

Treatment of rinsing water in Henkel KGaA's on-site water treatment facility in Dusseldorf.

The water treatment at the Henkel plant in Dusseldorf is designed to handle up to 600 m³/h. The untreated water is predominantly filtrate from the harbour which is mixed with small quantities of well water and surface runoff. A fluidised bed reactor employing lime slurry is used to decarbonise the water. This achieves precipitation or elimination of 95% of carbonates. The decarbonised water contains further impurities. The water is subsequently clarified in the downstream sand filters.

The sand filtering system comprises a total of 6 filters with a total filter area of nearly 30 m².

To ensure maximum system performance, each filter is rinsed once a day. For each rinse, 300 m³ of waste water is generated, resulting in 100,000 m³ of rinse water entering the on-site water treatment facility annually. The treatment costs are allocated within the plant.

Based on experiences from treating rinsing water at swimming pools, a pilot system utilizing an SAB microfiltration unit was set up in October of 1999. The following results were obtained over a two-month period:

- constant throughput under varying concentrations of raw water
- consistent filter quality
- effective backwashing of membranes
- long interval between chemical cleanings



Based on these results, the operating costs for an industrial-scale system capable of treating all the rinsing water were calculated.

With the resulting annual savings, the calculated break-even point for the total investment, which also includes providing additional temporary storage capacity for the rinsing water in addition to the membrane system, would be reached in 2.5 years.

Process and system equipment

Due to the limited space available in the water treatment building, the entire membrane system was installed in a 20-ft. container. The system is designed to output 12 m³/h of treated water under fully automatic operation with a yield no less than 80% of the raw water input.

The rinsing water normally accumulates during the day shift and is kept in a storage tank while it is supplied at a constant to the membrane system.

The impurities contained in the rinsing water are kept in suspension via aeration through the tank floor so that no sediment layer can develop.



The mixed waste water is continuously supplied to the membrane system via a frequency-regulated feed pump. The membrane system is equipped with 5 filter modules running in parallel, each filtering separate circulation systems. The parallel design ensures high availability of the system.



The waste water is filtered using a cross-flow process and transported to a tank for the treated water. During the periodic backwashing, concentrates are removed from the circulation systems.

This achieves a nearly constant concentration within the circulation systems, automatically discharging the concentrates to the clarification plant in small quantities, thus enabling the clarification plant to also achieve nearly constant operation conditions. After the stored quantity of rinsing water has been treated, the system shuts itself down automatically.

The process is controlled using an SPS/S7. The system can be operated from the water treatment control centre as well as from the control board located in the container using a touch panel. The process is also monitored remotely.

Due to the favourable results, the system capacity was increased in December of 2005 by 50%. The system allows 400 m³ of treated water to be reused every day.