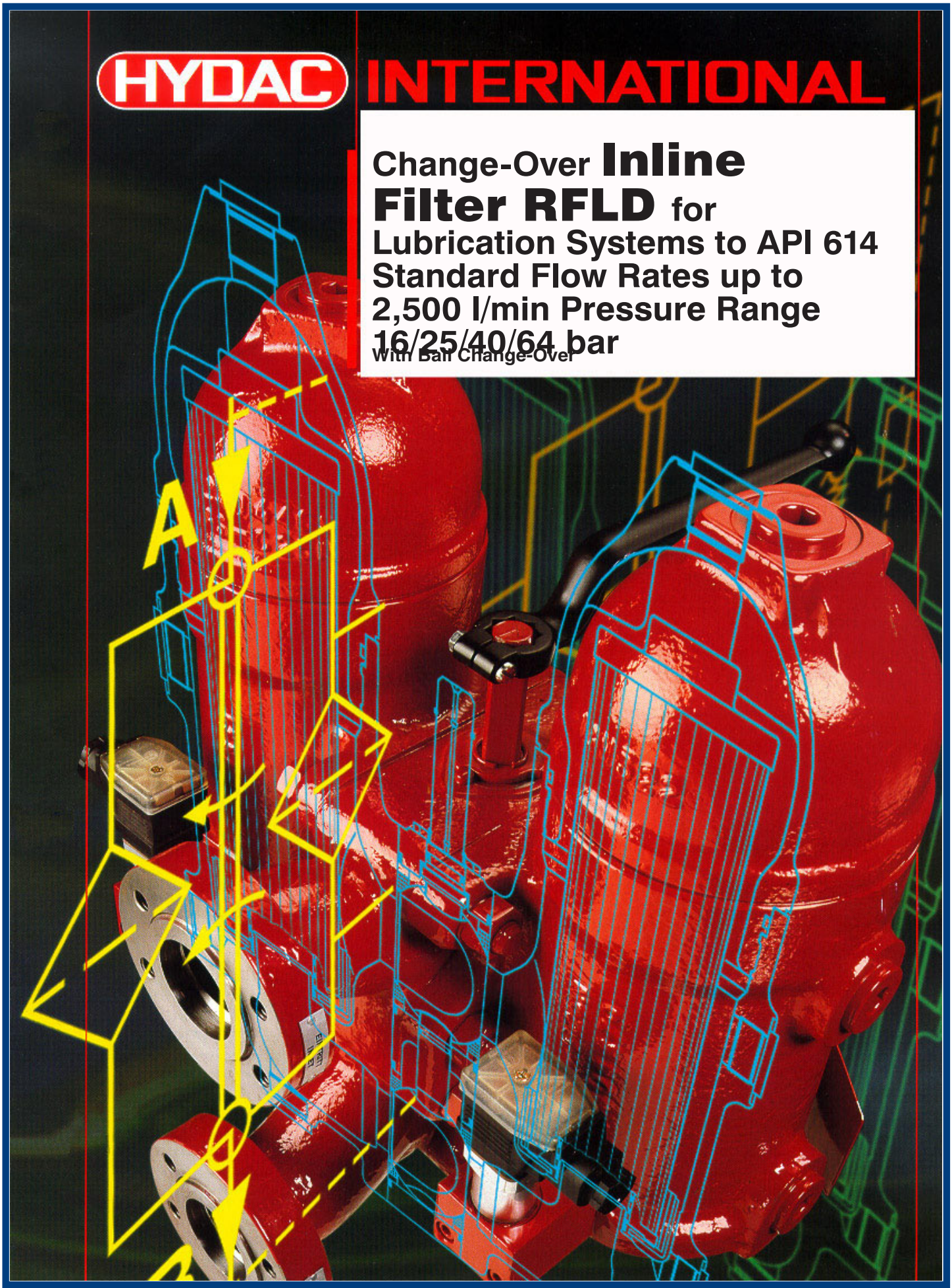
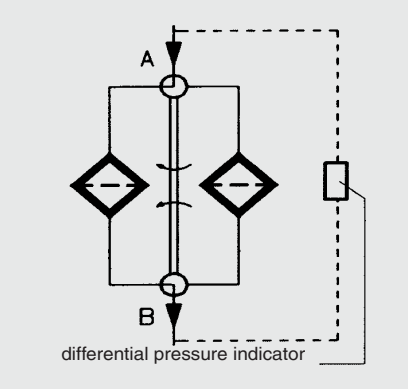
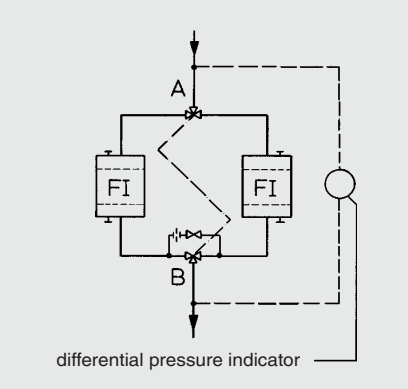
HYQUIP
+44 (0)1204 699959
enquiries@hyquip.co.uk
hyquip.co.uk





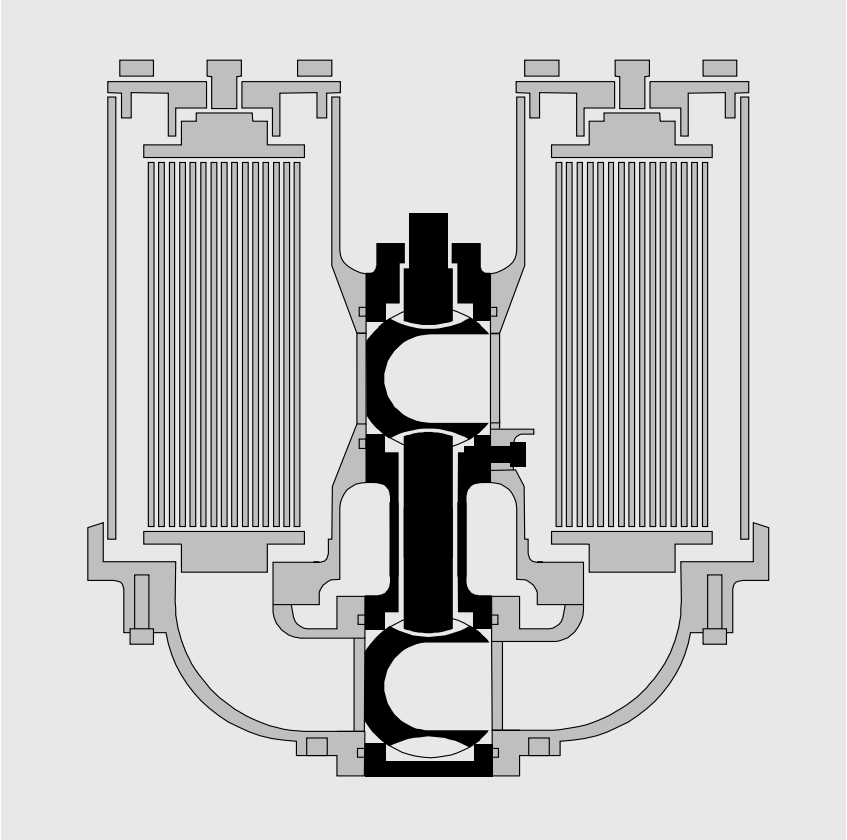
Hydraulic systems



Lubrication systems

Change-over inline filters, type RFLD, are designed for inline mounting in hydraulic and lubrication systems which operate non-stop.

The filter materials can be selected according to the application.



1. TECHNICAL SPECIFICATIONS

1.1. FILTER HOUSING
Construction

The filter housing and changeover valve are designed in accordance with API 614, i.e. in cast steel, steel or stainless steel materials.

The two filter housings are connected by means of a ball change-over valve with negative overlap. Therefore, there can be flow through both filter housings, if necessary. The internal parts of the change-over valve are in stainless steel (except for size 2502/2522).

All filters are fitted with a pressure compensation line and a ball valve. Therefore filling and/or pressure compensation between the two filter sides can be carried out.

When the pressure compensation line is fitted separately, a reusable pipe connector is used.

All filters have connections for venting and draining in NPT thread as standard.

1.2. FILTER ELEMENTS

Hydac filter elements meet all ISO test criteria.

Reliable filter operation is only guaranteed with original HYDAC filter elements.

Filter elements with 10 **µ**m filtration rating meet the API requirements. The following types of element can be used: glass fibre (G/HC), paper (P/HC) and metal fibre (V). Wire mesh filter elements can also be supplied on request.

The filter elements are also suitable for use in dynamic applications due to their high pressure stability; max. permiss. **Δ**p across the element:

Glass fibre (=β_{10} > 10) (G/HC) : 25 bar

Paper (P/HC) : 10 bar

Wire mesh (W/HC) : 30 bar

Stainless steel fibre (V): 30 bar

Fluid compatibility

Suitable for mineral oils, lubrication oils, non-flam fluids, synthetic and rapidly biodegradable oils. For use with water, please contact our technical sales department.

For further details on filter elements, please see:
brochure no.: E 7.200../..

1.3. CLOGGING INDICATORS

Clogging indicators are fitted between the inlet and outlet of the filter. The required ports are available as standard.

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

1.4. SEALS

Choice of Perbunan (= NBR) or Viton (= FPM for HFD fluids).

1.5. MODELS

1.5.1 **RFLD filter to API standard**

- The permissible operating pressure of the filter depends on the required flange type. Inlet and outlet with ANSI flange (150 lbs/ 300 lbs)
- Ball change-over: ball and spindle in stainless steel (except for size 2502/2522)
- Pressure compensation line with ball valve in the reusable pipe connector
- Venting / draining in NPT design (blanking plug)
- Filter element in 10µm (G/HC) ⇒ blocked bypass
- No clogging indicator **Test certificates**
- Manufacturer's certificate M to DIN 55350 Part 18 relating to construction and pressure testing
- Test certificate 3.1 B to EN 10204 (material certificate)

1.5.2 **Options**

- Inlet and outlet: with flanged models (DIN, SAE…)
- Ball change-over valve: material: ball = hard-chromed, spindle = tempered steel
- Pressure compensation line with DILO reusable screw connector
- Venting / draining with ball valve and/or in the flanged version
- Clogging indicator (fitted separately)
- Cover plate lifting device (for sizes 2502 and above)
- Socket set screws (for sizes 2502 and above)
- Stand (for sizes 332/333 - 1322, except for size 1303) **Test certificates**
- ASME design
- Material certificate from the approval authorities are possible:
- Germanischer Lloyd (GL), Lloyd's Register (LR), American Bureau of Shipping (ABS), Det Norske Veritas (DNV) and Technischer Überwachungsverein (TÜV)
NOTE Additional prices for the listed options are available on request.

1.6. DOCUMENTATION

Standard

- Combination drawing (section / positions / principle dimensions)
- Operating and maintenance instructions

2. GENERAL

Mounting

Filters must be mounted using flexible joints and must not be used as a pipe support.

Direction of flow

Inlet: top

Outlet: bottom

Temperature range

-10 °C … +100 °C

Pressure setting of differential pressure clogging indicator

Δp_a= 0.8 bar/1 bar/2 bar

Other pressure settings on request

The filter elements are fitted with a blocked bypass (API requirement)

3. MODEL CODE

(also order example)

3.1. COMPLETE FILTER

RFLD G/HC 502 F A 3 10 W 1.0 /-Z-150-KB

Filter type

Filter material of element
G/HC glass fibre
P/HC paper
W/HC stainless steel wire mesh
V stainless steel fibre

Size / Material
Cast steel GS: 332/ 502/ 662/ 852/ 952/ 1302/ 1322/ 2502/ 2522
Stainless steel: 503/ 853/ 1303

Operating pressure

	pmax according to AD guidelines (housing)	pmax according to ASME (housing)	Size
C	16 bar	16 bar	(size 1303, 2502, 2522)
D	25 bar	25 bar	(size 853)
E	40 bar	25 bar	(size 503, 662-1322)
F	64 bar	52 bar	(size 332-502)

Type of change-over
A = ball all nominal widths

Type of connection / Connection sizes
Filter housing material: GS +cast stainless steel (·), welded steel /GS (✱), welded stainless steel / cast stainless steel (✖)

Type	Connection	Filter size									
		332	502 503	662	852 853	952	1302	1303	1322	2502	2522
3	ANSI 2"	•	•								
4	ANSI 3"			•	•						
5	ANSI 4"					•	•	✖	•		
7	ANSI 6"									✱	✱
0	According to customer specification										

Other sizes, nominal widths and pressure ranges on request

Filtration rating in µm
G/HC, P/HC : 10
W/HC : 25, 50, 100, 200
V : 3, 5, 10, 20

Type of clogging indicator
W no indicator connection
A without indicator, connection plugged
B with visual indicator
C with electrical indicator
D with combined visual/electrical indicator

Type code
1

Modification number
X the latest version is always supplied

Supplementary details
V FPM seals, filter suitable for rapidly biodegradable oils and phosphate ester (HFD-R)
150 details for pressure load (150 lbs, 300 lbs, 600 lbs)
L... light with corresponding voltage (24V, 48V, 110V, 220V)
LED 2 light-emitting diodes up to 24 volts
KB* without bypass valve
STV stand (sizes 332 - 1322, except for size 1303)
SB2 pressure compensation line with 2mm orifice
DH cover plate lifting device
DE differential pressure measurement across the element (2 clogging indicators)
Z* manufacturer's certificate M to DIN 55350 Part 18
Test certificate 3.1 B to EN 10204 (material certificate)

***) stipulated by API**

3.2. REPLACEMENT ELEMENT

1300 R 010 G/HC /-KB

Size
0330, 0500, 0660, 0850, 0950, 1300, 1700, 2600

Type
R

Filtration rating in µm
G/HC, P/HC : 10
W/HC : 25, 50, 100, 200
V : 3, 5, 10, 20

Filter material
G/HC; V; P/HC; W/HC

Supplementary details
V = FPM seals, filter suitable for rapidly biodegradable oils and phosphate ester (HFD-R)
W = filter suitable for oil-water emulsions (HFA, HFC), NBR seals
KB = without bypass valve (API 614)

4. FILTER SPECIFICATIONS

Filter type	Connection	Element size	Number of elements per side	Weight [kg] incl. element
332	ANSI 2"	0330 R...	1	67.8
502/503	ANSI 2"	0500 R...	1	69.4
662	ANSI 3"	0600 R...	1	96.0
852/853	ANSI 3"	0850 R...	1	98.8
952	ANSI 4"	0950 R...	1	146.4
1302/1303	ANSI 4"	1300 R...	1	156.2
1322	ANSI 4"	2600 R...	1	196.2
2502	ANSI 6"	0850 R...	3	304.4
2522	ANSI 6"	1700 R...	3	362.8

5. FILTER CALCULATION / SIZING

To calculate the filter according to API 614, the following applies:

Pressure drop for complete filter ≤ 0.35 bar

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

The pressure drop can either be determined with the aid of our FSP Filter Sizing Program, which is available free of charge, or by using the following graphs.

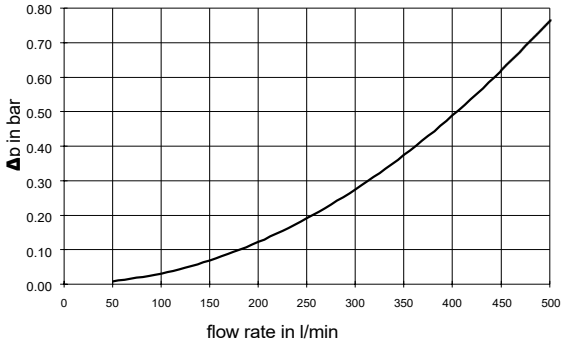
It must be stressed that all of the technical documentation at HYDAC Filtertechnik always gives the total housing pressure drop, i.e. **including change-over valve**.

5.1. **Δ**P-Q HOUSING GRAPHS (INCLUDING CHANGE-OVER VALVE!) TO ISO 3968 The housing graphs apply to mineral oil with a density of 0.86 kg/dm$_3$ for the largest nominal width per size in each case.

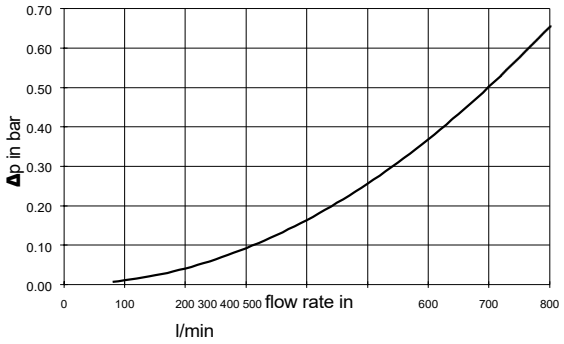
In this case, the differential pressure changes proportionally to the density.

In each case, the **Δ**p given is for the largest possible flange nominal width.

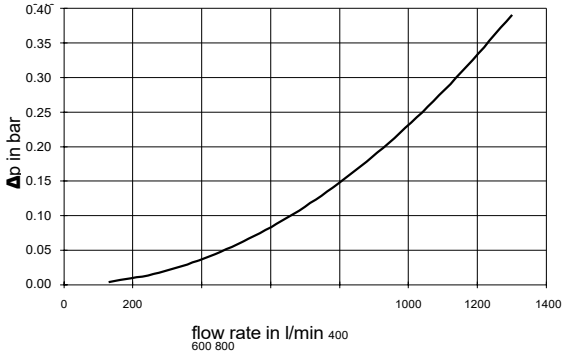
RFLD 332 - 502, 503



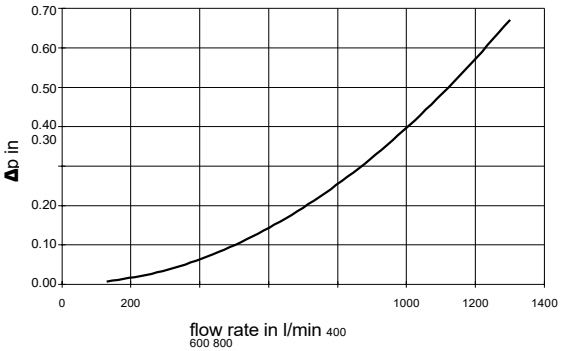
RFLD 662, 852, 853



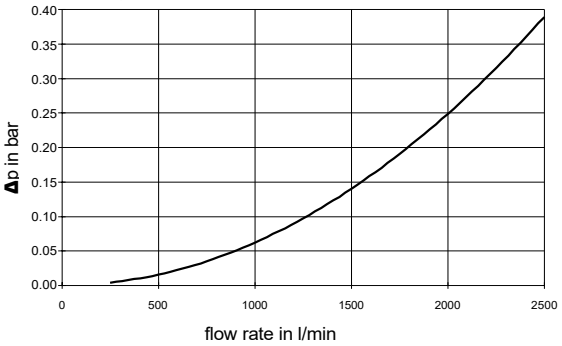
RFLD 1303



RFLD 952 - 1322



RFLD 2502, 2522

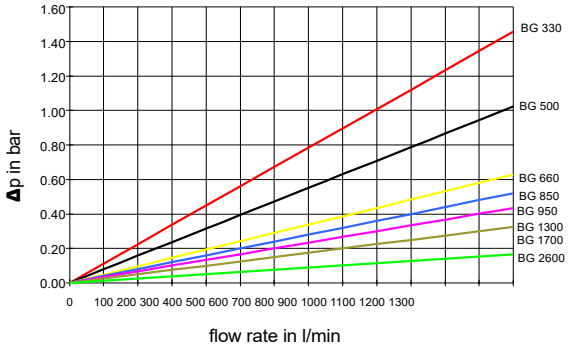


5.2. ΔP-Q GRAPHS - FILTER ELEMENTS

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.).

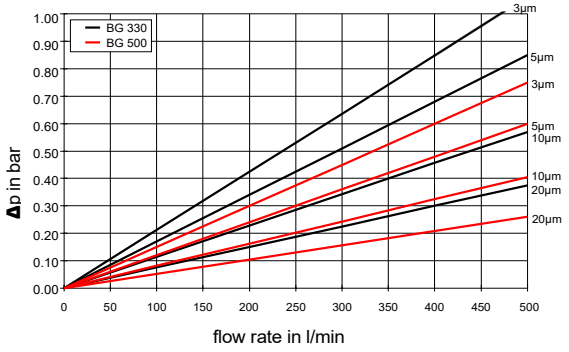
BG = Size

G/HC

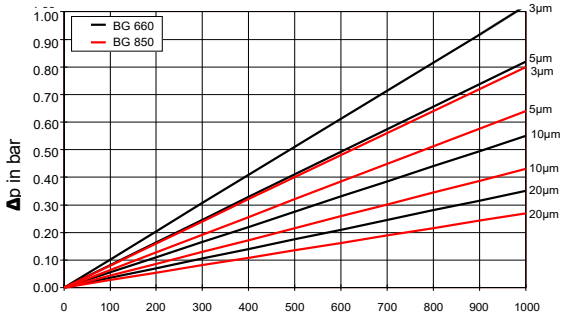


flow rate in l/min

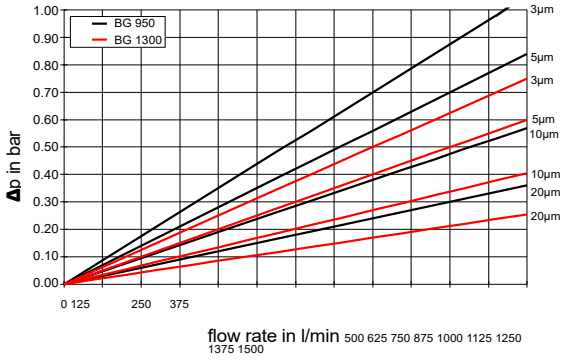
V



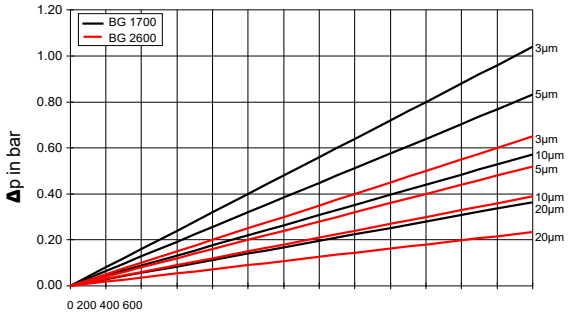
flow rate in l/min



flow rate in l/min

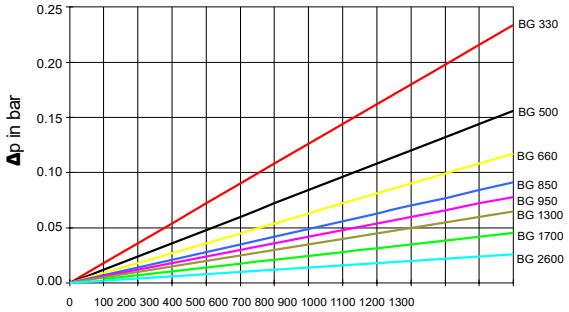


flow rate in l/min 500 625 750 875 1000 1125 1250 1375 1500



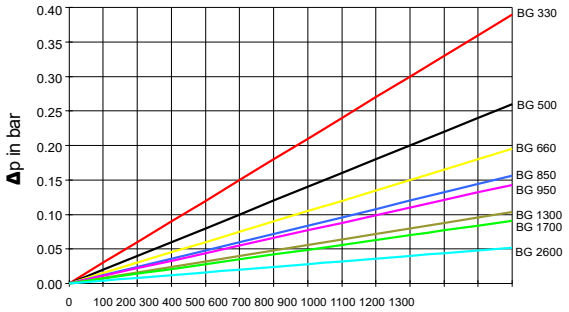
flow rate in l/min 800 1000 1200 1400 1600 1800 2000 2200 2400 2600

W/HC



flow rate in l/min

P/HC (10 µm)



flow rate in l/min

5.3. EXAMPLE

General

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

$\Delta p_{housing}$ = to be determined from point 5.1. $\Delta p_{element}$ = element pressure drop at Q and viscosity 30 mm²/s n according to point 5.2.

Example

System data: Q = 530 l/min; RFLD 662 with W/HC
W/HC wire mesh element; viscosity = 46 mm²/s

(ISO VG 46 at 40 °C)

Parameter: API 614 pressure drop for complete filter ≤ 0.35 bar

⇒ $\Delta p_{housing}$ = 0.28 bar (RFLD 662)

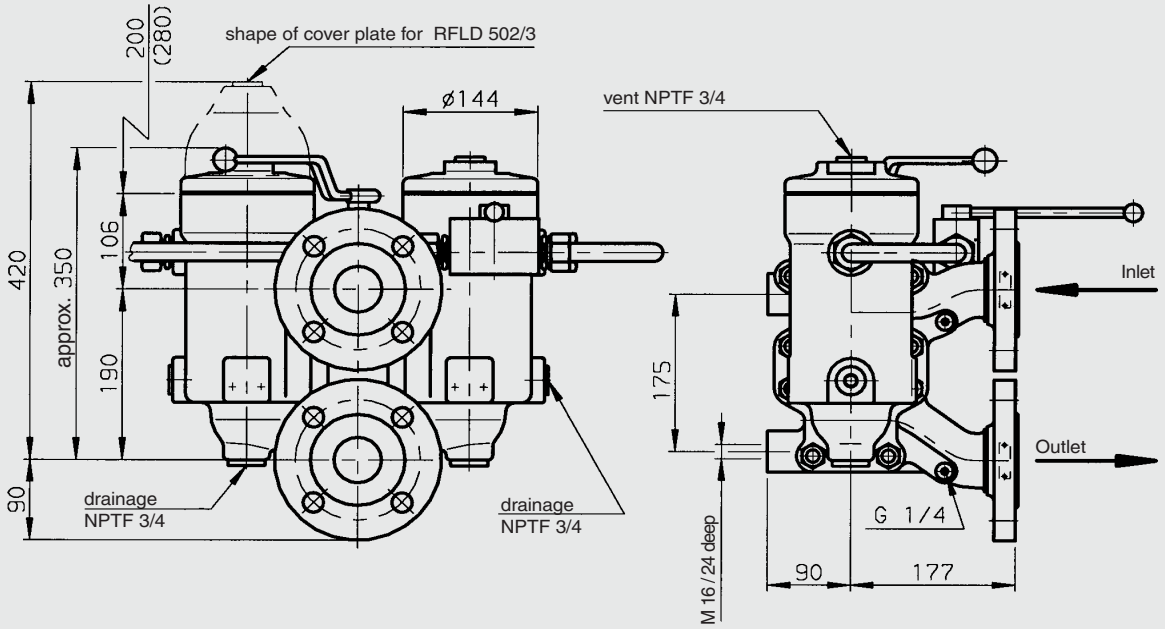
$\Delta p_{element}$ = 0.05 bar x ~~0.07 bar~~ 46 mm²/s / 30 mm²/s

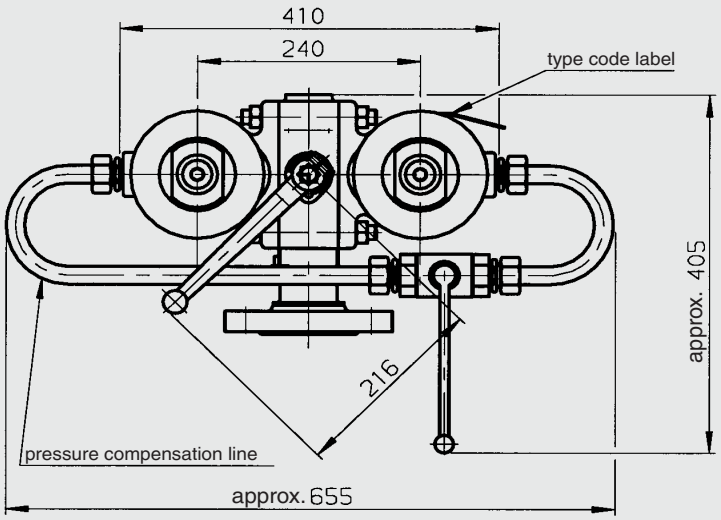
$\Delta p_{total} = \Delta p_{housing} + \Delta p_{element}$ = 0.35 bar

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

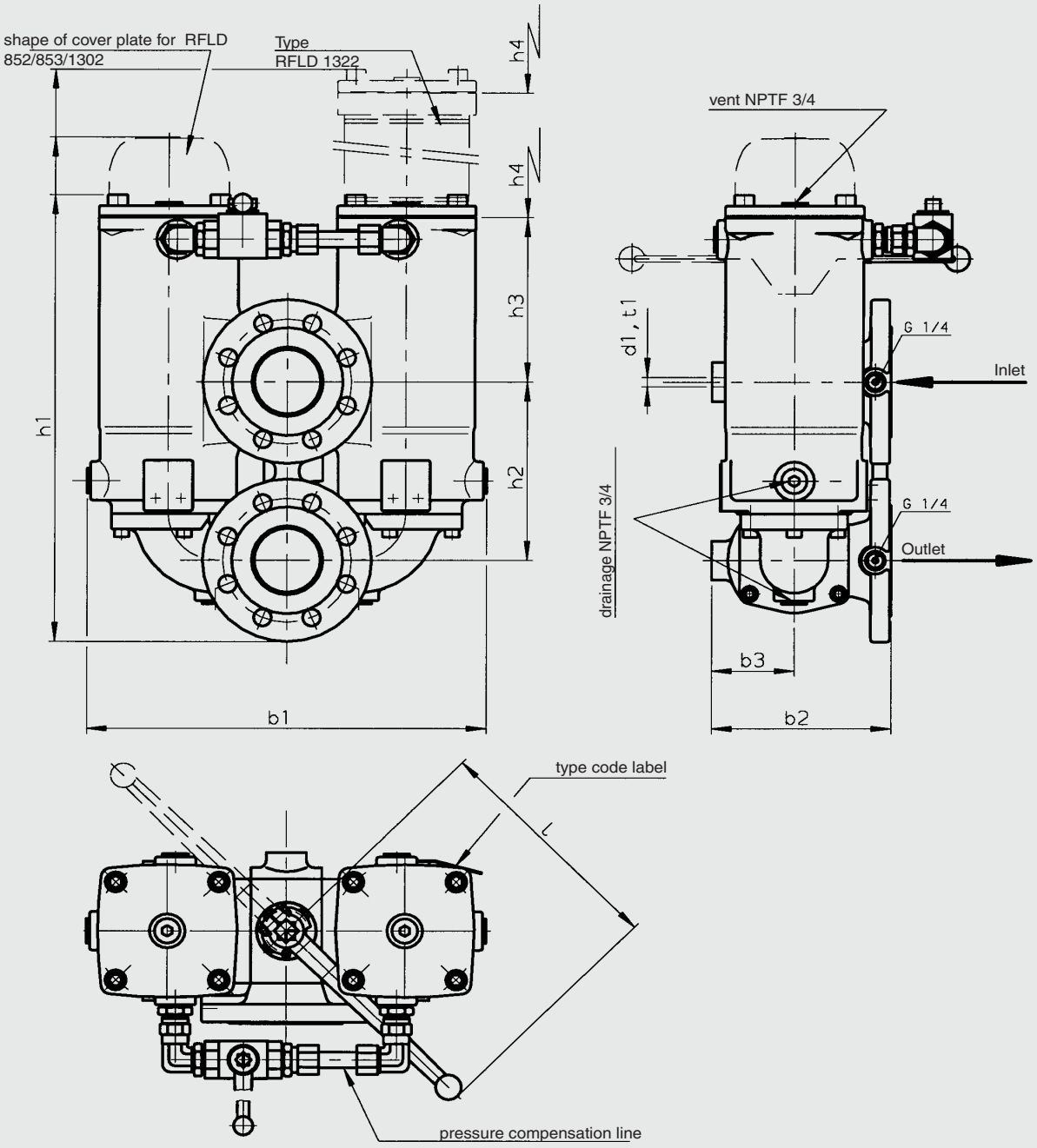
6. DIMENSIONS

6.1. RFLD 332/502/503





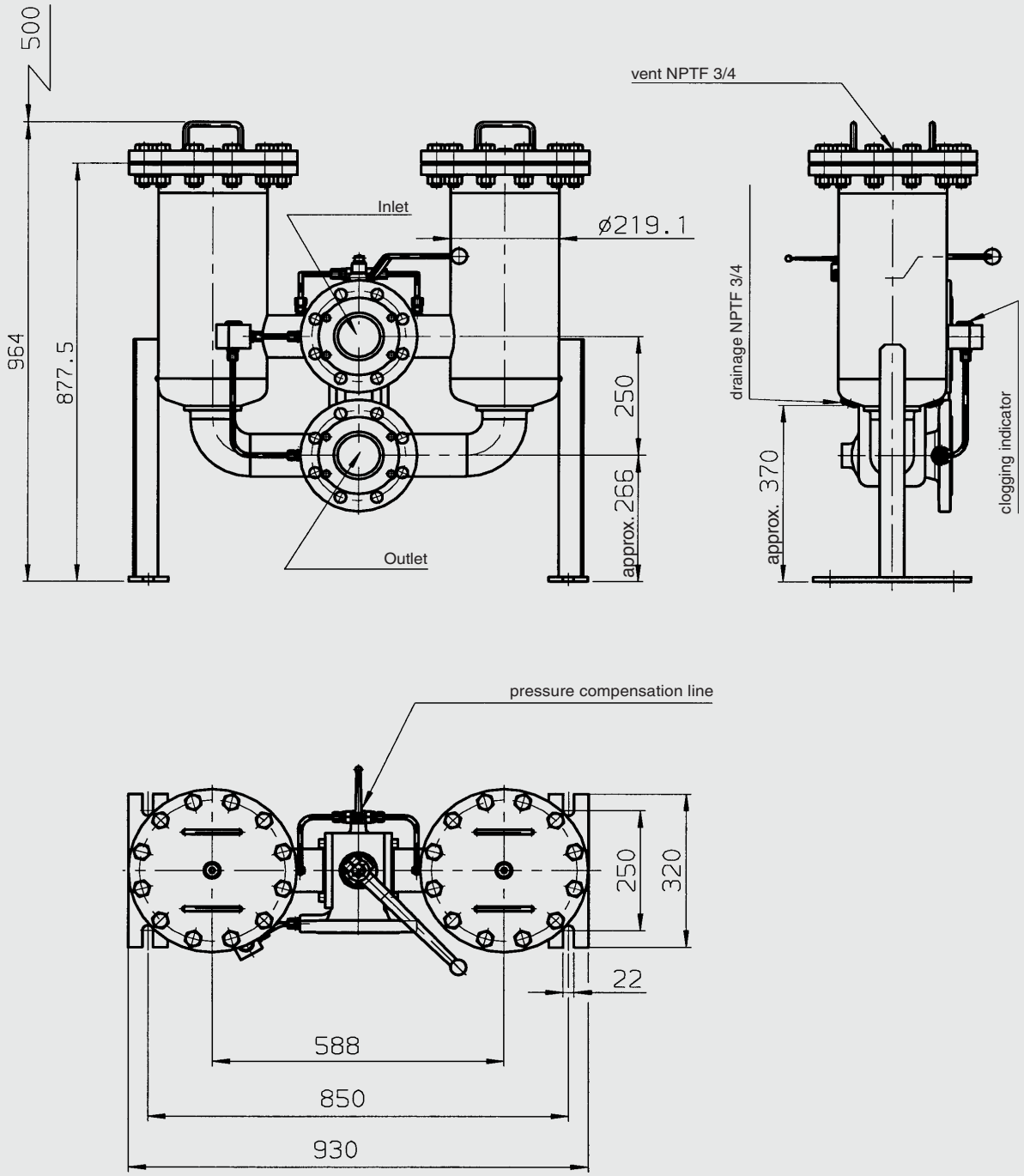
6.2. RFLD 662-1302, 853, 1322



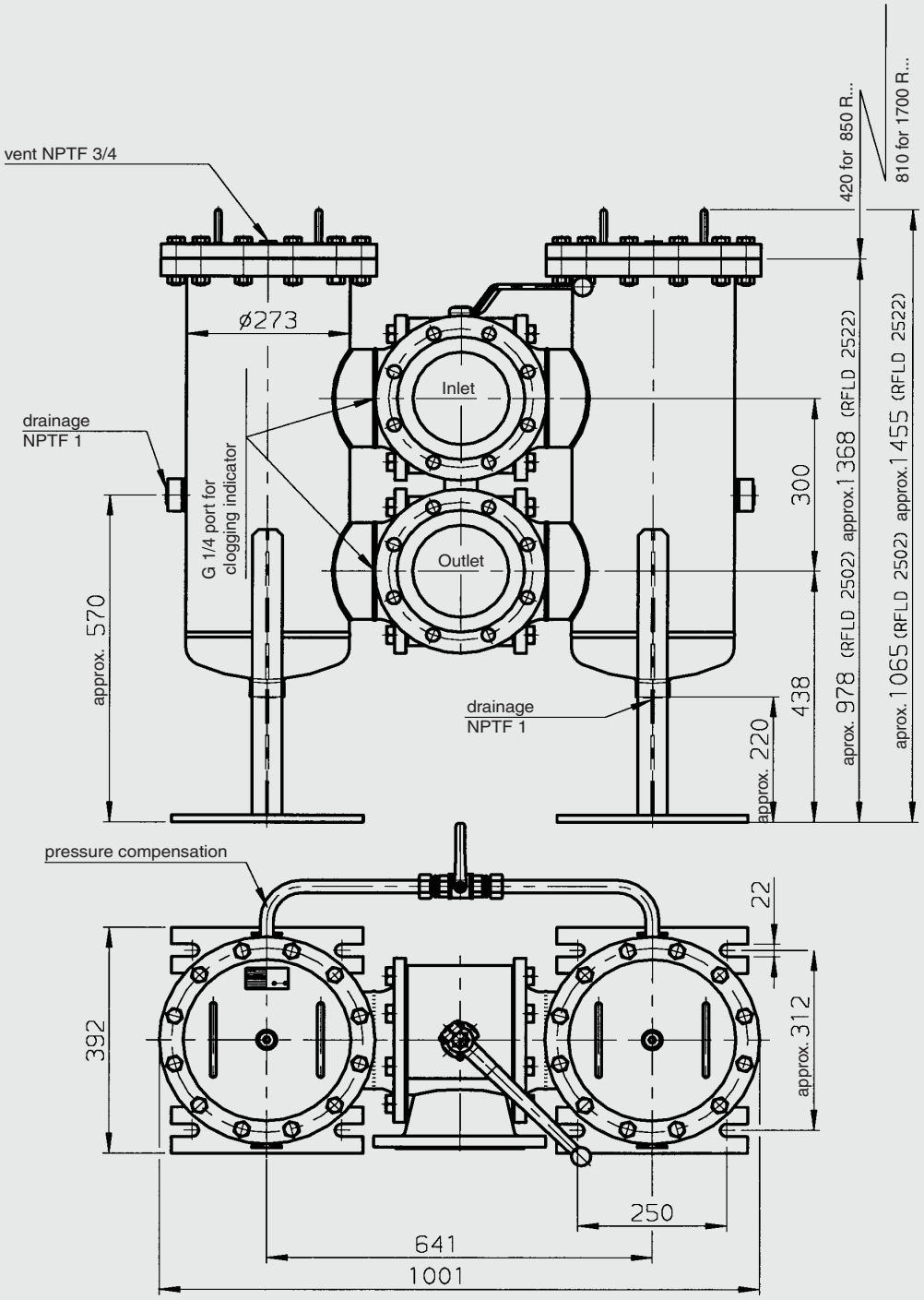
Dimensions in mm

Type	Flanged connection	b_1	b_2	b_3	h_1	h_2	h_3	h_4	h_5	l	M1(Nm)	d_1	t_1
662	DN 80 (3")	495	222	102	574	230	210	340	230	301	150	M12	23
852	DN 80 (3")	495	222	102	665	230	210	420	230	301	150	M12	23
853	DN 80 (3")	495	222	102	665	230	210	420	230	301	150	M12	23
952	DN 100 (4")	573	248	118	719	250	238	380	250	301	250	M16	17
1302	DN 100 (4")	573	248	118	819	250	238	490	250	301	250	M16	17
1322	DN 100 (4")	573	248	118	1200	250	238	930	250	301	250	M16	17

6.3. RFLD 1303


500
964
877.5
Inlet
ø219.1
250
approx. 266
Outlet
vent NPTF 3/4
drainage NPTF 3/4
approx. 370
clogging indicator
pressure compensation line
250
320
22
588
850
930

6.4. RFLD 2502/2522



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.