pass
- High layer thickness of filter medium
  - ➔ High storage volumes for contamination

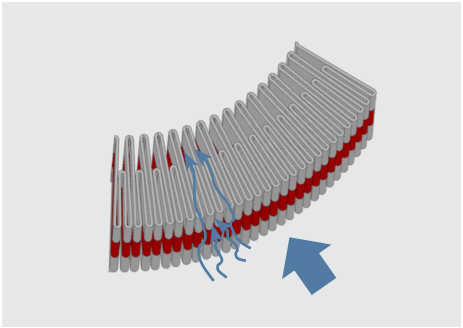


The optimum filter element for every application:

### Processmicron® High Flow 6"

**Working filtration:**

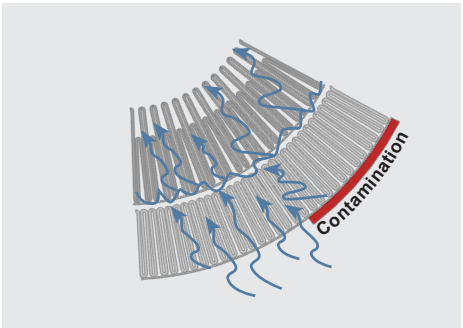
- M-fold
- Optimised, increased upstream flow area for high contamination loads



### Processmicron® High Flow/9" HighLoadCascade

**Comprehensive working filtration:**

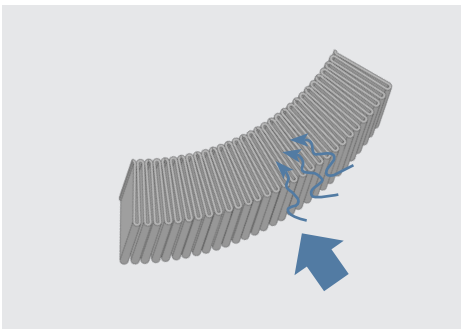
- Combination of parallel folds (outside) and M-folds (inside)
- Double security, even in the case of contamination surges, thanks to the cascade effect
- Filter layer selection precisely tailored to the filtration task at hand (outer and inner layer)




### Processmicron® High Flow 9"

**Protective filtration:**

- Pleated filter element structure (parallel fold)
- High flow rates
- Extreme fold stability thanks to an innovative parallel fold on a large area of the filter



## 4. FILTER CALCULATION

### PROTECTIVE FILTER

| | | |
|---|---|---|
| **Purpose** | ■ Protection of downstream system components<br>■ Only in the event of a malfunction of the main filtration stage | |
| **Filter selection** | Based on volumetric flow | |
| **Volumetric flow per filter element** | Water: | max. 100 m³/h per filter element |
| | Cooling lubricant/washing agents: | max. 50 m³/h per filter element |
| **Filter position** | After upstream filter | |
| **Pre-filtration requirements** | Higher demands | |

### WORKING FILTER

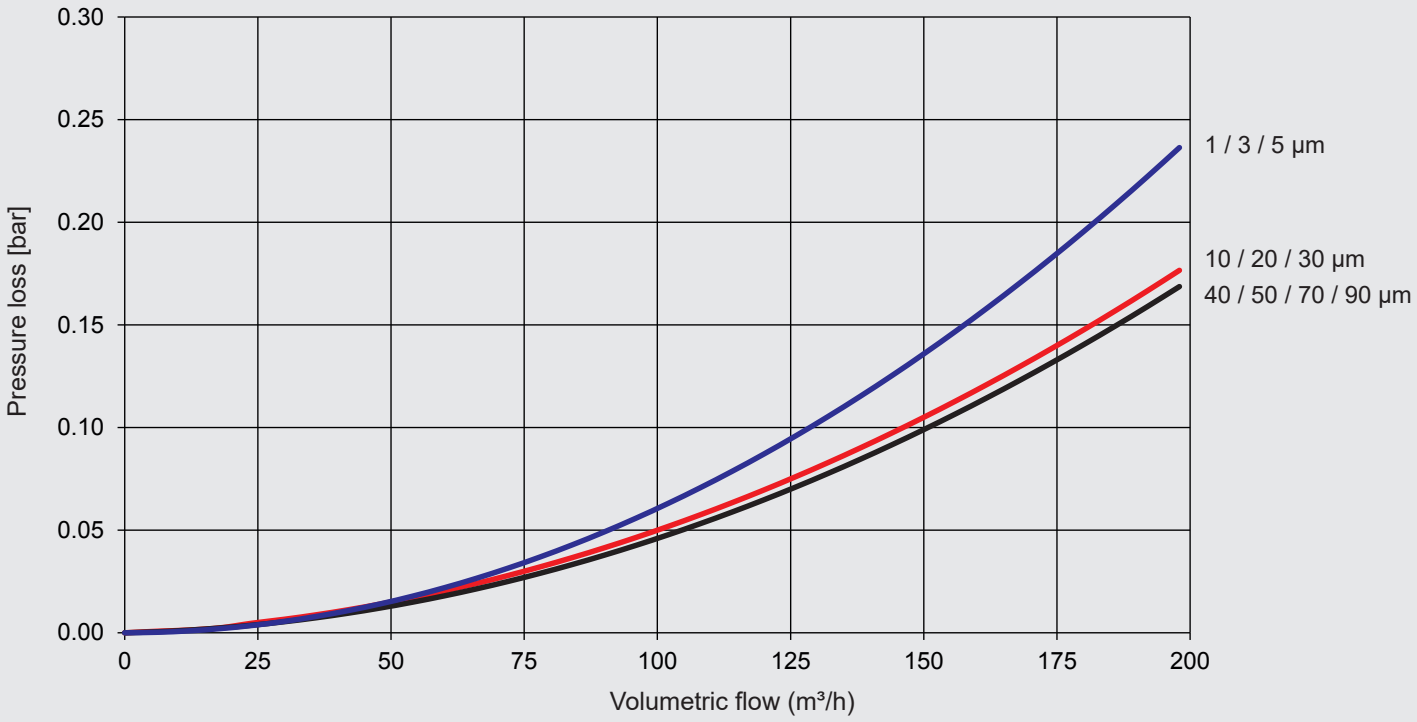
| | | |
|---|---|---|
| **Purpose** | Main dirt basin of the fluid system | |
| **Filter selection** | Based on the level and type of contamination | |
| **Volumetric flow per filter element** | Water: | max. 30 m³/h per filter element |
| | Cooling lubricant/washing agents: | max. 25 m³/h per filter element |
| **Filter position** | Main filter in the filter system | |
| **Pre-filtration requirements** | Water: | Pre-filtration<br>from 200 to 500 µm |
| | Cooling lubricant/washing agents: | Coarse filtration<br>Approx. 3000 µm is sufficient |

## 5. FILTER CONFIGURATION*

| | Standard | Optional |
|---|---|---|
| **Flange connections** | DIN | ■ ASME<br>■ JIS |
| **Filter housing seal material** | ■ FKM<br>■ Clamp coupling preferably EPDM or NBR | ■ NBR<br>■ EPDM<br>■ Other sealing materials on request |
| **Filter element sealing materials** | FKM | ■ NBR<br>■ EPDM<br>■ Silicone<br>■ Other sealing materials on request |
| **Differential pressure monitoring** | ■ Visual<br>■ Visual-electrical<br>■ Electrical | Pressure transmitter (4 – 20 mA) |
| **Filter housing materials** | ■ Stainless (E1):<br>1.4301 or similar (Group 304)<br>■ Stainless (E2):<br>1.4571 or similar (Group 316) only in conjunction with clamp coupling or flange connection | ■ Other materials |
| **Filter element materials** | ■ Polyester (PES), polyamide (PA) end cap material<br>■ Polypropylene (PP) | |
| **Documentation** | Operating instructions | ■ Material certificates in accordance with EN10204, 3.1 for the pressure-bearing wetted components<br>■ Manufacturer's test certificate in accordance with DIN 55350, Part 18 "M" for construction and pressure testing<br>■ As per customer requirement |

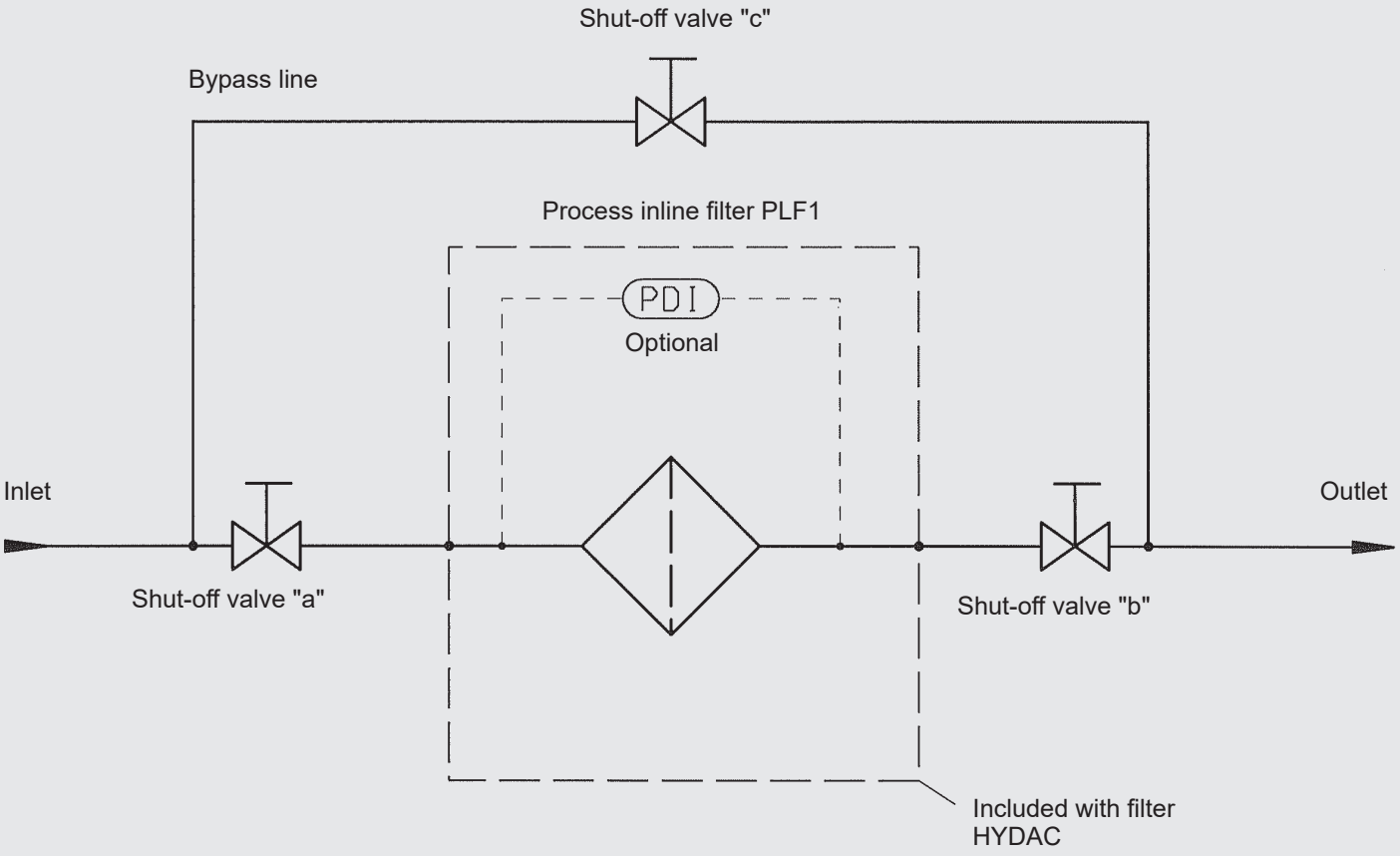
* Other versions/features and customer-specific solutions also available subject to prior consultation.

## PRESSURE LOSS GRAPH




**Size 1**
Dimensioning for higher flow rates available subject to prior consultation.

## PIPING DIAGRAM



# 6. MODEL CODE

## PROCESS INLINE FILTER PLF1 MODEL CODE

**PLF1 – 1 – 2 – 9HF – V – E1 – S – C – E1 – 10 – N – 1 – 0 – 1 – So**

**Filter model**
Single-place filter housing [1)]

**Filter size**
1 = for 9" High Flow (HF) or HighLoadCascade (HLC) filter element
(replaceable support tube for DN 50/DN 80 - fixed support tube DN 100/DN 150)
2 = for 6" High Flow (HF) filter element

**Filter housing length**
1 = single-stage
2 = two-stage

**Element diameter and element models**
6HF = 6" High Flow (HF) filter element diameter
9HF = 9" High Flow (HF) filter element diameter
9HLC = 9" HighLoadCascade (HLC) filter element diameter

**Filter orientation**
V = vertical
H = horizontal (on request)

**Housing material**
E1 = Stainless steel 1.4301/1.4541 or similar (Group 304/321)
E2 = Stainless steel 1.4571 or similar (Group 316)
SD = Super Duplex (on request)
D = Duplex (on request)
A = an additional "A" is placed after for ANSI flanges
J = an additional "J" is placed after for JIS flanges

**Design code**
S = HYDAC Standard
A = ASME VIII Div. 1
U = ASME VIII Div. 1 Stamped
E = EN 13445

**Connection type**

| | Nominal diameter of connection | Available for sizes | |
|---|---|---|---|
| G2 | Thread G 2" | not used | 2 |
| C | DIN DN 50 / 2"ANSI | 1 | 2 |
| E | DIN DN 80 / 3" ANSI | 1 | not used |
| F | DIN DN 100 / 4" ANSI | 1 | not used |
| K | DIN DN 150 / 6" ANSI | 1 | not used |

**Internal parts material**
E1 = Stainless steel 1.4301 or similar (Group 304)
E2 = Stainless steel 1.4571 or similar (Group 316)
SD = Super Duplex (on request)
D = Duplex (on request)

**Pressure stages**
10 = PN 10
16 = PN 16 (only in combination with optional equipment 5 or 6)

**Sealing material**
N = NBR
V = FKM (Viton) [2)]
E = EPDM

**Contamination indicator**
0 = none
1 = with visual CI (PVD 2B.1)
2 = with visual electric CI (PVD 2D.0/-L24)
3 = V01
4 = Aluminium differential pressure gauge with 2 adjustable switching contacts
5 = Stainless steel differential pressure gauge with 2 adjustable switching contacts
6 = with electric CI (PVD 2C.0)
7 = PVL2GW.0/-V-110
8 = PVL2GW.0/-V-120

**Optional features**
3 = Stainless steel venting ball valve
4 = Drainage ball valve
5 = Flange
6 = Clamp coupling
7 = Special parts cleaning system design (TRA)
PFL1-1-9HF: Inlet at the side, outlet at the bottom, DIN/EN DN 50 flange, rounded handles
PFL1-2-6HF: Inlet at the side, outlet at the bottom, G 2", fixing clamps
8 = including magnetic technology
9 = height-adjustable tripod base frame for PLF1-2-6HF, TRA (option 7)

(Multiples available, state relevant number combination!)

**Modification number**

**Additional information**
So = ID number for optional equipment

[1)] Single-place filter housing = filter housing with a support tube
[2)] For containers made from stainless steel 1.4571 or similar (Group 316), preferably use NBR or EPDM as a sealing material

## MODEL CODE FOR PROCESSMICRON® FILTER ELEMENTS

**PELF-PM – 6 – HF – 2 – PL – 005 – PES – PA – V – 1**

**Filter element model**
Processmicron®

**Filter element diameter**
6 = 6" outer diameter
9 = 9" outer diameter

**Filter element model**
HF = HighFlow (6" or 9")
HLC = HighLoadCascade (9") External layer filtration rating placed after, e.g. "HLC10"
Available filtration ratings external layer: 10 / 20 / 30 / 40 / 50 / 70 / 90 µm
is placed after for HLC, e.g. HLC10

**Length**
2 = 20"

**Filter element type**
PL = pleated

**Filtration rating***
001 = 1 µm
003 = 3 µm
005 = 5 µm
010 = 10 µm
020 = 20 µm
030 = 30 µm
040 = 40 µm
050 = 50 µm
070 = 70 µm
090 = 90 µm

**Filter material**
PES = Polyester
PP = Polypropylene

| Filter material | Filter element type | Filtration rating |
|---|---|---|
| PP | PL | 003 / 005 / 010 / 020 / 030 / 040 / 050 / 070 |
| PES | PL | 001 / 003 / 005 / 010 / 020 / 030 / 040 / 050 / 070 / 090 |

**End caps**
PA = Polyamide
PP = Polypropylene (not for “PES” filter material)

**Sealing material**
N = NBR
V = FKM
E = EPDM
S = Silicon

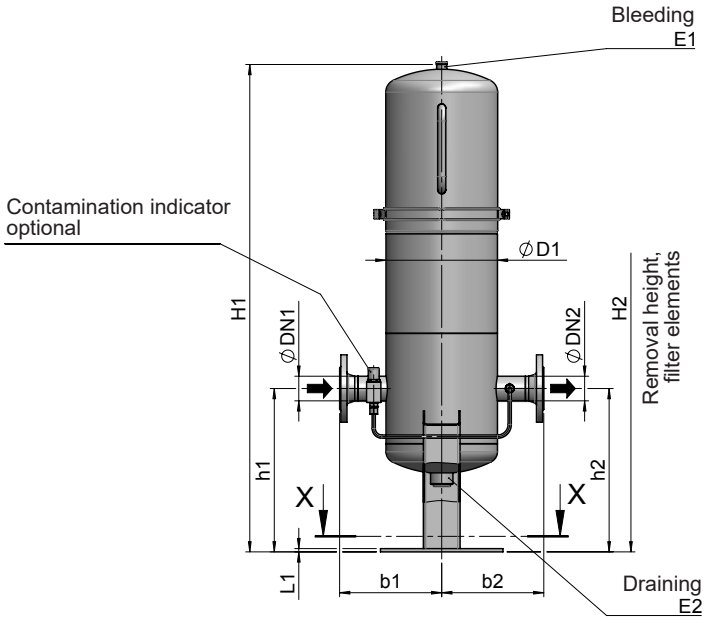
**Technical design**
1 = Injection-moulded end caps with 2-K PUR adhesive
(only for use with filter element type: PL/PES)
2 = Injection-moulded end caps with polyolefin hot melt
(only for use with filter element type: PL/PP)
3 = Injection-moulded end caps with IR welding
(only for use with filter element type: PL/PP)

* When opting for the HighLoadCascade (HLC) filter element model, the filtration rating of the external layer must be defined; see filter element model for available filtration ratings.

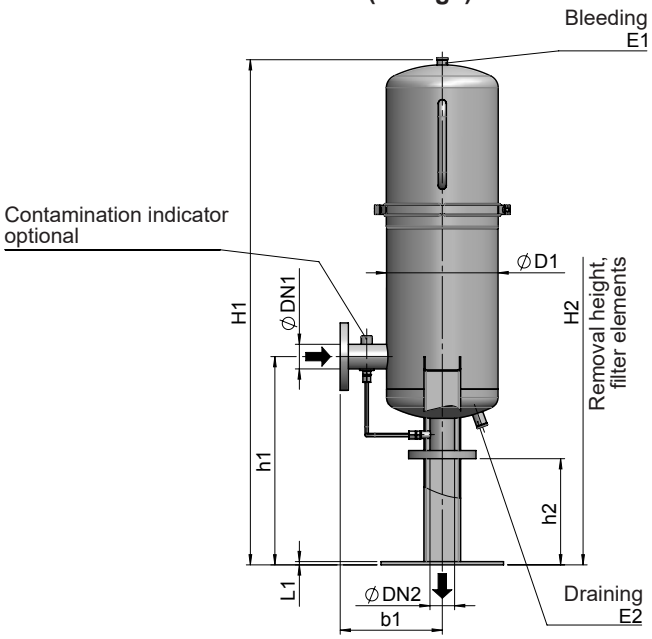
# 7. DIMENSIONS

## PLF1 - 10 bar version

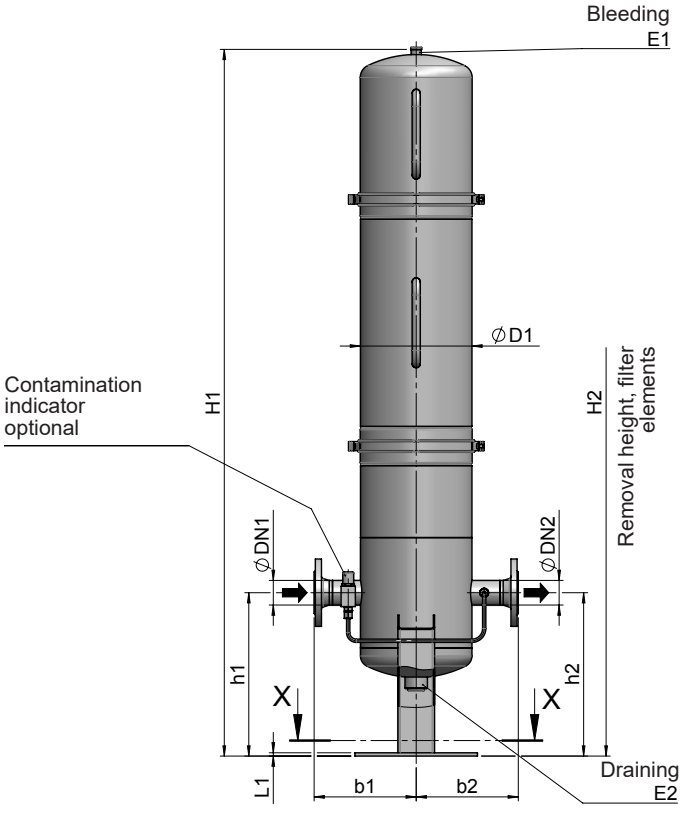
### In-line (1-stage)



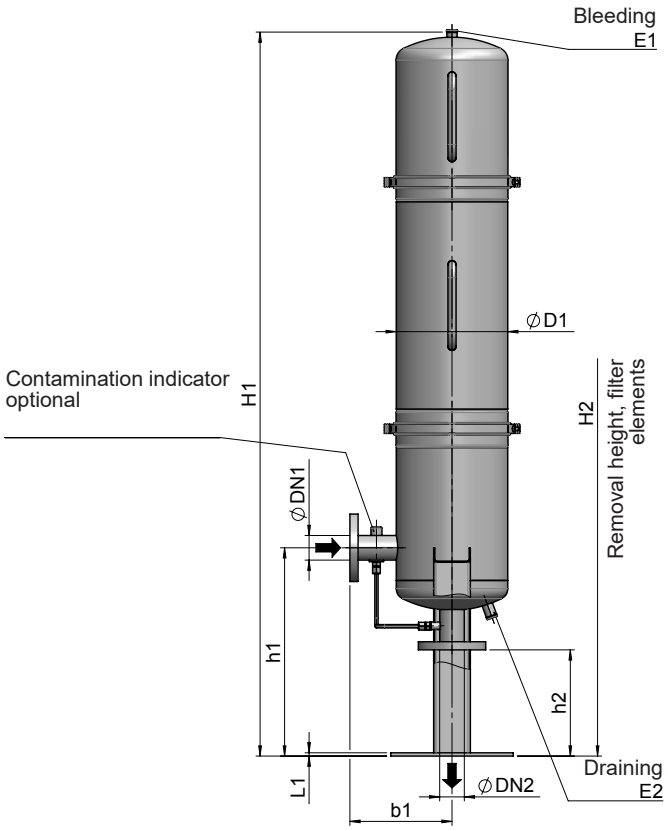

### Outlet at the bottom (1-stage)




### In-line (2-stage)




### Outlet at the bottom (2-stage)

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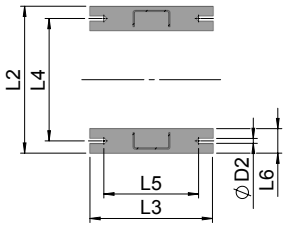
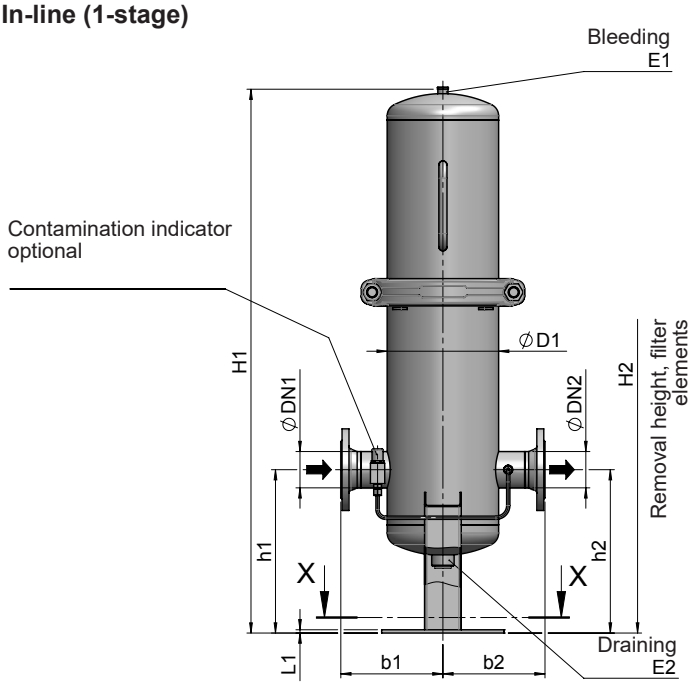


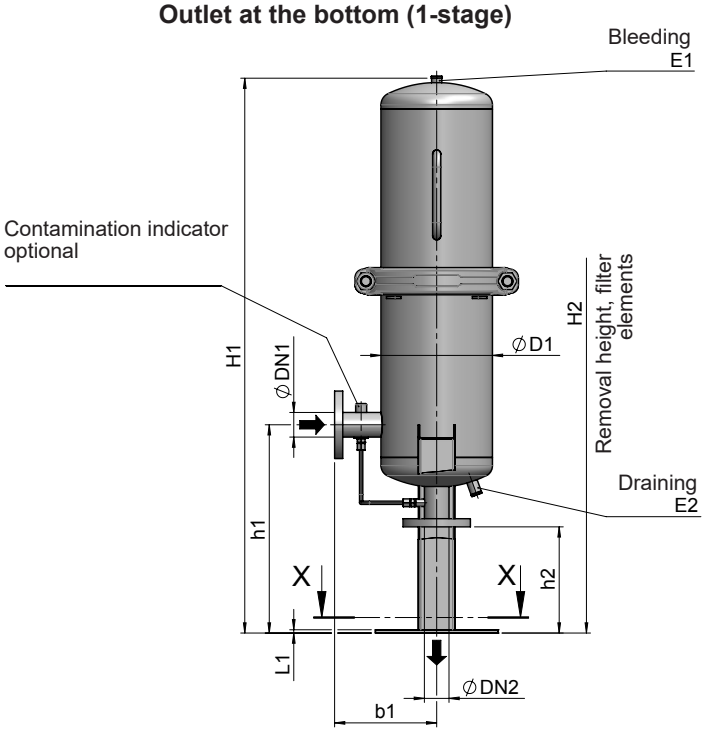

The dimensions given here have a tolerance of ± 10 mm.
Subject to technical modifications.

## PLF1 - 16 bar version

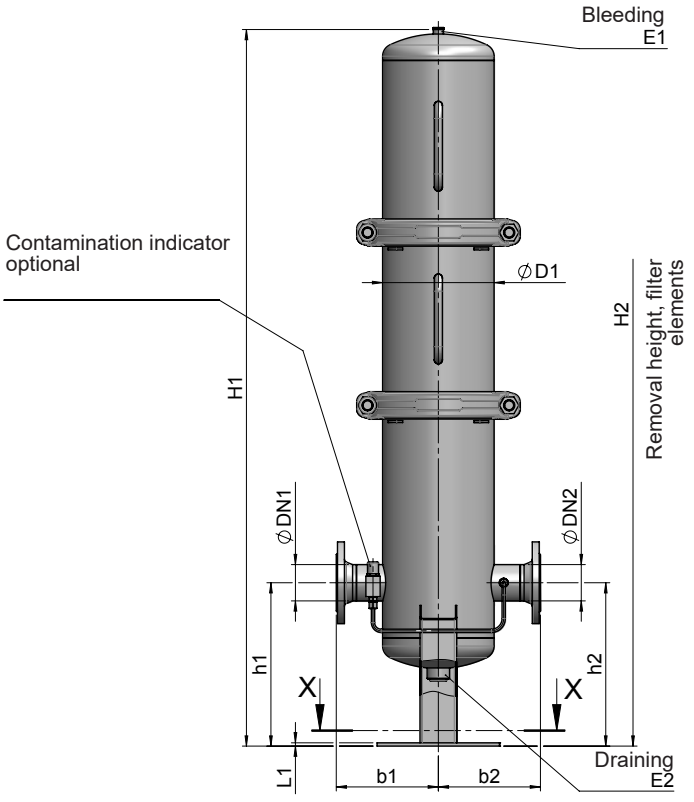
### In-line (1-stage)



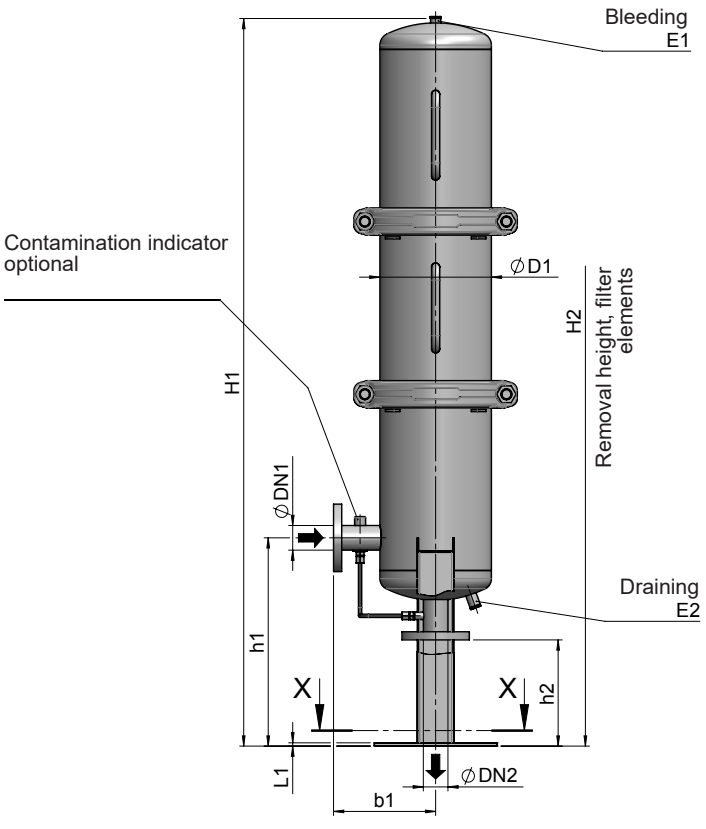

### Outlet at the bottom (1-stage)




### In-line (2-stage)




### Outlet at the bottom (2-stage)

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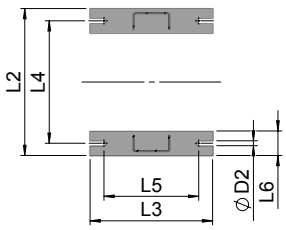


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Subject to technical modifications.

| PLF1 | H1 | H2 | h1 | h2 | b1 | b2 | DN1 | DN2 | D1 | D2 | L1 | L2 | L3 | L4 | L5 | L6 | E1 | E2 | Vol. [l] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-stage PN10 In-line | 1203 | 1750 | 400 | 400 | 250 | 250 | 50/80 100/150 | 50/80 100/150 | 273 | 12 | 8 | 360 | 300 | 300 | 232 | 60 | G 1/2" | G 1" | 45 |
| 2-stage PN10 In-line | 1733 | 2550 | | | | | | | | | | | | | | | | | 90 |
| 1-stage PN16 In-line | 1332 | 1750 | | | | | | | | | | | | | | | | | 50 |
| 2-stage PN16 In-line | 1755 | 2550 | | | | | | | | | | | | | | | | | 90 |
| 1-stage PN10* | 1242 | 1750 | 510 | 260 | | – | 50/80 100/150 | 50/80 100/150 | | | | | | | | | | G 1/2" | 45 |
| 2-stage PN10* | 1773 | 2550 | | | | | | | | | | | | | | | | | 90 |
| 1-stage PN16* | 1369 | 1750 | | | | | | | | | | | | | | | | | 50 |
| 2-stage PN16* | 1788 | 2550 | | | | | | | | | | | | | | | | | 90 |

* Outlet at the bottom

## NOTE

The information given in this brochure refers to the described operating conditions and applications.

For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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