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Technical datasheet

FRP & GRP Filtration Equipment

Cartridge filter housings and pressure vessels in fibreglass-reinforced polyester, for RO pre-treatment, desalination, media filtration and process water.

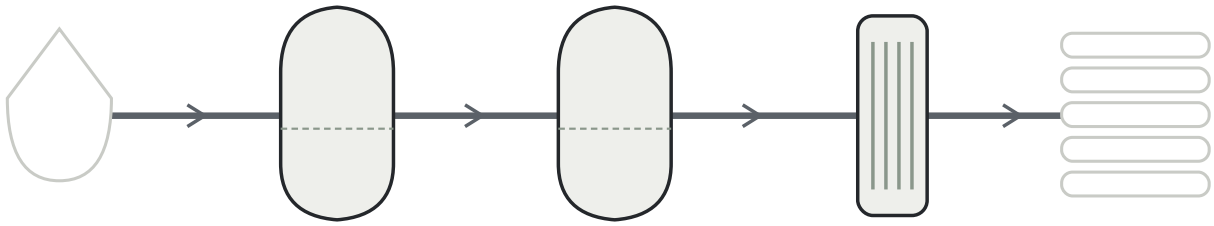
6 to 4,711	m^3/h through a single cartridge housing
10 bar	standard design pressure, higher on request
No metal	in contact with the water, so nothing to corrode

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Overview

One material, the whole pre-treatment line

Both product families are laminated from the same system: a vinyl-ester chemical barrier facing the water, backed by a glass-reinforced structural wall. Nothing rusts, nothing needs an internal lining, and performance holds in seawater, brine and chemically dosed water.



Where each product sits in a typical reverse-osmosis pre-treatment train. Equipment in this datasheet is drawn in solid line.

Cartridge filter housings

The last barrier before the membranes. Double-open-end cartridges held on rigid support rods with knife-edge seals.

Series	five, vertical and horizontal
Closures	quick-open or bolted flange
Flow	6 to 4,711 m^3/h per housing
Cartridges	3 to 673 per housing, 30″ to 70″
Range	standard models with full dimensions

Section 1, sheets 3 to 10

Pressure vessels

Vessels for granular media: multimedia and sand filters, activated carbon, softeners, ion exchange and remineralisation.

Layout	vertical or horizontal, dished heads
Sizing	engineered for each project
Internals	nozzle plates, laterals, distributors
Access	manholes, sight glasses, GRP nozzles
Supports	legs, skirt or saddles

Section 2, sheets 11 and 12

Common material data

Chemical barrier	vinyl-ester resin with C-glass or synthetic veil, FDA and NSF compliant
Structural wall	isophthalic polyester or vinyl-ester resin with E-glass or ECR-glass reinforcement
Design codes	ASME X, EN 13121-3, AD-Merkblatt 2000, AS 1210, per product and project
Drinking water	materials compliant with NSF/ANSI 61 and 372
Connections	GRP flat-face flanges drilled to EN 1092-1, ANSI on request
Finish	UV-resistant topcoat, RAL 7035 as standard or any RAL colour

Choosing a housing

The housings take universal double-open-end (DOE) cartridges. Each cartridge sits on a rigid support rod, the *sword*, with knife-edge seals at both ends: no bypass, no vibration damage, and a larger open flow area for lower pressure drop.

Shells are FRP throughout, so there is no coating to inspect and no corrosion allowance to design for. Closures are either bolt-free quick-open, for small housings changed often, or a single bolted flange for large diameters.

Design pressure	up to 10 bar (150 psi), higher on request
Design temperature	up to 85 °C (194 °F)
Codes	ASME X, EN 13121-3, AD 2000, AS 1210
Drinking water	NSF/ANSI 61-G and 372
Options	davit arm, swing bolts, GRP elbows
Engineering	seismic and wind calculations

Series selector

Series	Layout	Closure and flow path	Flow m^3/h	Cartridges	Lengths in	Best for
FH-VQ	Vertical	Quick-open, no bolts; side in, side out	**6 – 182**	3 – 70	30, 40, 50	Low flows, skids, frequent change-out
FH-HQ	Horizontal	Quick-open, no bolts; top nozzles	**14 – 228**	7 – 70	30, 40, 50	Low flows where headroom is limited
FH-VS	Vertical	Bolted top flange; side in, bottom out	**234 – 4,466**	90 – 638	40, 50, 70	Medium to high flows
FH-HS	Horizontal	Bolted end flange; side inlet	**234 – 4,466**	90 – 638	40, 50, 70	High flows in low buildings
FH-VB	Vertical	Body flange; bottom in, top out; cartridges lift out as one package	**260 – 4,711**	100 – 673	40, 50, 70	Large plants, shortest downtime (needs overhead crane)

Sizing rule

Design flow = cartridges × length in inches ÷ 10 × **0.65 m^3/h**. Maximum flow uses **1.00 m^3/h** per 10″. Example: 50 cartridges of 40″ give 50 × 4 × 0.65 = **130 m^3/h** design, 200 m^3/h maximum. Housings from DN 1700 up are engineered to order.

Vertical quick-open

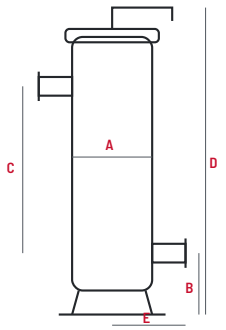
Small flows, fast changes. 6 to 182 m³/h, 3 to 70 cartridges.

VQ

Flow	6 – 182 m³/h
Pressure	up to 10 bar
Cartridges	3 – 70, DOE
Lengths	30, 40, 50 in
Mounting	anchoring brackets
Option	davit arm

A compact vertical housing whose closure opens without bolts. The closure itself is non-metallic, so the whole housing is corrosion-free, and a cartridge change takes minutes. Cartridges seat in a false-bottom plate and are clamped from above by a quick-release nut.

Product key **FH-VQ** followed by number of cartridges, cartridge length in inches and pressure rating, e.g. **FH-VQ 22-40 PN10**.



Schematic. Dimensions A to E in mm.

Model	Design flow m³/h	Max. flow m³/h	Cartridges	Length in / mm	N1/N2 DN	A	B	C	D	E
FH-VQ 3-30	6	9	3	30″ / 762	50	150	105	995	1,100	155
FH-VQ 3-40	8	12	3	40″ / 1,016	50	150	105	1,250	1,350	155
FH-VQ 3-50	10	15	3	50″ / 1,270	50	150	105	1,400	1,600	155
FH-VQ 5-30	10	15	5	30″ / 762	50	200	105	995	1,100	180
FH-VQ 5-40	13	20	5	40″ / 1,016	50	200	105	1,250	1,300	180
FH-VQ 5-50	17	25	5	50″ / 1,270	50	200	105	1,400	1,500	180
FH-VQ 7-30	14	21	7	30″ / 762	50	250	250	895	1,500	235
FH-VQ 7-40	19	28	7	40″ / 1,016	50	250	250	1,150	1,700	235
FH-VQ 7-50	23	35	7	50″ / 1,270	80	250	250	1,400	1,950	235
FH-VQ 12-30	24	36	12	30″ / 762	100	300	250	895	1,500	260
FH-VQ 12-40	32	48	12	40″ / 1,016	100	300	250	1,150	1,700	260
FH-VQ 12-50	39	60	12	50″ / 1,270	100	300	250	1,400	1,950	260
FH-VQ 22-30	43	66	22	30″ / 762	100	400	250	895	1,500	310
FH-VQ 22-40	58	88	22	40″ / 1,016	100	400	250	1,150	1,700	310
FH-VQ 22-50	72	110	22	50″ / 1,270	100	400	250	1,400	1,950	310
FH-VQ 35-30	69	105	35	30″ / 762	150	500	250	895	1,500	360
FH-VQ 35-40	91	140	35	40″ / 1,016	150	500	250	1,150	1,700	360
FH-VQ 35-50	114	175	35	50″ / 1,270	150	500	250	1,400	1,950	360
FH-VQ 50-30	98	150	50	30″ / 762	150	600	285	895	1,600	410
FH-VQ 50-40	130	200	50	40″ / 1,016	150	600	285	1,150	1,850	410
FH-VQ 50-50	163	250	50	50″ / 1,270	200	600	285	1,400	2,100	410
FH-VQ 70-30	137	210	70	30″ / 762	200	700	285	895	1,600	500
FH-VQ 70-40	182	280	70	40″ / 1,016	200	700	285	1,150	1,850	500

Design flow at 0.65 m³/h per 10″ of cartridge length, maximum at 1.00 m³/h per 10″. A heavier rule marks each change of shell size. Final sizing depends on feed water quality (SDI, TSS), micron rating and allowable pressure drop; dimensions are confirmed on the certified GA drawing issued with the order.

Horizontal quick-open

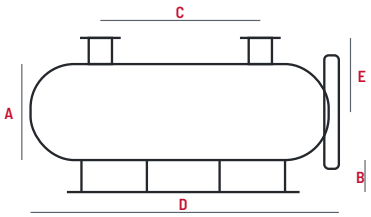
The quick-open housing laid down on saddles, for skids and low plant rooms. 14 to 228 m³/h.

HQ

Flow	14 – 228 m³/h
Pressure	up to 10 bar
Cartridges	7 – 70, DOE
Lengths	30, 40, 50 in
Mounting	saddles
Option	davit arm

The same bolt-free closure and sword support system as the vertical series, turned horizontal. Useful on skids and in plant rooms where there is no headroom to lift cartridges out of a vertical shell.

Product key **FH-HQ** followed by number of cartridges, cartridge length in inches and pressure rating, e.g. **FH-HQ 22-40 PN10**.



Schematic. Dimensions A to E in mm.

Model	Design flow m³/h	Max. flow m³/h	Cartridges	Length in / mm	N1/N2 DN	A	B	C	D	E
FH-HQ 7-30	**14**	21	7	30″ / 762	80	250	250	895	1,500	235
FH-HQ 7-40	**19**	28	7	40″ / 1,016	80	250	250	1,150	1,700	235
FH-HQ 7-50	**23**	35	7	50″ / 1,270	80	250	250	1,400	1,950	235
FH-HQ 12-30	**24**	36	12	30″ / 762	100	300	250	895	1,500	260
FH-HQ 12-40	**32**	48	12	40″ / 1,016	100	300	250	1,150	1,700	260
FH-HQ 12-50	**39**	60	12	50″ / 1,270	100	300	250	1,400	1,950	260
FH-HQ 22-30	**43**	66	22	30″ / 762	100	400	250	895	1,500	310
FH-HQ 22-40	**58**	88	22	40″ / 1,016	100	400	250	1,150	1,700	310
FH-HQ 22-50	**72**	110	22	50″ / 1,270	100	400	250	1,400	1,950	310
FH-HQ 35-30	**69**	105	35	30″ / 762	150	500	250	895	1,500	360
FH-HQ 35-40	**91**	140	35	40″ / 1,016	150	500	250	1,150	1,700	360
FH-HQ 35-50	**114**	175	35	50″ / 1,270	150	500	250	1,400	1,950	360
FH-HQ 50-30	**98**	150	50	30″ / 762	150	600	285	895	1,600	410
FH-HQ 50-40	**130**	200	50	40″ / 1,016	150	600	285	1,150	1,850	410
FH-HQ 50-50	**163**	250	50	50″ / 1,270	200	600	285	1,400	2,100	410
FH-HQ 70-30	**137**	210	70	30″ / 762	200	700	285	895	1,600	500
FH-HQ 70-40	**182**	280	70	40″ / 1,016	200	700	285	1,150	1,850	500
FH-HQ 70-50	**228**	350	70	50″ / 1,270	200	700	285	1,400	2,100	500

Design flow at 0.65 m³/h per 10″ of cartridge length, maximum at 1.00 m³/h per 10″. A heavier rule marks each change of shell size. Final sizing depends on feed water quality (SDI, TSS), micron rating and allowable pressure drop; dimensions are confirmed on the certified GA drawing issued with the order.

Vertical, side inlet

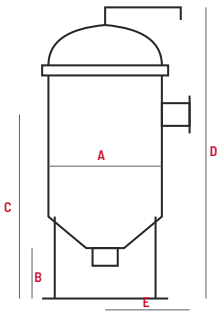
The workhorse for medium and high flows. 234 to 1,866 m^3/h standard, to 4,466 m^3/h engineered.

VS

Flow	234 – 4,466 m^3/h
Pressure	up to 10 bar
Cartridges	90 – 638, DOE
Lengths	40, 50, 70 in
Mounting	legs
Options	swing bolts, davit arm

A vertical shell on legs with a single bolted flange at the top, side inlet and bottom outlet. This is the usual choice for RO pre-treatment and desalination trains once flows pass a few hundred cubic metres an hour.

Product key **FH-VS** followed by number of cartridges, cartridge length in inches and pressure rating, e.g. **FH-VS 22-40 PN10**.



Schematic. Dimensions A to E in mm.

Model	Design flow m^3/h	Max. flow m^3/h	Cartridges	Length in / mm	N1/N2 DN	A	B	C	D	E
FH-VS 90-40	**234**	360	90	40″ / 1,016	250	800	690	1,825	2,795	640
FH-VS 90-50	**293**	450	90	50″ / 1,270	250	800	690	2,080	3,050	640
FH-VS 114-40	**297**	456	114	40″ / 1,016	250	900	690	1,845	2,915	700
FH-VS 114-50	**371**	570	114	50″ / 1,270	300	900	800	2,215	3,285	700
FH-VS 114-70	**519**	798	114	70″ / 1,778	350	900	900	2,825	3,890	700
FH-VS 135-40	**351**	540	135	40″ / 1,016	300	1,000	800	1,990	3,100	750
FH-VS 135-50	**439**	675	135	50″ / 1,270	300	1,000	800	2,245	3,355	750
FH-VS 135-70	**615**	945	135	70″ / 1,778	350	1,000	900	2,850	3,965	750
FH-VS 180-40	**468**	720	180	40″ / 1,016	300	1,100	800	2,065	3,205	850
FH-VS 180-50	**585**	900	180	50″ / 1,270	350	1,100	900	2,420	3,560	850
FH-VS 180-70	**819**	1,260	180	70″ / 1,778	400	1,100	1,010	3,040	4,175	850
FH-VS 215-40	**559**	860	215	40″ / 1,016	350	1,200	900	2,115	3,280	875
FH-VS 215-50	**699**	1,075	215	50″ / 1,270	350	1,200	900	2,370	3,530	875
FH-VS 215-70	**979**	1,505	215	70″ / 1,778	400	1,200	1,010	2,985	4,145	875
FH-VS 260-40	**676**	1,040	260	40″ / 1,016	350	1,300	900	2,115	3,290	925
FH-VS 260-50	**845**	1,300	260	50″ / 1,270	400	1,300	1,010	2,475	3,650	925
FH-VS 260-70	**1,183**	1,820	260	70″ / 1,778	450	1,300	1,115	3,085	4,260	925
FH-VS 295-40	**767**	1,180	295	40″ / 1,016	400	1,400	1,010	2,355	3,805	1,100
FH-VS 295-50	**959**	1,475	295	50″ / 1,270	400	1,400	1,010	2,610	4,060	1,100
FH-VS 295-70	**1,343**	2,065	295	70″ / 1,778	500	1,400	1,215	3,320	4,770	1,100
FH-VS 335-40	**871**	1,340	335	40″ / 1,016	400	1,500	1,010	2,365	3,800	1,150
FH-VS 335-50	**1,089**	1,675	335	50″ / 1,270	450	1,500	1,115	2,725	4,160	1,150
FH-VS 335-70	**1,525**	2,345	335	70″ / 1,778	500	1,500	1,215	3,330	4,765	1,150
FH-VS 410-40	**1,066**	1,640	410	40″ / 1,016	450	1,600	1,115	3,025	4,700	1,150
FH-VS 410-50	**1,333**	2,050	410	50″ / 1,270	500	1,600	1,215	3,355	5,040	1,150
FH-VS 410-70	**1,866**	2,870	410	70″ / 1,778	600	1,600	1,365	4,075	5,820	1,150

Design flow at 0.65 m^3/h per 10″ of cartridge length, maximum at 1.00 m^3/h per 10″. A heavier rule marks each change of shell size. Final sizing depends on feed water quality (SDI, TSS), micron rating and allowable pressure drop; dimensions are confirmed on the certified GA drawing issued with the order.

Horizontal, side inlet

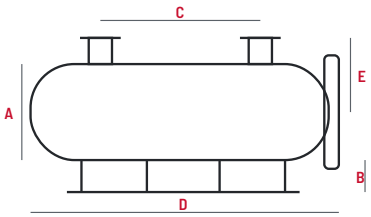
High flows in low buildings, with cartridge access from floor level.

HS

Flow	234 – 4,466 m³/h
Pressure	up to 10 bar
Cartridges	90 – 638, DOE
Lengths	40, 50, 70 in
Mounting	saddles
Options	swing bolts, davit arm

The side-inlet housing on saddles, with a single bolted end closure. Suits large flows where building height is limited, and lets operators change cartridges standing on the floor.

> Product key **FH-HS** followed by number of cartridges, cartridge length in inches and pressure rating, e.g. **FH-HS 22-40 PN10**.



Schematic. Dimensions A to E in mm.

Model	Design flow m³/h	Max. flow m³/h	Cartridges	Length in / mm	N1/N2 DN	A	B	C	D	E
FH-HS 90-40	**234**	360	90	40″ / 1,016	250	800	615	1,320	2,020	640
FH-HS 90-50	**293**	450	90	50″ / 1,270	250	800	615	1,320	2,275	640
FH-HS 114-40	**297**	456	114	40″ / 1,016	250	900	670	1,160	2,015	700
FH-HS 114-50	**371**	570	114	50″ / 1,270	300	900	670	1,415	2,270	700
FH-HS 114-70	**519**	798	114	70″ / 1,778	350	900	670	1,925	2,775	700
FH-HS 135-40	**351**	540	135	40″ / 1,016	300	1,000	725	1,190	2,110	750
FH-HS 135-50	**439**	675	135	50″ / 1,270	300	1,000	725	1,445	2,365	750
FH-HS 135-70	**615**	945	135	70″ / 1,778	350	1,000	725	1,950	2,875	750
FH-HS 180-40	**468**	720	180	40″ / 1,016	300	1,100	725	1,270	2,200	850
FH-HS 180-50	**585**	900	180	50″ / 1,270	350	1,100	725	1,520	2,455	850
FH-HS 180-70	**819**	1,260	180	70″ / 1,778	400	1,100	725	2,030	2,965	850
FH-HS 215-40	**559**	860	215	40″ / 1,016	350	1,200	825	1,215	2,185	875
FH-HS 215-50	**699**	1,075	215	50″ / 1,270	350	1,200	825	1,470	2,440	875
FH-HS 215-70	**979**	1,505	215	70″ / 1,778	400	1,200	825	1,975	2,950	875
FH-HS 260-40	**676**	1,040	260	40″ / 1,016	350	1,300	875	1,215	2,200	925
FH-HS 260-50	**845**	1,300	260	50″ / 1,270	400	1,300	875	1,470	2,450	925
FH-HS 260-70	**1,183**	1,820	260	70″ / 1,778	450	1,300	875	1,975	2,960	925
FH-HS 295-40	**767**	1,180	295	40″ / 1,016	400	1,400	985	1,410	2,475	1,100
FH-HS 295-50	**959**	1,475	295	50″ / 1,270	400	1,400	985	1,660	2,730	1,100
FH-HS 295-70	**1,343**	2,065	295	70″ / 1,778	500	1,400	985	2,170	3,240	1,100
FH-HS 335-40	**871**	1,340	335	40″ / 1,016	400	1,500	1,085	1,360	2,490	1,150
FH-HS 335-50	**1,089**	1,675	335	50″ / 1,270	450	1,500	1,085	1,610	2,740	1,150
FH-HS 335-70	**1,525**	2,345	335	70″ / 1,778	500	1,500	1,085	2,120	3,255	1,150
FH-HS 410-40	**1,066**	1,640	410	40″ / 1,016	450	1,600	1,177	1,915	3,260	1,150
FH-HS 410-50	**1,333**	2,050	410	50″ / 1,270	500	1,600	1,177	2,170	3,510	1,150
FH-HS 410-70	**1,866**	2,870	410	70″ / 1,778	600	1,600	1,177	2,675	4,020	1,150

Design flow at 0.65 m³/h per 10″ of cartridge length, maximum at 1.00 m³/h per 10″. A heavier rule marks each change of shell size. Final sizing depends on feed water quality (SDI, TSS), micron rating and allowable pressure drop; dimensions are confirmed on the certified GA drawing issued with the order.

Vertical, bottom inlet

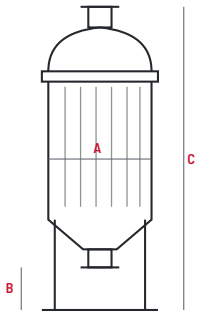
For large plants: all cartridges lift out together as one package. 260 to 4,711 m^3/h.

VB

Flow	260 – 4,711 m^3/h
Pressure	up to 10 bar
Cartridges	100 – 673, DOE
Lengths	40, 50, 70 in
Mounting	legs
Options	spare package, swing bolts

Bottom inlet, top outlet and a single body flange. The swords hang from an upper false plate and, with the guide plates, form one extractable filtering package. With a spare package on hand, a full change-out is a lift and a swap. An overhead crane is required.

Product key **FH-VB** followed by number of cartridges, cartridge length in inches and pressure rating, e.g. **FH-VB 22-40 PN10**.



Schematic. Dimensions A to C in mm.

Model	Design flow m^3/h	Max. flow m^3/h	Cartridges	Length in / mm	N1/N2 DN	A	B	C
FH-VB 100-40	**260**	400	100	40″ / 1,016	250	800	690	2,860
FH-VB 100-50	**325**	500	100	50″ / 1,270	250	800	690	3,120
FH-VB 121-40	**315**	484	121	40″ / 1,016	250	900	690	2,970
FH-VB 121-50	**394**	605	121	50″ / 1,270	250	900	690	3,220
FH-VB 121-70	**551**	847	121	70″ / 1,778	300	900	900	3,845
FH-VB 150-40	**390**	600	150	40″ / 1,016	300	1,000	800	3,180
FH-VB 150-50	**488**	750	150	50″ / 1,270	300	1,000	800	3,435
FH-VB 150-70	**683**	1,050	150	70″ / 1,778	350	1,000	900	4,045
FH-VB 195-40	**507**	780	195	40″ / 1,016	300	1,100	800	3,335
FH-VB 195-50	**634**	975	195	50″ / 1,270	350	1,100	900	3,690
FH-VB 195-70	**888**	1,365	195	70″ / 1,778	400	1,100	1,010	4,310
FH-VB 240-40	**624**	960	240	40″ / 1,016	350	1,200	900	3,400
FH-VB 240-50	**780**	1,200	240	50″ / 1,270	400	1,200	1,010	3,760
FH-VB 240-70	**1,092**	1,680	240	70″ / 1,778	450	1,200	1,115	4,370
FH-VB 280-40	**728**	1,120	280	40″ / 1,016	350	1,300	900	3,420
FH-VB 280-50	**910**	1,400	280	50″ / 1,270	400	1,300	1,010	3,780
FH-VB 280-70	**1,274**	1,960	280	70″ / 1,778	500	1,300	1,215	4,490
FH-VB 315-40	**819**	1,260	315	40″ / 1,016	450	1,400	1,010	3,925
FH-VB 315-50	**1,024**	1,575	315	50″ / 1,270	450	1,400	1,115	4,140
FH-VB 315-70	**1,434**	2,205	315	70″ / 1,778	500	1,400	1,215	4,750
FH-VB 360-40	**936**	1,440	360	40″ / 1,016	400	1,500	1,010	3,935
FH-VB 360-50	**1,170**	1,800	360	50″ / 1,270	450	1,500	1,115	4,290
FH-VB 360-70	**1,638**	2,520	360	70″ / 1,778	600	1,500	1,365	5,050
FH-VB 433-40	**1,126**	1,732	433	40″ / 1,016	450	1,600	1,115	4,490
FH-VB 433-50	**1,408**	2,165	433	50″ / 1,270	500	1,600	1,215	4,840
FH-VB 433-70	**1,971**	3,031	433	70″ / 1,778	600	1,600	1,365	5,550

Design flow at 0.65 m^3/h per 10″ of cartridge length, maximum at 1.00 m^3/h per 10″. A heavier rule marks each change of shell size. Final sizing depends on feed water quality (SDI, TSS), micron rating and allowable pressure drop; dimensions are confirmed on the certified GA drawing issued with the order.

Large-diameter housings

Shells from DN 1700 to DN 2000, engineered for each project. VS and HS share cartridge layouts and ratings.

FH-VS and FH-HS

Model	Cartridges	Length in	Shell Ø A mm	Design flow m^3/h	Max. flow m^3/h
FH-VS/HS 433-40	433	40″	1,700	**1,126**	1,732
FH-VS/HS 433-50	433	50″	1,700	**1,408**	2,165
FH-VS/HS 433-70	433	70″	1,700	**1,971**	3,031
FH-VS/HS 504-40	504	40″	1,800	**1,311**	2,016
FH-VS/HS 504-50	504	50″	1,800	**1,638**	2,520
FH-VS/HS 504-70	504	70″	1,800	**2,294**	3,528
FH-VS/HS 553-40	553	40″	1,900	**1,438**	2,212
FH-VS/HS 553-50	553	50″	1,900	**1,798**	2,765
FH-VS/HS 553-70	553	70″	1,900	**2,517**	3,871
FH-VS/HS 638-40	638	40″	2,000	**1,659**	2,552
FH-VS/HS 638-50	638	50″	2,000	**2,074**	3,190
FH-VS/HS 638-70	638	70″	2,000	**2,903**	4,466

FH-VB

Model	Cartridges	Length in	Shell Ø A mm	Design flow m^3/h	Max. flow m^3/h
FH-VB 470-40	470	40″	1,700	**1,222**	1,880
FH-VB 470-50	470	50″	1,700	**1,528**	2,350
FH-VB 470-70	470	70″	1,700	**2,139**	3,290
FH-VB 542-40	542	40″	1,800	**1,410**	2,168
FH-VB 542-50	542	50″	1,800	**1,762**	2,710
FH-VB 542-70	542	70″	1,800	**2,467**	3,794
FH-VB 590-40	590	40″	1,900	**1,534**	2,360
FH-VB 590-50	590	50″	1,900	**1,918**	2,950
FH-VB 590-70	590	70″	1,900	**2,685**	4,130
FH-VB 673-40	673	40″	2,000	**1,750**	2,692
FH-VB 673-50	673	50″	2,000	**2,188**	3,365
FH-VB 673-70	673	70″	2,000	**3,063**	4,711

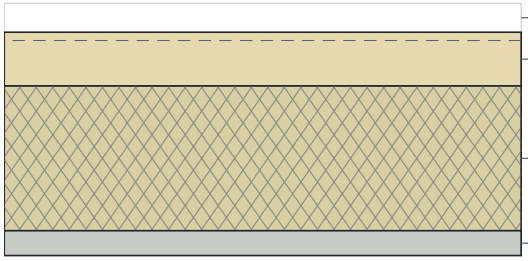
Overall dimensions and nozzle sizes for large-diameter housings are issued with the proposal.

Materials of construction

Standard materials by series. Alternatives on request.

Component	FH-VQ	FH-HQ	FH-VS and FH-VB	FH-HS
Shell / cap / main body	FRP	FRP	FRP	FRP
Supports	CS painted C5M / SS A2-A4 (brackets)	CS painted C5M / SS / FRP (saddles)	FRP / CS painted C5M / SS (legs)	CS painted C5M / SS / FRP (saddles)
Inlet / outlet flanges	FRP	FRP	FRP	FRP
Air vent	FRP / PP	FRP / PP	FRP	FRP
Clean & dirt drains	FRP / PP / PA	FRP / PP / PA	FRP	FRP
Deflector plate	FRP	FRP	FRP	FRP
Tube sheet	PVC / PPH / FRP	PVC / PPH / FRP	FRP	FRP
Guide plate	PVC / PPH	PVC / PPH	PVC / PPH	PVC / PPH
Lifting lugs	FRP / SS A2-A4	FRP / SS A2-A4	FRP / SS / CS C5M	FRP / SS / CS C5M
Body gaskets	EPDM	EPDM	EPDM	EPDM
Closure bolts	— (bolt-free)	— (bolt-free)	SS A2 / A4	SS A2 / A4
Davit arm (optional)	SS A2 / A4	SS A2 / A4	SS A2 / A4	SS A2 / A4
Cartridge element	PP	PP	PP	PP

CS carbon steel; SS stainless steel; C5M marine-grade coating system; PP polypropylene; PPH homopolymer polypropylene; PA polyamide; EPDM ethylene propylene diene rubber.



Wetted side: process water

Resin-rich chemical barrier
vinyl-ester resin with C-glass or synthetic veil; resists the water and chemicals

Structural wall
helically wound glass roving in isophthalic or vinyl-ester resin; carries the pressure

External topcoat
UV-resistant, RAL 7035 or any RAL colour

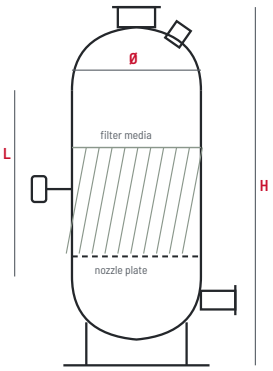
Shell wall section, not to scale. The same build-up is used for cartridge housings and pressure vessels.

GRP and FRP pressure vessels

Media filtration, activated carbon, softening and ion exchange, built to each project.

Layout	vertical or horizontal
Heads	torispherical or ellipsoidal
Size	diameter and height to suit
Pressure	6 or 10 bar, higher on request
Vacuum	rating on request
Temperature	to 60 °C, higher on request
Codes	ASME X, EN 13121-3

Filament-wound and hand-laid FRP vessels, delivered complete with internals and nozzles and ready for face piping. With no steel shell there is no rubber lining or epoxy coating to fail, which matters most in seawater, brackish water and chemically regenerated service.



Vertical media filter, schematic.

Internals

- FRP nozzle plate with PP or ABS strainers
- Header-lateral or hub-lateral collectors
- Inlet distributor or baffle plate
- Air-scour distribution for media filters
- Regenerant distributors for softeners and ion exchange
- Support gravel or direct-nozzle false bottom

Nozzles, access and supports

- GRP flanged nozzles to EN 1092-1 or ANSI B16.5
- Top and side manholes, typically DN 450 to 600
- Media fill and media removal nozzles
- Sight glasses for bed and backwash inspection
- Vent, drain and instrument connections
- Legs, skirt or saddles; FRP or SS lifting lugs

Typical design values by process

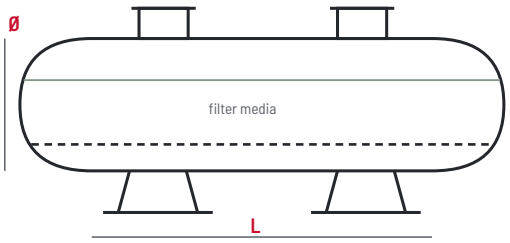
Process	Purpose	Velocity m/h	Bed depth m	Cleaning or regeneration
Multimedia / sand filtration	Turbidity, TSS and SDI reduction ahead of RO / UF	**10 – 15 (≤ 20)**	0.9 – 1.2	Water + air scour
Activated carbon	Dechlorination, organics, taste & odour	**8 – 15**	1.0 – 1.5	Water
Softening (cation exchange)	Hardness removal	**10 – 30**	≥ 0.8	Regeneration with brine
Iron & manganese removal	Catalytic / oxidizing media	**8 – 15**	0.8 – 1.2	Water (+ air)
Demineralization (cation / anion)	Ion removal for process & boiler water	**15 – 30**	≥ 1.0	Acid / caustic regeneration
Calcite / remineralization	pH & hardness correction of permeate	**per contact time**	per design	Periodic top-up

Industry ranges for preliminary selection. Final sizing follows the raw-water analysis, media supplier data and the required run length.

Sizing by diameter

Filtration area needed = design flow ÷ filtration velocity.

Worked example. 120 m^3/h at 12 m/h needs 10 m^2 of bed. That is one vessel of Ø 3,600 mm, or two duty vessels of Ø 2,600 mm at 5.3 m^2 each. Splitting the flow keeps water moving while one vessel backwashes, and keeps each shell easier to ship.



Horizontal vessel, schematic.

Internal Ø mm	Bed area m^2	at 8 m/h m^3/h	at 10 m/h m^3/h	at 15 m/h m^3/h	at 20 m/h m^3/h	at 30 m/h m^3/h
Ø 600	**0.28**	2	3	4	6	8
Ø 800	**0.50**	4	5	8	10	15
Ø 1,000	**0.79**	6	8	12	16	24
Ø 1,200	**1.13**	9	11	17	23	34
Ø 1,400	**1.54**	12	15	23	31	46
Ø 1,600	**2.01**	16	20	30	40	60
Ø 1,800	**2.54**	20	25	38	51	76
Ø 2,000	**3.14**	25	31	47	63	94
Ø 2,200	**3.80**	30	38	57	76	114
Ø 2,600	**5.31**	42	53	80	106	159
Ø 3,000	**7.07**	57	71	106	141	212
Ø 3,600	**10.18**	81	102	153	204	305

Calculated as area = $\pi \cdot Ø^2/4$ × velocity. This is a reference grid, not a model list: available diameters, shell lengths and nozzle layouts are confirmed with each inquiry.

For a quotation, send	process and water analysis; design flow and number of duty and standby vessels; operating and design pressure; preferred diameter or height limit; media and bed depth if known; internals and nozzle preferences; supports and site conditions; quantity and delivery date.

References

Supplied and installed

FRP and GRP vessels and housings from recent Elsafa projects.







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