

## Rinsing the membrane modules of the RO plant

In the course of the operation, the surface of the membrane becomes soiled. As during normal operation a constant wastewater flux is specified by the high-pressure pump, the operating pressure increases. In order to generate a constant permeate flux at relatively little pressure over the long-term, the rinsing of the membrane modules is to be carried out depending on the relevant parameters. For this purpose an in-process cleaning device (CIP - Cleaning in Process) is installed. The rinsing intervals depend on the type and composition of the leachate.

At the start of each cycle of operation, the CIP tank will be filled with permeate. If it is required to clean the first stage, the rinsing solution is to be added into the CIP tank and the rinsing process can start accordingly.

At the beginning of the rinsing process, the prepressure pump transports the cleansing water according to specifications through the gravel filters or past them. The cleansing solution flows through both fine filters, pressure pump and the modules, however, with a maximum pressure of 10 bar. The low pressure is reached by the entire opening of the control valve and its bypass valve.

In the process, the leachate that is still present in the modules and piping is initially pushed into the concentrate storage, until a defined fill level in the CIP tank is reached. After completion of the pushing out process, the high-pressure pump and the recirculation pumps (circulation pumps) are started up successively. The output high-pressure pump is specified by the parameters set. The entire cleansing solution is now driven in a circle over the concentrate side of the membranes and the CIP tank, until the specified rinsing period has expired.

At the end of the rinsing period, the concentrate passes through the open valve into the concentrate storage again. After reaching the set fill level in the CIP tank, the RO plant is removed and the rinsing is terminated.

TDL Energie GmbH recommends you on demand a rinsing process, which circulates a loop rinsing with an acid solution or an alkali solution containing additives through all modules / tanks at high speed and low pressure.

The required amount of rinsing solution depends on the pH value required during rinsing. When using the recommended rinsing solution, the pH values should comply with the following:

Alkaline cleaner ,P3 Ultrasil 14'                      pH > 12  
! Rinsing **without** gravel filter !

Acid cleaner ,Citric Acid Monohydrate'                      pH < 2  
! Rinsing with or without gravel filter !