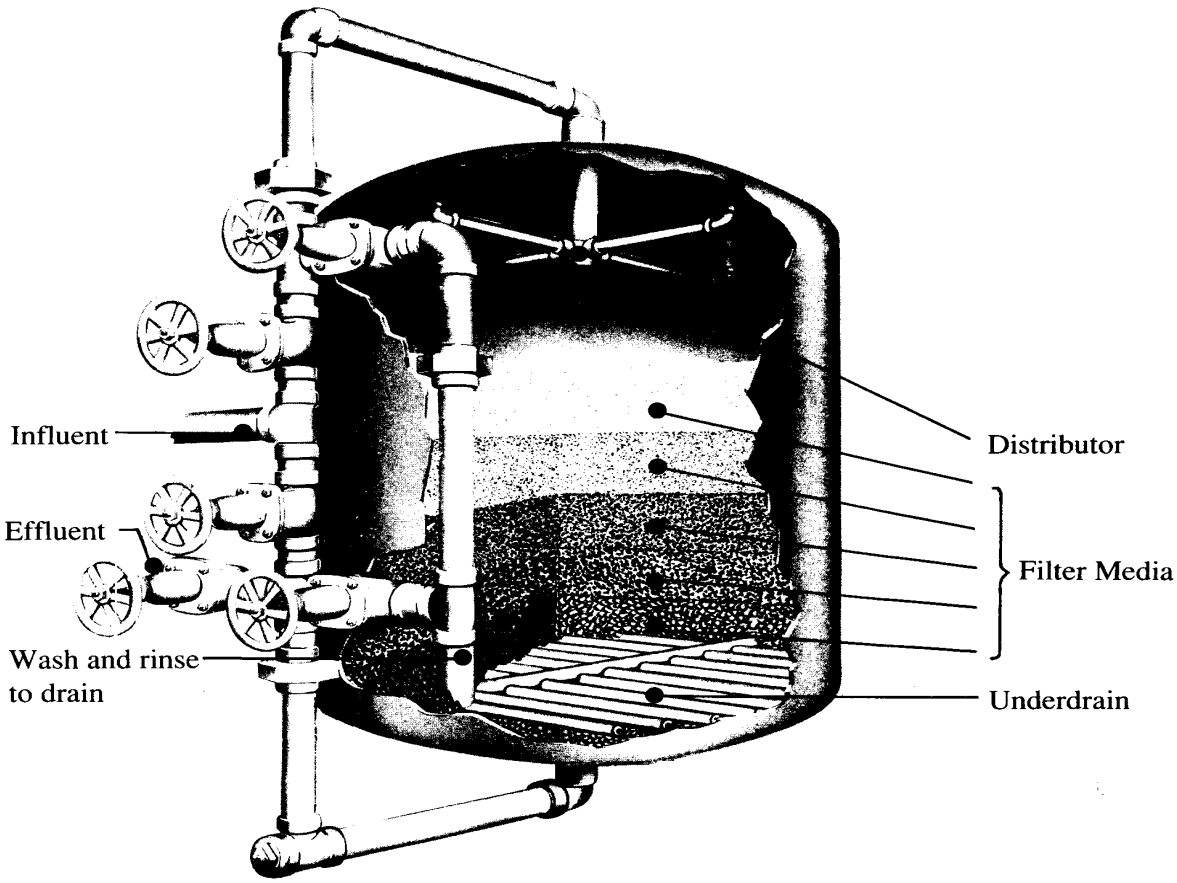
HYDREX
WATER & WASTE TREATMENT

Bulletin No.113-02-R3

HP-PRESSURE FILTER

For high performance Filtration application

For removal of dirt, turbidity, suspended solids, iron, foul taste and color from water.



Hydrex Pressure Filters are custom designed in order to offer a most efficient and economical method of removing dirt, turbidity, iron, color and suspended impurities from water. Depending on the source of the water and the impurities to be removed, a Hydrex Pressure Filter can be installed to filter raw water, chemically treated water, or coagulated water after clarification.

A complete range of sizes, types and optional items is available in vertical or horizontal design containing high quality granular media to meet your most stringent water quality requirements.

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How The Filter Works

A Pressure Filter consists of a cylindrical tank with support legs, distribution and collection system, manhole, pressure gauges and sampling valves, operating valves, flowrate indicators, piping and filter media.

Water, under pressure, enters the tanks through the inlet diffuser at the top and proceeds downward through the media. Suspended solids are trapped by the upper layer of the filter bed and the clear water is collected uniformly at the bottom through the underdrain system.

Underdrain

An underdrain of false bottom with strainer nozzles, or header – lateral pipe system, is located below the filter media and acts to collect filtered water. Hydrex filter have been designed to keep the filter bed operating at its maximum efficiency.

Operating Valves

All filtering functions such as normal operation, backwashing and rinsing are controlled by the proper operation of the valves. Models are available with individual valves or a multiport valve for manual or automatic operat.

Backwashing

Backwashing is very simple with pressure Filters. It is accomplished by reversing the flow and directing the water upward through the media. Backwash water enters the filter through the underdrain system amd flows upward, expands the media then carries the dirt to the diffuser and goes down the wash pipe to the drain. Because suspended solids are trapped on the top layer of the filter media, backwashing with water at proper rate and duration simply flush the deposits off and to be carried over to the drain.

Instrumentation

Two 100 mm dial pressure gauges are provided for monitoring of the pressure loss through the media bed and to determine backwash.
One flowrate inicator, continuous or impact type, shall be provided to monitor the service, backwash and rinse flowrates.

Optional items

Tank Construction:
Weld steel tank with or without lining are available. The type of lining and design working pressure to be specified at time of order. Fiberglass tanks are also available for smaller tanks.

Air Souring:
Depending the type and amount of chemicals used for coagulation, the precipitate and dirt may stick the granular media together to form mud balls and lumps on the top of a filter bed. This condition reduce the fitration efficiency of the filter. Compressed air can be introduced at the bottom of a filter through suitable device, valves and special underdrain system to break down the lumps and scoure the media before backwashing.

Strainers for steam sterilization:
Either low cost high temperature plastic or SS 316 strainers can be supplied.

Automatic backwash initiation devise:
Pressure differential switch and/ or programmable timer can be provided for un-manned operation.

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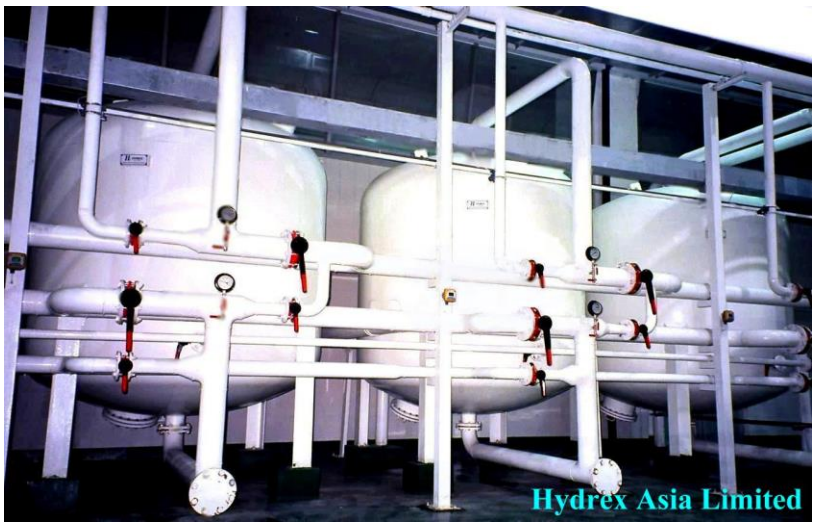
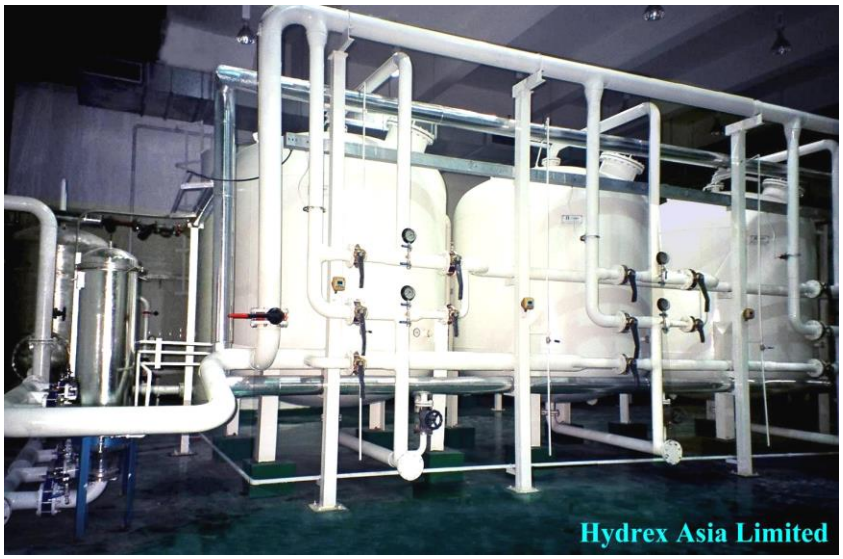


2.5m Diameter multi media filters with air scouring device for R/O system pre-treatment.

Filter arrays for one of the largest soft drink bottling plants in the world.



2.3m activated carbon purifiers with stanless steel cartridge polishing filters for high quality potable water treatment.

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Filter Media Types

Sand

Standard Filter media consists of fine and medium grade of spherical silica sand, with or without a support bed of graded gravel. Other types of filter media are also available from Hydrex to satisfy and process requirement.

Multi-Media

In order to increase dirt holding capacity and to incease particales removal efficiecy, different types and sizes of media can be placed in layers inside a filter to obtain the desirable filtration effect.

Carbon

The Pressure Filter can be adapted for the removal of free chlorine, taste, and odor and dissolved organic contaminants from water by using activated carbon as the filter media. Only suitable type activated carbon with long life and high capacity is used in Hydrex Carbon filters.

Anthracite

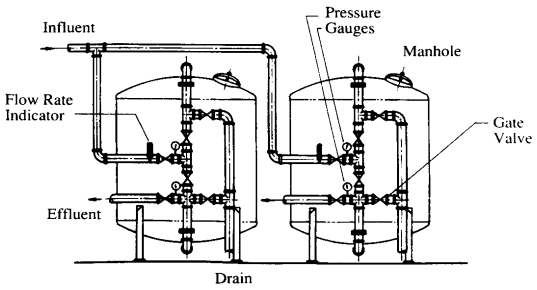
When silica pick-up is undesirable or deep bed filtration is called for, the sand bed is replaced or topped with anthracite, a non-siliceous material that is as efficient as sand, but lighter in weight so it can be backwashed at lower rates.

Calcite

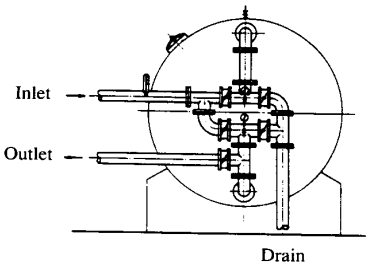
For the correction of low pH water, granular calcite (calcium carbonate) over a graded gravel support bed is used. This process automatically increases the pH to slightly above 7 to prevent corrosion. Periodically the calcite bed should be replenished.

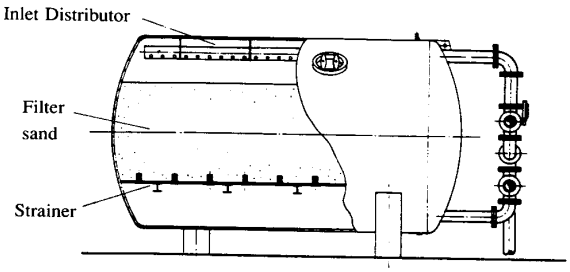
General Arrangement

Vertical Filter



Horizontal Filter





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1.8m diameter automatic silica sand filters for a food processing factory.

2.0m diameter automatic activated carbon purifiers with steam sterilization system.

2.4m diameter automatic horizontal filters for an industrial park water supply system.

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Selection Table ~ Vertical Filter

TANK DIAMETER		FILTER AREA		SERVICE FLOW RATE						BACKWASH RATE				OPERATING WEIGHT
				GPM			M³/HR			GPM		M³/HR		
in	m	ft²	m²	3 gpm/ft²	4gpm/ft²	5 gpm/ft²	7.5 m³/m²/hr	10m³/m²/hr	12.5 m³/m²/hr	Sand	Carbon	Sand	Carbon	m tons
30	0.76	4.9	0.45	15	20	25	3.4	4.5	5.7	60	29	14	6.6	1.3
36	0.91	7.0	0.65	21	28	35	4.9	6.5	8.2	85	42	20	9.5	2.1
42	1.07	9.7	0.90	29	39	49	6.8	9.0	11.3	115	58	27	13.2	2.7
48	1.22	12.6	1.16	38	50	63	8.7	11.6	14.5	150	75	35	17.0	3.3
54	1.37	15.9	1.47	48	63	80	11.0	14.7	18.4	190	95	44	21.6	4.7
60	1.52	19.5	1.81	59	78	98	13.6	18.1	22.7	235	117	54	26.6	6.0
66	1.67	23.8	2.19	72	95	119	16.4	21.9	27.4	285	143	66	32.5	7.3
72	1.83	28.3	2.63	85	113	142	19.7	26.3	32.9	340	170	79	38.6	8.7
78	1.98	33.1	3.08	100	133	166	23.1	30.8	38.5	400	199	93	45.2	10.5
84	2.13	38.4	3.56	115	153	192	26.7	35.6	44.5	460	230	107	52.3	12.3
90	2.29	44.3	4.12	135	177	222	30.9	41.2	51.5	530	266	124	60.5	14.5
96	2.44	50.3	4.68	151	201	252	35.1	46.8	58.5	600	302	140	68.6	16.8

Vertical filter tanks are from 3’ to 5’ in straight height.

Selection Table ~ Horizontal Filter

TANK STR LENGTH		FILTER AREA		SERVICE FLOW RATE						BACKWASH RATE				OPERATING WEIGHT
				GPM			M³/HR			GPM		M³/HR		
ft	m	ft²	m²	3 gpm/ft²	4gpm/ft²	5 gpm/ft²	7.5 m³/m²/hr	10m³/m²/hr	12.5 m³/m²/hr	Sand	Carbon	Sand	Carbon	m tons
11	3.4	103	9.7	309	412	515	73	97	121	1200	600	300	150	49
12	3.7	111	10.4	333	444	555	78	104	130	1300	650	320	160	52
13	4.0	119	11.2	357	476	595	84	112	140	1400	700	340	170	55
14	4.3	127	11.9	381	508	635	89	119	149	1500	750	360	180	58
15	4.6	135	12.6	405	540	675	95	126	158	1600	800	380	190	61
16	4.9	143	13.4	429	572	715	101	134	168	1700	850	400	200	64
17	5.2	151	14.1	453	604	755	106	141	176	1800	900	420	210	67
18	5.5	159	14.8	477	636	795	111	148	185	1900	950	450	225	70
19	5.8	167	15.5	501	668	835	116	155	194	2000	1000	470	235	73
20	6.1	175	16.3	525	700	875	122	163	204	2100	1050	490	245	76
21	6.4	183	17.0	549	732	915	128	170	213	2200	1100	510	255	80
22	6.7	191	17.7	573	764	955	133	177	221	2300	1500	530	265	83

All horizontal filter tanks are 2.4 m (8’) in diameter.

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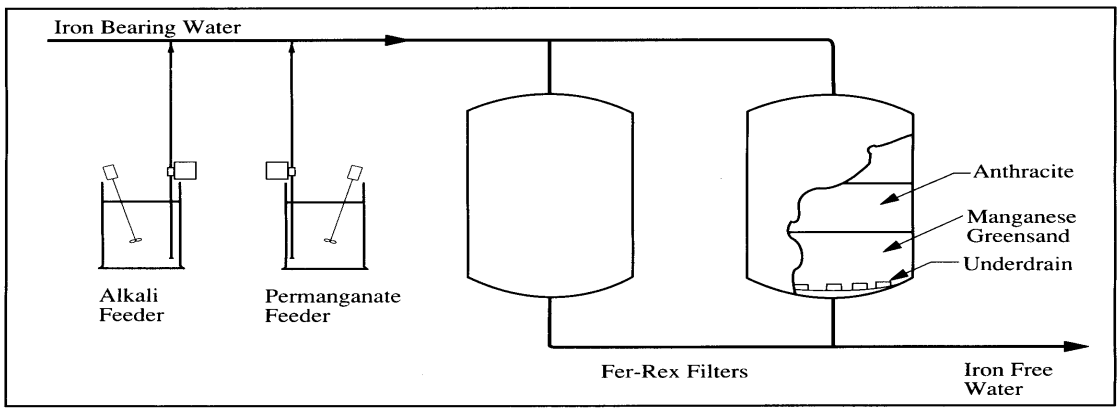
Iron Removal Filters

Oxidation is required to remove dissolved iron, manganese or hydrogen sulphide from water. The Hydrex Fer-Rex system utilizes potassium permanganate as the primary oxidizing agent, plus a filter bed of anthracite and manganese greensand. The permanganate completely oxidizes the contaminants to an insoluble precipitate before contact with the filter bed. If the permanganate is insufficient for complete oxidation, the greensand acts as ion exchanger for removal of any residual dissolved iron or manganese in addition to its function as a filter. Alternatively, it will regenerate the greensand bed. Some iron bearing waters may require the addition of a small quantity of alkali to adjust the pH and aid iron and manganese precipitation. Water treated by the Fer-Rex system is clean and clear and essentially free of suspended or dissolved iron and manganese

Backwashing occurs in the normal manner, except that filtered water must be used to prevent any precipitation and clogging of the strainer nozzles or contamination of the effluent.

Fer-Rex is an extremely low-cost-system – than 50% of the initial cost of a conventional aeration type system. It is simple to operate, requires a minimum of maintenance and produces a superior effluent.

Typical Layout ~Fer-Rex Iron Removal System



FOR FURTHER INFORMATION

A full range of water and wastewater treatment systems and equipment are available from Hydrex. For further information, please contact us or our authorized agent.

Authorized Agent:

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