

microza

MBR Membrane Comparison

Hollow Fiber(HF) vs. Flat Sheet(FS)



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GROUP

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Hollow Fiber Membrane

Flat Sheet Membrane



SKID



Module



SKID



Element

Different point #1. Existence of Backwashing function

FS has no function of periodic backwashing while HF has.

Advantages for FS;

FS don't need the backwashing pump, line and valves so it's system control logic is simple.

Disadvantages for FS;

Periodic backwashing reduce the contamination of membrane, especially pore blocking. Backwashing cannot be applied to FS because of its unique structure so FS cannot enjoy the effect of backwashing.

By doing backwashing periodically, HF membrane reduce the fouling and make all the surface act as a filtration area without dead zone.

Different point #2. Aeration consumption

FS needs much more amount of aeration for membrane operation.

HF membrane's every single fiber can move freely by the turbulence made by aeration and by this moving action, contaminants attached on the surface of membrane can be detached.

Comparing with fixed surface and turbulence by air, scrubbing between fibers itself is more efficient for detaching surface contaminants.

In FS system, much more amount of aeration is needed to compensate for the low cleaning efficiency while HF needs small enough for shaking fibers

Oxygen transfer by aeration for membrane is lower than that of the original aeration for bioreactor, so large volume of aeration for membrane means higher energy consumption

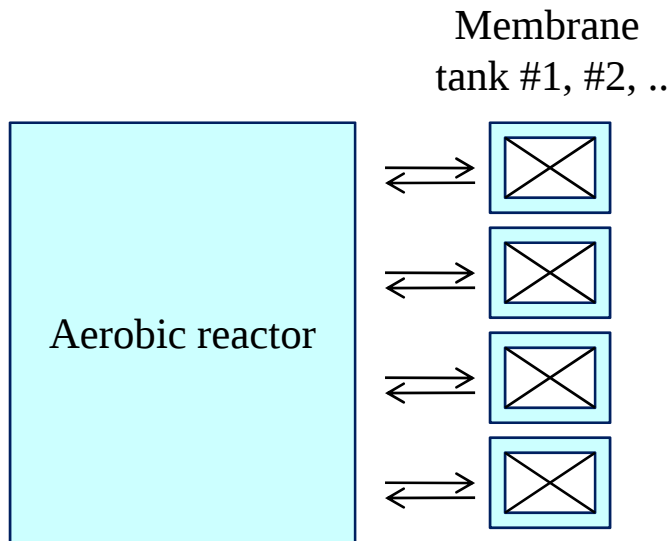
Different point #3. Difference in SKID volume

HF's skid is more compact than FS skid.

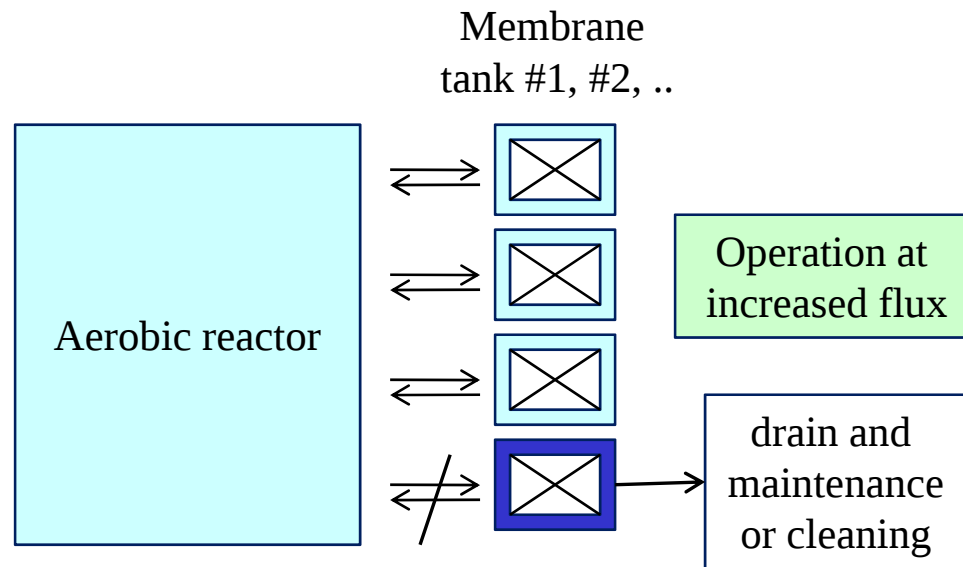
For the same treatment capacity, FS needs bigger footprint for membrane skid than HF.

Recent tendency of MBR system design goes to divide the membrane tank from aerobic reactor for the convenient maintenance and chemical cleaning (recovery cleaning). In FS system design, separation of Membrane tank and aerobic reactor is almost impossible because of big volume of membrane skid.

< Normal full operation >



< One block maintenance or cleaning >



Different point #4. Availability of Integrity Test

Simple and easy integrity test is available on HF system

Integrity test is a method to ensure that all the membrane is perfect and has no defect. Using the integrity test operator also can check the leak in the connection parts.

In HF system, high pressure air is applied to the treated water line and operator monitors the pressure decay velocity to check the integrity. (if there is a defect, pressure decay will be faster than normal)

In FS system, monitoring the treated water quality is the available method to check the integrity.

Checking treated water quality is not so fast and accurate as direct integrity test. If some defect is detected in a big system, FS needs lots of time to find out the defect point comparing with HF system.

Different point #5. Existence of Fine Screen

HF system need to install fine screen on feed channel to protect membrane

HF system need to install fine screen on the feed channel (and also on internal recycle line for better).
It's an advantage for FS to reduce initial construction cost.

Different point #6. Dead zone happening

In FS, dead-zone can be made more easily

Because of it's structure, pressure difference according to the position can be made in one element, which can be the reason of dead-zone after some times past.

