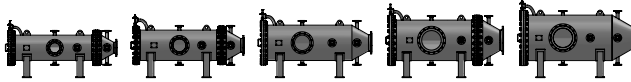


Process Inline Filter

Protective filter PLF2-9HF



Specifications	
Nominal size:	DN 300 - DN 600
Q _{s max} :	3000 m ³ /h
p _{s max} :	16 bar
Filtration ratings:	1 - 90 µm

1. GENERAL

Product description

- Protective filter for continuous separation of low solid particle concentrations (protective filtration) from low-viscosity fluids, such as water, coolants, washing media, processing oils, scrubber water.

Filter element technology

- Filter element type Processmicron® PELF-PM-9HF (9" HighFlow)
- Filter material: polyester (PES) / polypropylene (PP)
- Filter element design: pleated parallel folding
- Filtration ratings: 1 to 90 µm
- Filter element length: 20" per filter element, 3-stage filter housing (60")
- Sealing materials: asbestos-free gasket, FKM / NBR / EPDM

Product advantages

- Very large filter area per filter element
- Compact design with high flow rates
- Protection of the clean side during filter element replacement thanks to fixed support tube
- Low pressure drops due to large cross sections and surfaces
- Superior handling compared to commonly available disposable filter elements
- Short maintenance times
- High contamination retention capacity
- High filtration efficiency
- High media compatibility

Technical data, filter housing

Size	Mounting dimension	Materials Filter housing ¹⁾	p _{s max} [bar]	T _{s max} [°C]	Weight [kg]	Volume [l]
PLF2-3-9HF	DN 300 / 12"	- Carbon steel - Stainless steel	6 10 16	60 °C ²⁾ 90 °C ³⁾	See section on dimensions dependent on pressure and design code	550
PLF2-5-9HF	DN 400 / 16"					1050
PLF2-7-9HF	DN 500 / 20"					1350
PLF2-9-9HF	DN 500 / 20"					1660
PLF2-12-9HF	DN 600 / 24"					2485

Technical data, filter elements

Length	Filter materials ⁴⁾	Filtration ratings [µm]	Permissible differential pressure at the filter element [bar]
3-stage (3x 20") ⁶⁾	- Polyester (PES) ⁵⁾ - Polypropylene (PP)	PES = 1 / 3 / 5 / 10 / 20 / 30 / 40 / 50 / 70 / 90 PP = 3 / 5 / 10 / 20 / 30 / 40 / 50 / 70	2.5

Legend

- ¹⁾ Materials of filter housing:
E1 = stainless steel 1.4301 / 1.4541 or similar (Group 304 / 321)
E2 = stainless steel 1.4571 or similar (Group 316)
- ²⁾ For coated housing
- ³⁾ For stainless steel housing
- ⁴⁾ T_{s max} PES filter element: 90 °C
T_{s max} PP filter element: 60 °C
- ⁵⁾ Material of end caps: polyamide
- ⁶⁾ 1-stage (1x 20") and 2-stage (2x 20") housing designs on request

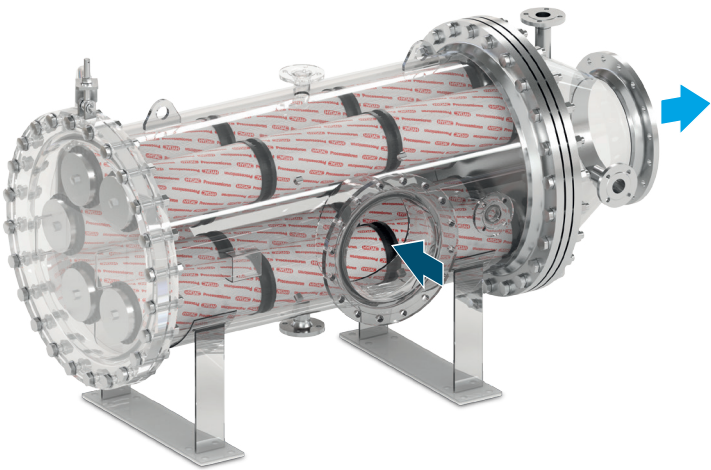
2. FUNCTION AND SPECIAL FEATURES

FUNCTIONAL PRINCIPLE

- Flow through the filter element is from the outside to the inside
- The separated solids remain on the outer side of the filter element
- Particles being deposited during the filtration causes a loss of pressure
- Filter element change when differential pressure is reached

ACCESSORIES

- Pivoting lid device
- Drain and vent ball valves
- Various clogging indicators



3. CLOGGING INDICATORS

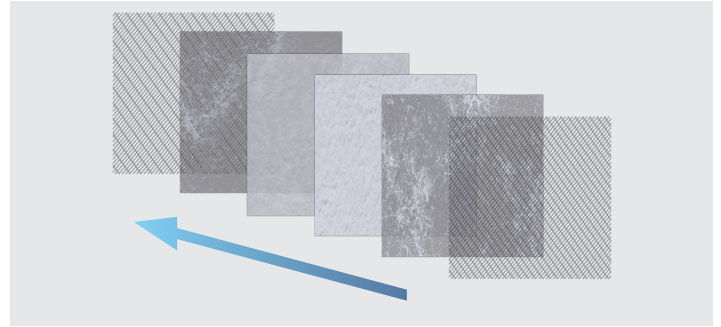
Type	Image	Description
Clogging indicator/differential pressure monitoring		
Visual PVD x B.x		• Visual display with green/red field • Automatic reset
Electrical PVD x C.x		• Electrical signal when trigger point is reached • Switch type: normally closed or normally open • Automatic reset
Visual-electrical PVD x D.x /-L...		• Lamp for visual display • Electrical signal (normally closed or normally open) • Automatic reset
Differential pressure gauge DS11		• 2 micro-switches (N/C or N/O) • Switch points of the micro-switches can be adjusted from outside • Measuring cell made from aluminium or brass alloy

4. FILTER ELEMENT TECHNOLOGY

All Processmicron® filter elements are fundamentally structured as follows:

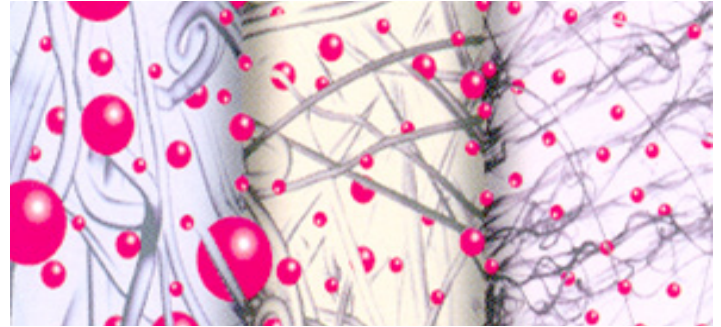
Multi-layer filter mat construction

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



Staged (graduated) depth filtration

- High cleanliness in single passage
- High layer thickness of the filter medium
 - ➔ High storage volume for contamination

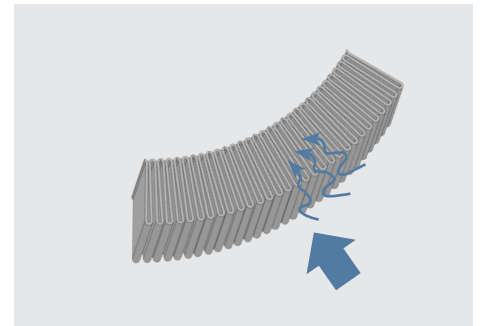


Filter element type:

Processmicron® HighFlow 9"

Protective filtration:

- Pleated build of filter element (parallel folding)
- High flow rates
- Extreme fold stability through parallel folding at large filter element circumference



5. FILTER CALCULATION

PROTECTIVE FILTER

Purpose	• Protection of downstream system components • Only in the event of a malfunction of the main filtration stage	
Filter selection	Based on the flow rate	
Flow rate per filter element	Water:	Max. 100 m³/h per filter element
	Coolants/washing media:	Max. 50 m³/h per filter element
Position of the filter	After upstream filter	
Pre-filtration requirements	Stringent requirements	

CHECKLIST FOR FILTER CALCULATION

STEP 1: REQUIRED OPERATING DATA

- Observe Pressure Equipment Directive PED 2014/68/EU
- Type of operating medium
- Viscosity
- Operating pressure
- Operating temperature
- Flow rate
- Required filtration rating
- Type of solid substances to be discharged
- Solid particle content

STEP 2: FILTER SIZING

- Hydraulic determination of size on basis of pressure drop curves
- The initial pressure difference for clean filter elements should not exceed a value of 0.2 bar*
- Housing material selected on basis of operating data and operating medium
- Sealing material selected on basis of operating data and operating medium
- The flow velocity of 4 m/s at the flange inlet should not be exceeded

STEP 3: DETERMINING THE FILTRATION RATING

- **As a basic rule: as coarse as possible – as fine as necessary!**

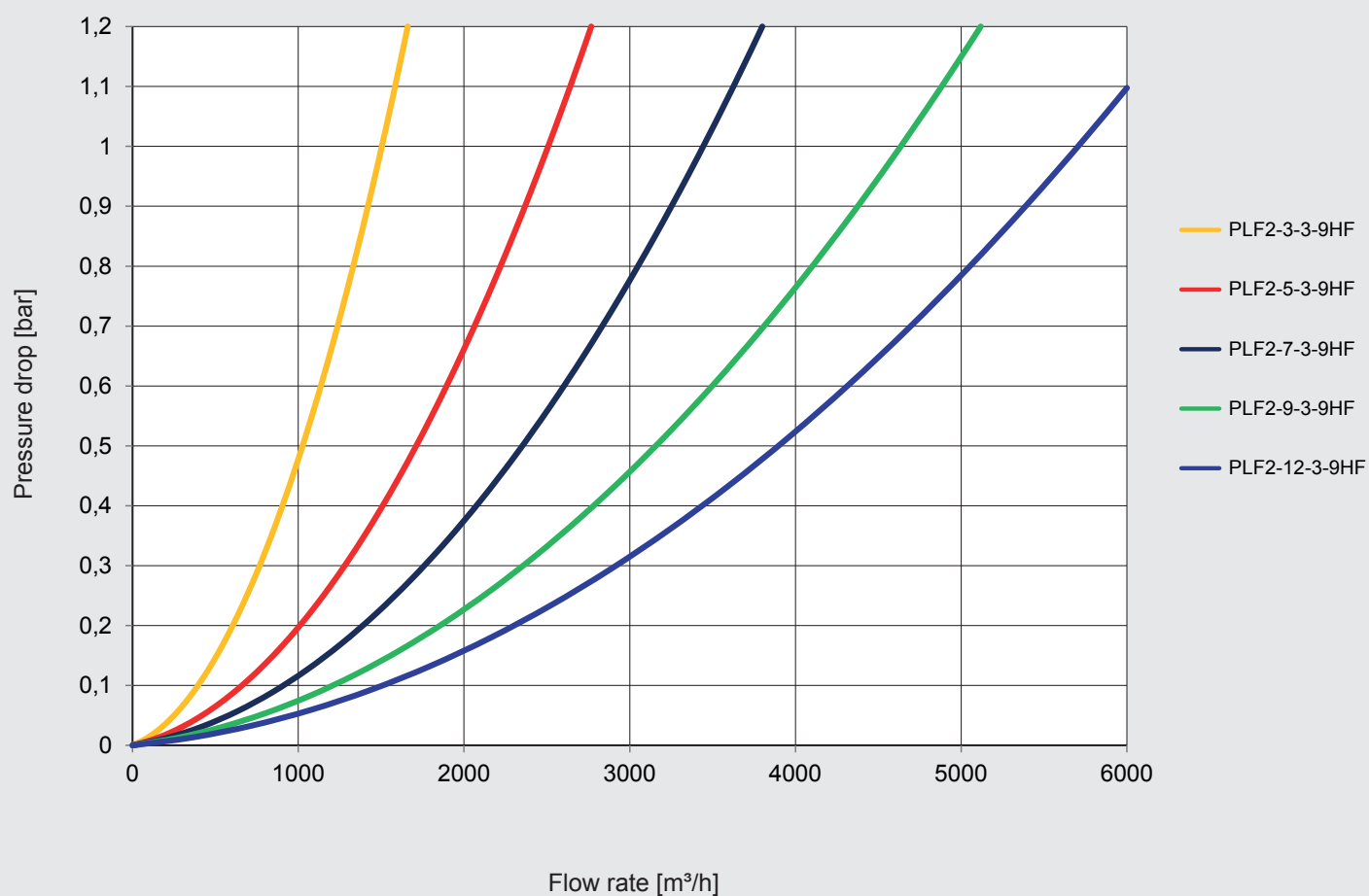
* Higher values possible following consultation with our Head Office.

6. FILTER CONFIGURATION*

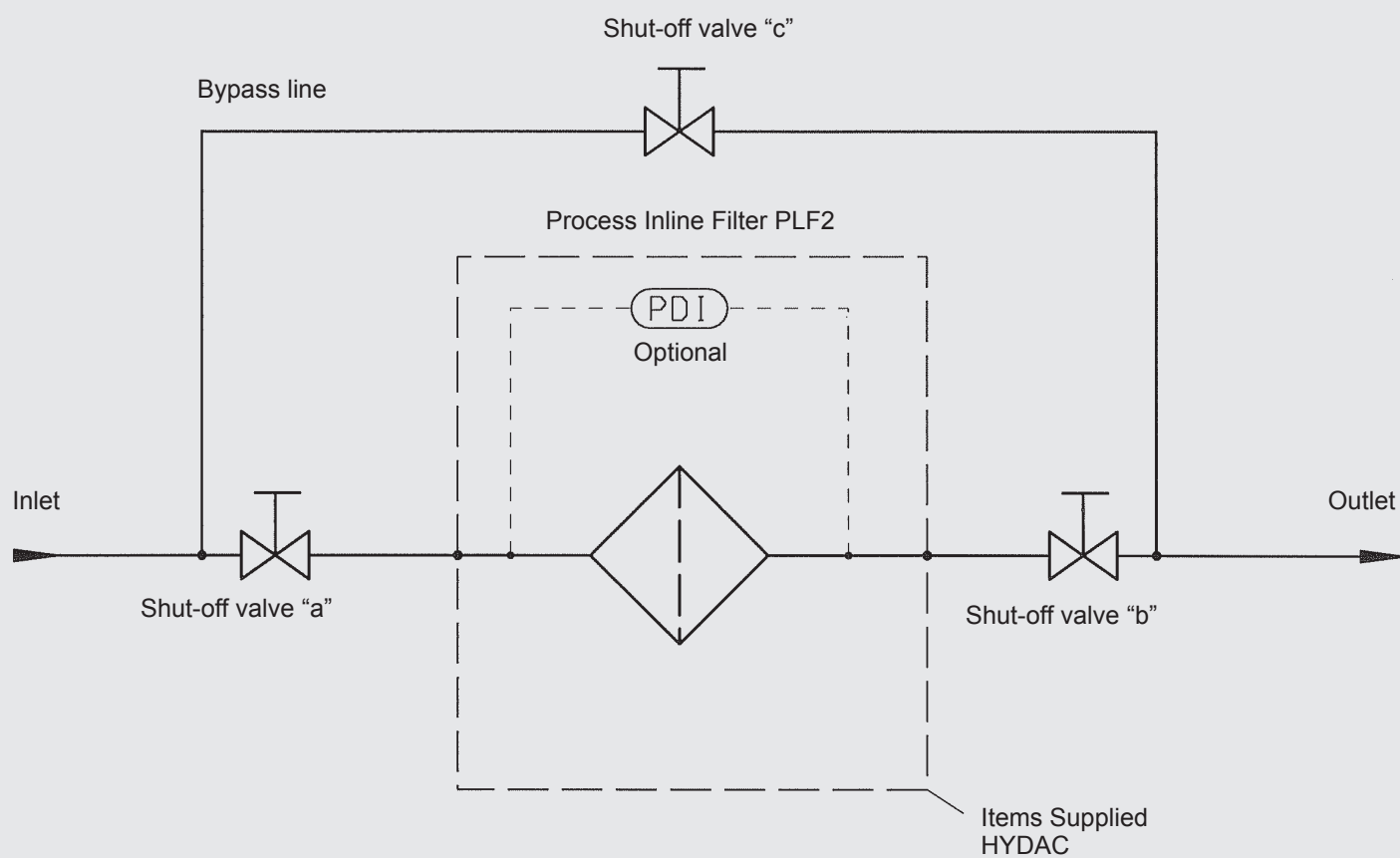
	Standard	Optional
Housing	- Housing design and housing production according to AD 2000 and, as required, Pressure Equipment Directive 2014/68/EU - ASME VIII Div. 1 Design	- ASME VIII Div. 1 with ASME stamp - EN 13445 - Others on request
Flange connections	- DIN EN - ASME	- JIS - Others on request
Seal materials Filter housing	FPM	Other sealing materials on request
Seal materials Filter elements	FPM	- NBR - EPDM - Silicone - Other sealing materials on request
Differential pressure monitoring	- Visual - Visual-electrical	Pressure transmitter (4 -20 mA)
Material of filter housing	- Carbon steel – Stainless steel: 1.4301 / 1.4541 or similar (Group 304 / 321) – Stainless steel: 1.4571 or similar (Group 316)	- Duplex - Super Duplex - FRP
External corrosion protection	2-layer coating (not applicable for stainless steel housing) - Colour RAL 7040 (window grey)	- Multi-layer coating - Special paints for offshore applications - Special paints/coatings according to customer specifications
Internal corrosion protection	2-comp. epoxy coating 2-comp. highly cross-linked polyurethane coating	- Glass flake lining - Special paints/coatings according to customer specifications - Rubber lining
Material of filter elements	- Polyester (PES), material of end caps: polyamide (PA) - Polypropylene (PP)	
Documentation	Operating manual	- Material certificates to EN 10204, 3.1 for pressure-bearing wetted housing parts - Manufacturer's inspection certificate to DIN 55350, part 18 "M" for construction and pressure inspection - According to customer specification 3rd parties (TÜV, ABS, Lloyd's, etc.)

* Other versions and customised special solutions following consultation with our Head Office.

PRESSURE DROP CURVE



CIRCUIT DIAGRAM



7. MODEL CODE

MODEL CODE PROCESS INLINE FILTER PLF2-9HF

PLF2 - 3 - 3 - 9HF - H - E1 - S - N - E1 - 10 - C - 1 - 0 - 0 - So

Filter type

Multiple-place filter housing ¹⁾

Size of filter

(corresponds to number of filter element support tubes)

	Filter element size
	9"
3	X
5	X
7	X
9	X
12	X

Length of filter housing

- 1 = 1-stage (on request)
- 2 = 2-stage (on request)
- 3 = 3-stage

Filter element diameter and filter element type

9HF = 9" filter element diameter HighFlow (HF)

Filter alignment

- H = horizontal
- V = vertical (on request)

Housing material

- NP = carbon steel, 2-comp. PUR internal coating
- NG = carbon steel, 3 mm rubber lining (on request)
- 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 = for ANSI flanges, add suffix "A"
- J = for JIS flanges, add suffix "J"

Design code

- S = HYDAC Standard (AD 2000)
- A = ASME VIII Div. 1 (material and calculation...)
- U = ASME VIII Div. 1 Stamped
- E = EN 13445

Type of connection

	Connection size	Filter size
		9"
N	DIN DN 300 / 12" ASME	3
Q	DIN DN 400 / 16" ASME	5
R	DIN DN 500 / 20" ASME	7 / 9
S	DIN DN 600 / 24" ASME	12

Material of internal parts

- 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 ranges

- 6 = PN 6
- 10 = PN 10
- 16 = PN 16

Sealing material

- C = asbestos-free gasket
- N = NBR
- V = FKM (Viton)
- E = EPDM

Clogging indicator

- 0 = without clogging indicator
- 1 = visual indicator (PVD 2B.1)
- 2 = visual-electrical indicator (PVD 2D.0/-L24)
- 3 = V01
- 4 = differential pressure gauge in aluminium with 2 adjustable switching contacts
- 5 = differential pressure gauge in stainless steel with 2 adjustable switching contacts
- 6 = electrical indicator (PVD 2C.0)
- 7 = PVL2GW.0/-V-110
- 8 = PVL2GW.0/-V-120

Optional equipment

- 1 = pivoting lid device (only for horizontal variant) / davit (only for vertical variant)
- 2 = toggle screws
- 3 = stainless steel air vent ball valve
- 4 = drain flap DN 50

(Multiple fittings possible, please provide the corresponding number combination!)

Modification number

Supplementary details

- So = code number for special equipment

¹⁾ Multiple-place filter housing = filter housing with several support tubes

TYPE CODE – PROCESSMICRON® FILTER ELEMENT 9“ HF

PELF-PM – 9 – HF – 2 – PL – 005 – PES – PA – V – 1

Filter element type

Processmicron®

Filter element diameter

9 = 9“ external diameter

Filter element type

HF = HighFlow (9“)

Length

2 = 20“

Type of filter element

PL = pleated

SP = spun spray

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	Type of filter element	Filtration rating
PP	PL	003 / 005 / 010 / 020 / 030 / 040 / 050 / 070
	SP	005 / 020 / 070
PES	PL	001 / 003 / 005 / 010 / 020 / 030 / 040 / 050 / 070 / 090

End caps

PA = polyamide (not for filter element type “SP”)

PP = polypropylene (not for filter element type “PES”)

Sealing material

N = NBR

V = FKM

E = EPDM

S = silicone

Technical design

1 = injection-moulded end caps with 2-comp. PUR adhesive (only suitable for filter element type: PL / PES)

2 = injection-moulded end caps with polyolefin melt (only suitable for filter element type: PL / SP / PP)

3 = injection-moulded end caps with IR welding (only suitable for filter element type: PL / SP / PP)

FILTER HOUSING, TWO-PART, CARBON STEEL

Size	DN1	DN2	b1	b2	h1	h2	h3	I1	I2	I3	H1	L1	L2	L3	L4
PLF2-3-3-9 PN6	300	300	500	400	650	400	400	1250	850	230	1247	1700	2194	2112	920
PLF2-3-3-9 PN10	300	300	500	400	650	400	400	1250	850	230	1260	1700	2214	2128	920
PLF2-3-3-9 PN16	300	300	500	400	650	400	400	1250	850	230	1289	1700	2245	2139	920
PLF2-3-3-9 ASME	12"	12"	500	400	650	400	400	1250	850	230	1277	1700	2352	2254	920
PLF2-5-3-9 PN6	400	400	600	500	750	500	500	1350	850	320	1458	1700	2321	2225	1125
PLF2-5-3-9 PN10	400	400	600	500	750	500	500	1350	850	320	1478	1700	2352	2252	1125
PLF2-5-3-9 PN16	400	400	600	500	750	500	500	1350	850	320	1483	1700	2383	2269	1125
PLF2-5-3-9 ASME	16"	16"	600	500	750	500	500	1350	850	320	1439	1700	2423	2317	1125
PLF2-7-3-9 PN6	500	500	650	550	800	550	550	1400	850	325	1558	1700	2328	2228	1225
PLF2-7-3-9 PN10	500	500	650	550	800	550	550	1400	850	325	1578	1700	2355	2253	1225
PLF2-7-3-9 PN16	500	500	650	550	800	550	550	1400	850	325	1583	1700	2386	2270	1225
PLF2-7-3-9 ASME	20"	20"	650	550	800	550	550	1400	850	325	1549	1700	2457	2347	1225
PLF2-9-3-9 PN6	500	500	650	600	850	600	600	1500	1000	400	1660	1700	2420	2320	1295
PLF2-9-3-9 PN10	500	500	650	600	850	600	600	1500	1000	400	1685	1700	2445	2343	1295
PLF2-9-3-9 PN16	500	500	650	600	850	600	600	1500	1000	400	1697	1700	2500	2384	1295
PLF2-9-3-9 ASME	20"	20"	650	600	850	600	600	1500	1000	400	1660	1700	2549	2440	1295
PLF2-12-3-9 PN6	600	600	825	700	950	700	700	1650	1100	500	1892	1700	2545	2433	1580
PLF2-12-3-9 PN10	600	600	825	700	950	700	700	1650	1100	500	1917	1700	2584	2466	1580
PLF2-12-3-9 PN16	600	600	825	700	950	700	700	1650	1100	500	1932	1700	2638	2506	1580
PLF2-12-3-9 ASME	24"	24"	825	700	950	700	700	1650	1100	500	1885	1700	2673	2545	1580

Size	L5	L6	L7	L8	L9	L10	L11	D1	D2	D3	E1	E2	F1	F2	F3
PLF2-3-3-9 PN6	560	30	15	770	510	1095	190	755	610	27	DN50	DN50	1300	700	180
PLF2-3-3-9 PN10	560	34	15	770	510	1095	190	780	610	27	DN50	DN50	1300	700	180
PLF2-3-3-9 PN16	560	54	15	770	510	1095	190	840	610	27	DN50	DN50	1300	700	180
PLF2-3-3-9 ASME	560	46.1	15	770	510	1095	190	815	610	27	2"	2"	1300	700	180
PLF2-5-3-9 PN6	560	44	15	930	660	1350	250	975	813	27	DN50	DN50	1280	800	180
PLF2-5-3-9 PN10	560	48	15	930	660	1350	250	1015	813	27	DN50	DN50	1280	800	180
PLF2-5-3-9 PN16	560	62	15	930	660	1350	250	1025	813	27	DN50	DN50	1280	800	180
PLF2-5-3-9 ASME	560	53.9	15	930	660	1350	250	940	813	27	2"	2"	1280	800	180
PLF2-7-3-9 PN6	560	48	15	1020	740	1480	280	1075	914	30	DN50	DN50	1280	900	180
PLF2-7-3-9 PN10	560	50	15	1020	740	1480	280	1115	914	30	DN50	DN50	1280	900	180
PLF2-7-3-9 PN16	560	64	15	1020	740	1480	280	1125	914	30	DN50	DN50	1280	900	180
PLF2-7-3-9 ASME	560	57.3	15	1020	740	1480	280	1055	914	30	2"	2"	1280	900	180
PLF2-9-3-9 PN6	560	52	15	1125	830	1650	310	1175	1016	33	DN50	DN50	1280	1000	180
PLF2-9-3-9 PN10	560	54	15	1125	830	1650	310	1230	1016	33	DN50	DN50	1280	1000	180
PLF2-9-3-9 PN16	560	68	15	1125	830	1650	310	1255	1016	33	DN50	DN50	1280	1000	180
PLF2-9-3-9 ASME	560	65.2	15	1125	830	1650	310	1175	1016	33	2"	2"	1280	1000	180
PLF2-12-3-9 PN6	560	60	15	1315	975	1950	340	1405	1219	33	DN50	DN50	1230	1200	180
PLF2-12-3-9 PN10	560	66	15	1315	975	1950	340	1455	1219	33	DN50	DN50	1230	1200	180
PLF2-12-3-9 PN16	560	80	15	1315	975	1950	340	1485	1219	33	DN50	DN50	1230	1200	180
PLF2-12-3-9 ASME	560	76.3	15	1315	975	1950	340	1390	1219	33	2"	2"	1230	1200	180

The dimensions indicated have ± 10 mm tolerances.
Subject to technical modifications.

FILTER HOUSING, ONE-PART, STAINLESS STEEL

Size	DN1	DN2	b1	b2	h1	h2	h3	I1	I2	I3	H1	L1	L2	L3	L4
PLF2-3-3-9 PN6	300	300	500	400	650	400	400	1250	850	230	1247	–	2172	2112	920
PLF2-3-3-9 PN10	300	300	500	400	650	400	400	1250	850	230	1260	–	2180	2128	920
PLF2-3-3-9 PN16	300	300	500	400	650	400	400	1250	850	230	1289	–	2205	2139	920
PLF2-3-3-9 ASME	12"	12"	500	400	650	400	400	1250	850	230	1277	–	2248	2254	920
PLF2-5-3-9 PN6	400	400	600	500	750	500	500	1350	850	320	1458	–	2269	2193	1125
PLF2-5-3-9 PN10	400	400	600	500	750	500	500	1350	850	320	1478	–	2294	2204	1125
PLF2-5-3-9 PN16	400	400	600	500	750	500	500	1350	850	320	1483	–	2311	2217	1125
PLF2-5-3-9 ASME	16"	16"	600	500	750	500	500	1350	850	320	1439	–	2345	2259	1125
PLF2-7-3-9 PN6	500	500	650	550	800	550	550	1400	850	325	1558	–	2300	2200	1225
PLF2-7-3-9 PN10	500	500	650	550	800	550	550	1400	850	325	1578	–	2309	2207	1225
PLF2-7-3-9 PN16	500	500	650	550	800	550	550	1400	850	325	1583	–	2332	2216	1225
PLF2-7-3-9 ASME	20"	20"	650	550	800	550	550	1400	850	325	1549	–	2386	2277	1225
PLF2-9-3-9 PN6	500	500	650	600	850	600	600	1500	1000	400	1660	–	2388	2288	1295
PLF2-9-3-9 PN10	500	500	650	600	850	600	600	1500	1000	400	1685	–	2397	2295	1295
PLF2-9-3-9 PN16	500	500	650	600	850	600	600	1500	1000	400	1697	–	2420	2304	1295
PLF2-9-3-9 ASME	20"	20"	650	600	850	600	600	1500	1000	400	1660	–	2474	2265	1295
PLF2-12-3-9 PN6	600	600	825	700	950	700	700	1650	1100	500	1892	–	2489	2377	1580
PLF2-12-3-9 PN10	600	600	825	700	950	700	700	1650	1100	500	1917	–	2507	2389	1580
PLF2-12-3-9 PN16	600	600	825	700	950	700	700	1650	1100	500	1932	–	2527	2395	1580
PLF2-12-3-9 ASME	24"	24"	825	700	950	700	700	1650	1100	500	1885	–	2588	2459	1580

Size	L5	L6	L7	L8	L9	L10	L11	D1	D2	D3	E1	E2	F1	F2	F3
PLF2-3-3-9 PN6	560	30	15	770	510	1095	190	755	610	27	DN50	DN50	1380	700	180
PLF2-3-3-9 PN10	560	34	15	770	510	1095	190	780	610	27	DN50	DN50	1380	700	180
PLF2-3-3-9 PN16	560	54	15	770	510	1095	190	840	610	27	DN50	DN50	1380	700	180
PLF2-3-3-9 ASME	560	46.1	15	770	510	1095	190	815	610	27	2"	2"	1380	700	180
PLF2-5-3-9 PN6	560	44	15	930	660	1350	250	975	813	27	DN50	DN50	1380	800	180
PLF2-5-3-9 PN10	560	48	15	930	660	1350	250	1015	813	27	DN50	DN50	1380	800	180
PLF2-5-3-9 PN16	560	62	15	930	660	1350	250	1025	813	27	DN50	DN50	1380	800	180
PLF2-5-3-9 ASME	560	53.9	15	930	660	1350	250	940	813	27	2"	2"	1380	800	180
PLF2-7-3-9 PN6	560	48	15	1020	740	1480	280	1075	914	30	DN50	DN50	1380	900	180
PLF2-7-3-9 PN10	560	50	15	1020	740	1480	280	1115	914	30	DN50	DN50	1380	900	180
PLF2-7-3-9 PN16	560	64	15	1020	740	1480	280	1125	914	30	DN50	DN50	1380	900	180
PLF2-7-3-9 ASME	560	57.3	15	1020	740	1480	280	1055	914	30	2"	2"	1380	900	180
PLF2-9-3-9 PN6	560	52	15	1125	830	1650	310	1175	1016	33	DN50	DN50	1380	1000	180
PLF2-9-3-9 PN10	560	54	15	1125	830	1650	310	1230	1016	33	DN50	DN50	1380	1000	180
PLF2-9-3-9 PN16	560	68	15	1125	830	1650	310	1255	1016	33	DN50	DN50	1380	1000	180
PLF2-9-3-9 ASME	560	65.2	15	1125	830	1650	310	1175	1016	33	2"	2"	1380	1000	180
PLF2-12-3-9 PN6	560	60	15	1315	975	1950	340	1405	1219	33	DN50	DN50	1380	1200	180
PLF2-12-3-9 PN10	560	66	15	1315	975	1950	340	1455	1219	33	DN50	DN50	1380	1200	180
PLF2-12-3-9 PN16	560	80	15	1315	975	1950	340	1485	1219	33	DN50	DN50	1380	1200	180
PLF2-12-3-9 ASME	560	76.3	15	1315	975	1950	340	1390	1219	33	2"	2"	1380	1200	180

The dimensions indicated have ± 10 mm tolerances.
Subject to technical modifications.

* Only available in two-part filter housing version

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 Process Technology GmbH
Am Wrangelflöz 1
D-66538 Neunkirchen
Tel.: +49 (0)6897 - 509-1241
Fax: +49 (0)6897 - 509-1278
Internet: www.hydac.com
E-mail: prozess-technik@hydac.com