

BIO-CEL® MBR Modules

Kubota membrane replacement

REPLACEMENT OF KUBOTA MEMBRANE SYSTEM WITH BIO-CEL MEMBRANES AND ACCOCIATED PLANT CHANGES

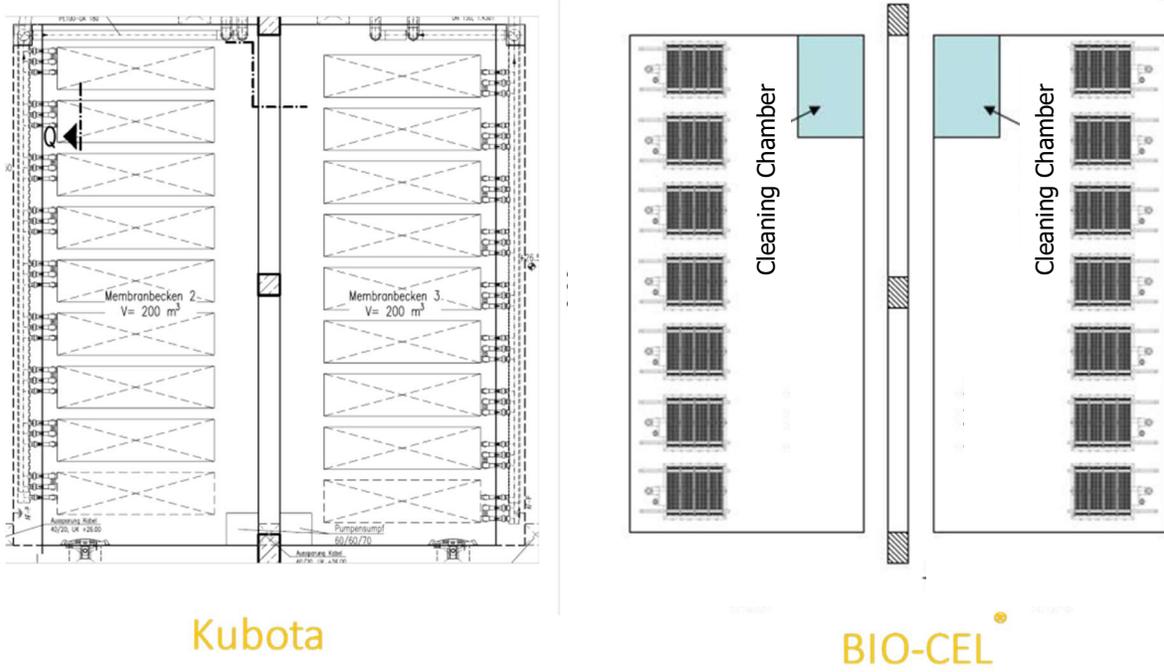
Arguments for BIO-CEL

- BIO-CEL membranes are self-healing, due to their unique structure and manufacturing method. The self-healing effect prevents the contamination of the permeate system with suspended solids. This is especially important if the MBR serves as pre-treatment for NF or RO.
- The membrane sheets move freely with the crossflow aeration and as such preventing sludge clogging between the sheets. Plate and frame systems have fixed membrane sheets without the ability to move and are much more prone to sludge clogging, especially in the corners and edges.
- BIO-CEL membranes can be backwashed with permeate, plate and frame systems are not. Kubota systems are only chemically backwashed without permeate. This normal backwash used in BIO-CEL modules significantly improves fouling control, especially if combined with a chemical backwash. Often the backwash is optional but having the ability there is a benefit for flexibility of operation and for increasing permeability.
- BIO-CEL uses fine bubble aerator to create crossflow across the membranes. The fine bubble diffusers also increase the oxygen transfer efficiency. The advantages of fine bubble diffusers are that they can be switched on and off when required. This is not possible with coarse bubble diffusers due to clogging of the aeration system with sludge. This requires a complicated cleaning operation of the aeration system multiple times a day. Also, the operation costs are lower with fine bubble diffuser because there is better oxygen transfer. This lowers the additional air amount for the biology and therefore the energy demand of the BIO-CEL is 55% lower in comparison to Kubota per square meter of membrane installed.

Infrastructural changes for retrofitting with BIO-CEL

- Permeate pumps are compatible in terms of flow requirements. Two lines (a double stack) of Kubota membranes can be replaced with equivalent BIO-CEL modules and existing permeate pump can remain in use. The common permeate header and pipework can remain intact; only the individual permeate pipes from the membrane modules to the header will need to be replaced. Replacing with BIO-CEL modules will be compatible with the existing PLC programming.
- If a membrane backwash is desired the permeate pumps may need to be replaced with reversible pumps, because Kubota does not offer a backwash function. An alternative single direction pump could be installed in addition which would be dedicated for backwash function.

- Existing blowers are also compatible if there is pressure and flow control (VFD) in place. Again, there will be some pipe work changes that need to be done to connect the individual air pipes from the header to each membrane module.
- There may be a need for PLC changes depending on how the existing plant has been programmed in terms production steps (filtration, relaxation, backwash etc.)
- There are also some minor changes to the CIP regime in terms of dosing of chemicals and their relative strengths. This may need to be a change to the PLC.
- Fixation: There are various fixation methods available for BIO-CEL modules; guide rails, fixation on the bottom, floor mounting with bracket fixation on the top of the modules or hanging configurations. However the BIO-CEL modules are often installed on the floor of the tank which is the cheapest option.
- Footprint; the BIO-CEL modules have a smaller footprint when comparing equivalent surface area. Below is an example of the difference in footprint of a Kubota set-up (left) and the BIO-CEL setup (right).



Success stories (Kubota plants retrofitted with BIO-CEL)

- OVIVO switched from Kubota to Microdyn-Nadir as sole membrane supplier for their US business.
- Hünxe, Germany.
- Dundrum, Northern Ireland.
- Hasolelim, Israel.
- Hasolelim, Eilon.
- Konacik, Turkey.

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