



OSMO ASIA PACIFIC LTD.

Ultrafiltration Hollow Fiber Systems Large Capacities

Applications:

- **Pre-treatment**
- **Primary Treatment**
- **Final Polishing**

**Self-contained Systems Modular
Process Units**

System Capacities:

- Standard 10 to 70 M³/H
- Custom designs for higher flows available

Product Water Quality:

- Removes virtually all particulates above 0.05 micron

Process Design Features:

- Single-pass at 95% recovery
- Fast flush
- Backwash
- Clean-In-Place (CIP)

Osmo Asia Pacific (OAP) Ultrafiltration Technology

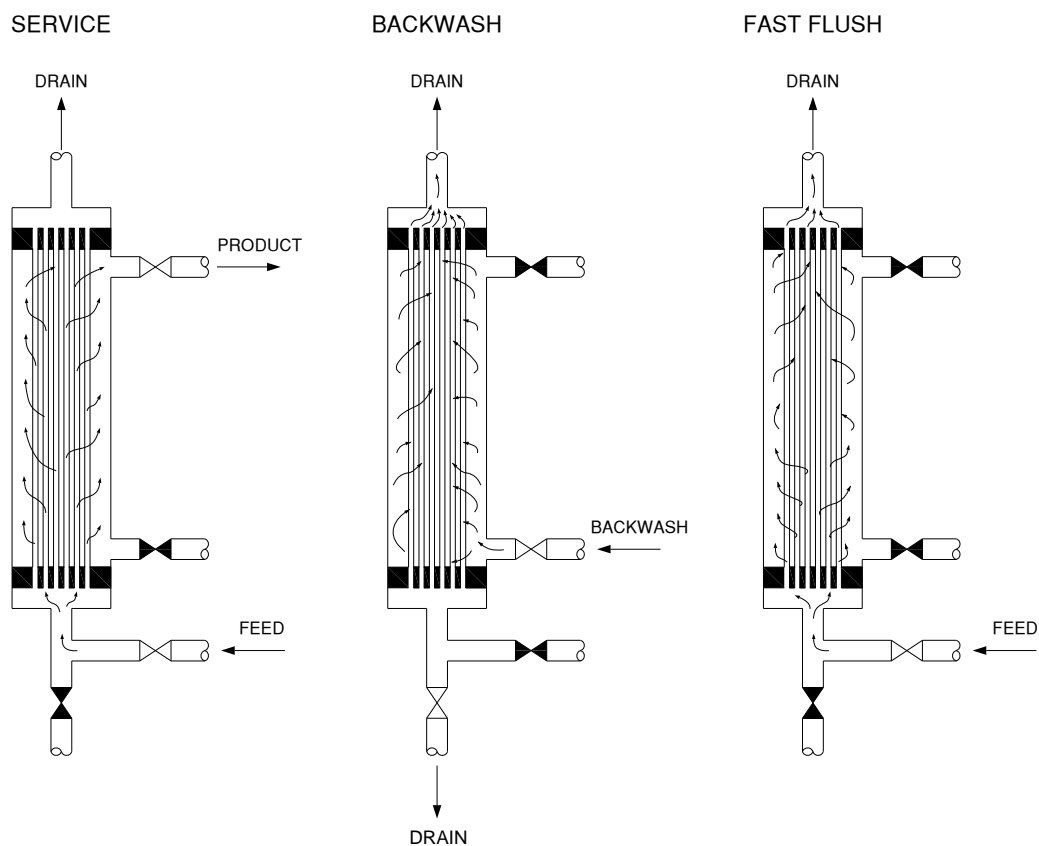
OAP Hollow Fiber Ultrafiltration Systems incorporate our OAPmod60-9 hollow fiber permeable membrane filter modules with 9 in. (23 cm) diameters or other modules as specified.

In designing total custom made systems, we are able to consult with managers, engineers and operating personnel for proper assessment of Ultrafiltration requirement.

Before recommending any Ultrafiltration machines, OAP engineers consider the feed water analysis and the desired water quality to be produced. Organic molecular weight and colloid content must be considered because they significantly affect the Ultrafiltration membranes and it will ultimately determine the machine efficiency.



Typical Ultrafiltration machines with OAPmod60-9 elements, arrange in two trains complete with backwash pump(s).



Modules operate in three modes: 1) single-pass ultrafiltration 2) backwash 3) fast-flush

Module Design

The ultrafilter module is a PVC cylinder with clamped noryl end pieces providing inlet and outlet ports on the shell for both process fluid and permeate. This shell is resistant to impact, temperature, chemicals and protects the inner core of PVC fibers. An epoxy potting compound secures the membrane bundle at each end of the module and separates collected permeate from process fluid.

Single-pass

For single-pass processing, water is fed into the lower inlet port of the module and enters the lumen* of each fiber in the bundle. As water flows through the bundle and exits through the upper outlet port, permeate is forced through the membrane fiber walls into the bundle shell while impurities collect along the membrane surface. Pore size of the hollow fiber material is approximately 0.05 micron, and the nominal molecular weight cut off is 100,000. Therefore, the permeate is free of all colloidal, particulate and higher molecular weight matter.

Backwash

Following service, backwashing will be necessary to clean the membrane surface of debris which may build up. To clean the membrane, permeate is forced back through the fiber under pressure. The motive being a backwash pump with an outlet pressure adjusted at approximately one and a half bar. Permeate port is closed; both backwash inlet and drain ports are open, creating a flushing action which carries solids away to drain.

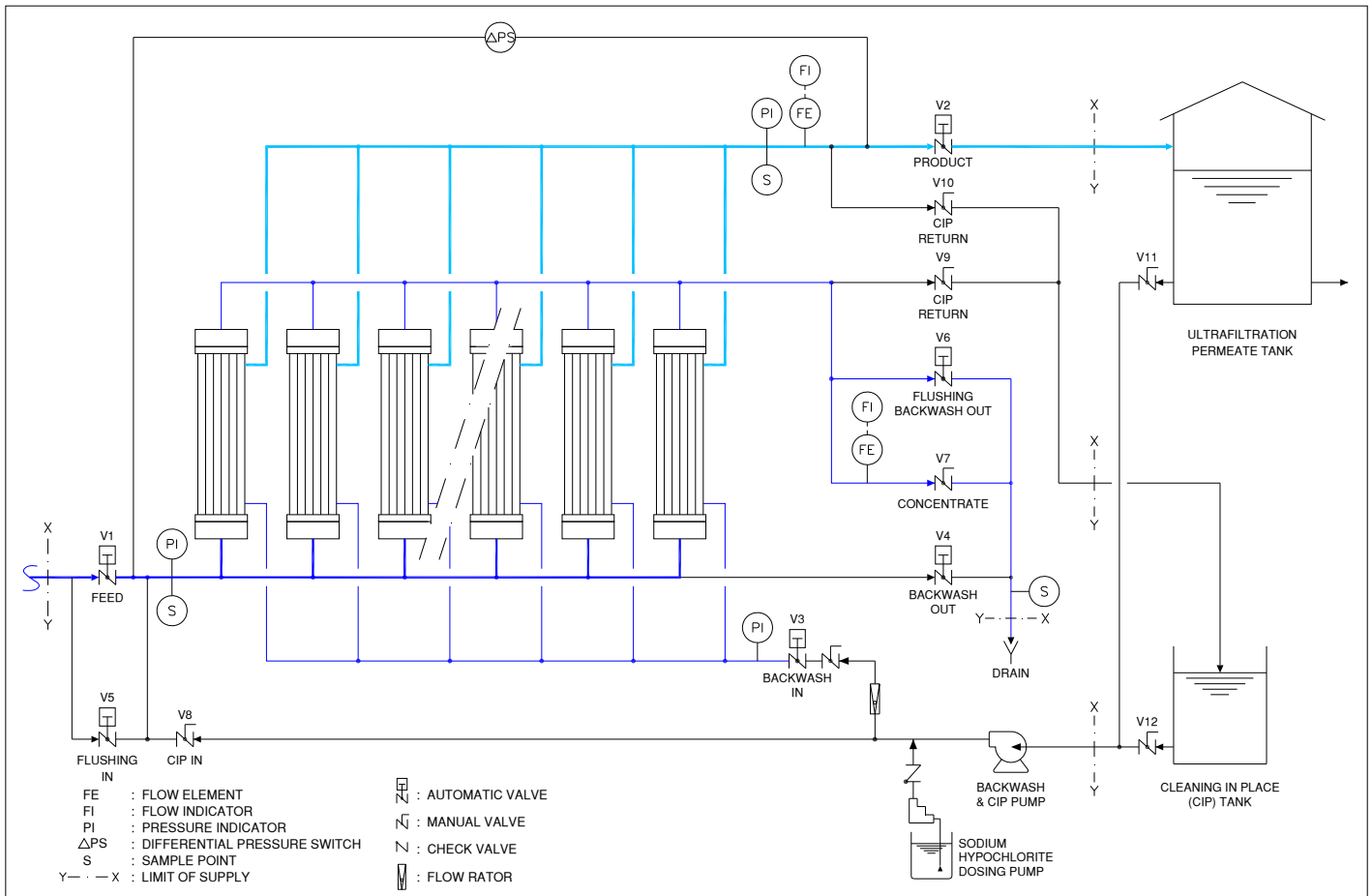
Fast-flush

Generally, 95% of the feed water will be recovered as permeate in a single pass. As a result, the upper half (or low pressure end) of a fiber is more susceptible to fouling and needs to be cleaned more thoroughly than the lower (or high pressure end). Fast-flush is used as a step of backwash to clean the membrane surface. Permeate outlet is closed to build up pressure within the fiber shell, and permeate throughout the module reaches a pressure equal to the average feed pressure.

Inside the fiber, a certain pressure drop is created by operating at maximum flow. The pressure differential at the upper half of the module causes permeate to flow in through the fiber, cleaning that end of the module.

Both backwash and fast-flush cleaning procedures maintain membrane flux at high production rates by reversing solids buildup on membrane surfaces. Though this phenomenon does not normally occur in water systems, there is always the risk of membrane fouling not readily reversed by these flushing techniques. If it does happen, chemical cleaning agents may be flushed through the modules without degrading the inert fiber matrix of the membranes. The backwash is conducted with a pressure of one and a half bar.

*lumen – open space in a fiber or tube



Ultrafiltration Machine Flow Diagram

Feed Water

It is not unusual to incorporate a pre-treatment before an Ultrafiltration machine.

Our disc filter system will inhibit solid which may build up on membrane surfaces.

This "pre-filtration" will be a necessity with certain surface water such as river, lake, sea water and waste water treatment effluent to be reused. Such a feed water may carry occasionally large sediments.

Pressure

Lower pressure is best for economical pump sizing and minimum operating costs.

The Ultrafiltration trans-membrane pressure in service is below one bar and in backwash is approximately one and a half bar.

Machine Concept

In order to keep the backwash pump within an acceptable capacity, Ultrafiltration machine with a quantity of modules above, say twelve, could be assembled in two trains.

In this particular case, each train will be made of six modules. Each of these trains will be then backwashed separately.

The backwash pump will be sized, in order to meet the necessary capacity needed by one train.

Specification: Standard OAP Units

Large Capacity Systems

Ultrafiltration machines, built to comply with pertinent standard for industry.

Versatile, flexible Ultrafiltration machines for treatment of raw water as well as deionized water.

Included:

- OAPmod60-9 element made of PVC hollow fiber Ø9" (23mm)
- Backwash pump – Use also for Clean-In-Place (CIP)
- PLC to control frequency and backwash steps
- Necessary protection against high differential pressure between feed & product
- Automatic air operated valves, as well as manual adjustment valve and sample points
- Chemical dosing system for sodium hypochlorite in backwash
- Flow indicators for Product, Concentrate, Backwash
- Pressure indicators for Feed, Product, Concentrate, Backwash
- Piping & fitting made of PVC
- Visual and audible alarms
- Graphic with various diodes indicating the automatic valves status

Optional:

- Flow monitoring C/W 4 to 20 mA output signals
- Chemical dosing system on the feed
- Custom specified PLC and panel view
- Automatic backwash disc filter

Power supply available:

- 380V 3Ph 50Hz (Control circuit at 220V 1Ph 50Hz)
- 460V 3Ph 60Hz (Control circuit at 110V 1Ph 60Hz)

Model	Capacity (m ³ /h)	No. of Modules	Pipe Size In/Out (in)	Dimensions			Shipping Weight (kg)
				L (cm)	D (cm)	H (cm)	
UF-10-HF-BW	10	2	1-1/2	291	80	230	800
UF-15-HF-BW	15	3	2	328	80	230	1120
UF-20-HF-BW	20	4	2-1/2	365	80	230	1350
UF-25-HF-BW	25	5	2-1/2	402	80	230	1500
UF-30-HF-BW	30	6	3	328	140	230	1650
UF-40-HF-BW	40	8	3	365	140	230	1800
UF-50-HF-BW	50	10	4	402	140	230	2000
UF-60-HF-BW*	60	12	4	440	140	230	2200
UF-70-HF-BW*	70	14	4	470	140	230	2400

* (2) train machines

Larger sizes are available in custom designs. Please consult us for details.

Note: Above nominal capacities are base on a feed water turbidity < 1 NTU.

At higher turbidity, up to 15 NTU, the capacities indicated above will have to be decreased accordingly.



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