SATHYA SAI PRESSURE SAND FILTERS

GENERAL DESCRIPTION

The Vertical air scoured pressure sand filters are supplied in standard sizes from 1800 to 2700 m.m. diameter. The filter shell is coated internally with anti-corrosive paint before despatch. The filter bed is supported on a mild steel nozzle plate welded in position, reinforced with heavy tie bars to the bottom dome and is fitted with domed air-scour type nozzles, which are fully resistant to corrosion. The nozzle plate is provided with tapped holes for fixing the nozzles. The filter has to be charged with media to be ready for operation.

AIR SCOUR SUPPLY

Air for scouring the filter is required at a pressure of 0.35 bars and at the rate of about 6.5 litre/sec/sq. meter of free air of filter bed. Air is usually provided by a motor driven centrifugal air blower designed to deliver the required quantity of air at the required pressure.

WASH WATER SUPPLY

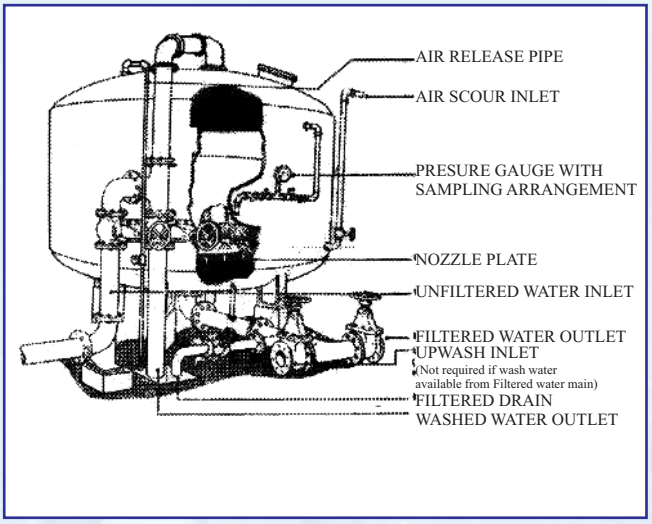
In a water supply system, if the filtered water from the pressure filter is received in an overhead reservoir, the wash water can be drawn from the reservoir directly Care should be taken to see that the residual head of water for back washing does not exceed 6 meters, when measured above filter floor level. Where the Installation consists of three or more filters, cleaning can be carried out without drawing from the reservoir, the discharge from two or more filters in operation providing the necessary upwash.

CONTROL VALVES

The valves for inlet, outlet, washout, upwash, air and drain are provided together with terminal pipe connections. The grouping of the valves usually follows an established pattern but it can be arranged to suit a particular layout of the plant. The mains connecting together a battery of filters can be above floor or in a covered trench. Normally the dirty washed water is discharged into an open sump or waste channel, so that it can be seen, but the discharge can be piped directly to waste, if this is preferred.

FILTER BED CLEANING

The standard filter bed usually has a total depth of 750 mm. and the grading of the sand and /or other material is selected according to the working conditions. The operation of cleaning the filter bed is by closing the inlet and outlet valves, and opening the washout valves and turning on the air scour for 3 to 5 minutes followed by upwash for 5 to 8 minutes according to conditions.



NOTE : Filters of 1500 mm. diameter and below are usually supplied with manually operated stirrer gear instead of air scour.

SATHYA SAI AQUA PURA SERVICES

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HORIZONTAL TYPE FILTERS

In installations where a large number of vertical filters would otherwise be required considerable advantage is obtained by using Sathya Sai horizontal filters. These are all 2.4 mtrs. in diameter in lengths up to 9 mtrs; one unit of this size has the same filter area as four 2.4 mtrs. diameter vertical filters.

The steel filter shell conforms with the recognized specifications for plate thickness and method of construction. Each shell is tested hydraulically and coated internally with anti-corrosive paint before despatch from Works. If required it can be shipped plate small for welding on site.

In the horizontal filter, it is not convenient to use a steel nozzle plate and a floor system generally similar to the Sathya Sai gravity filter is employed. A diagrammatic illustration is shown in fig. 2. The front domed end has a connection which serves both for admitting unfiltered water and letting out used washwater from the compartment formed by the vertical weir plate. The outlet connection on the underside of the cylinder serves for discharge of filtered water, the admission of upwash. and for draining out. The air scour is admitted through a pipe connecting to the internal air header. An air release automatic ball type or hand operated, is provided in the top of the cylinder.

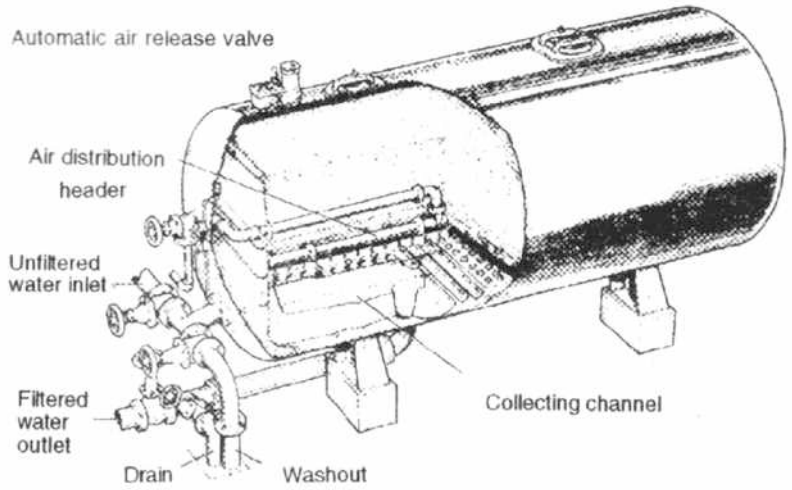
A pressure gauge is fitted on the front of the shell, connected through a four-way single lever valve to the inlet and outlet, to indicate the filtering head loss. A nozzle discharge is also provided for drawing samples of unfiltered and filtered water.

The standard filter bed has a total depth of 1 mtrs. and the grading of the sand is selected according to the working conditions.

It should be noted that in the Sathya Sai design, the width of the filter floor is the same as the width of the surface of the bed and represents the true filtering area provided by a horizontal type filter.

The operation of cleaning the filter bed is by closing inlet and outlet, opening washout, turning on air scour for 5 minutes followed by upwash for 5 to 8 minutes according to conditions.

Fig. 2
Sectional view of Sathya Sai horizontal type pressure filter.



CHOICE OF SITE FOR PRESSURE FILTERS

The main factors to be taken into consideration when selecting the site for a pressure filter installation are :

1 The pressure of the water at the site; the higher the pressure above 4.2 kg/cnr the greater the cost of the filters.
2 The conditions that will occur when filters are being washed and the arrangements for providing the wash-water as — referred to previously.
3 The availability of electricity supply.
4 The availability of sufficient head for filtration and friction in station pipework—usually 4.5 mtrs. to 6 mtrs.
5 The control of flow through the plant.
6 The avoidance of the filters being subjected to a negative head.

CONTROL OF FLOW THROUGH PRESSURE FILTER PLANT

Generally, the hydraulic conditions will come under one of three categories :

1. Pumping schemes where the water is pumped through the filters to a reservoir at a higher level.
2. Gravitation scheme where the water flows by gravity through the filters into a reservoir which may be at a higher or lower level than the plant.
3. Gravitation schemes where the water flows by gravity through the filters and the rate fluctuates due to the demand of services connected direct to the main.

In 1 the flow will normally be at a constant rate go\-erned by the pump output except for variation due to the effects of the filtering head loss.

In 2 the flow through the plant will very likely be governed by the setting of a valve in the main and will be practically constant as in 1.

In 3 it is recommended that wide fluctuations should be avoided and consideration would need to be given to each individual case.