



Purifying surface water to demineralised-water quality. Could that be done with fewer chemicals? Sure! North Water provided the technology, the construction, the maintenance and the financing of the purification plant.



Demineralised water by using membrane technology

for Kisuma Chemicals



Kisuma Chemicals BV (KCBV) was established in 1997 with the objective to produce, process, distribute, export and import industrial chemicals, reagents, cosmetic and pharmaceutical products. KCBV is part of Kisuma Euro BV, a subsidiary of Kyowa Chemicals Industry Co. Ltd., situated in Japan.

They chose Veendam for their site, because of the presence of magnesium-rich salt layers in the area. These days Nedmag Industries operates the magnesium-chloride mine and supplies brine of an exceptional quality to the adjacent factory of Kisuma Chemicals BV (KCBV).

North Water supplies process water of demineralised-water quality for the production of hydrotalcite, for which a water-purification plant was built in 1998. It was the first in the Netherlands that was based on membrane technology. The use of membrane technology means that fewer chemicals are required to process surface water to demineralised water and it reduces the discharge of chemicals in the wastewater.

The water intake system for Kisuma is combined with the intake for Nedmag, which is also owned and operated by North Water. From the start of the multi-year supply contract, the capacity of the water-purification plant has been expanded in a number of steps. Thus an excellent use of the DBFO concept of North Water, so that Nedmag and Kisuma can focus on their core activities.



Process Description

Surface water from the A.G. Wildervanck canal in Veendam is upgraded to demineralised water in the water-purification plant in three process steps. Through an intake structure with an automatic grid that removes large pieces of dirt, the surface water is pumped to the water-purification plant. A self-cleaning filter of 0.12mm ensures that large solid particles are removed. Then a flaking agent is added in a cascade, to ensure that suspended solids coagulate to flakes that precipitate. The three flocculators precipitate the flakes. Using three lamellar separators the suspended solids are separated from the water and are discharged as sludge. The water then flows into a buffer tank. The buffer tank feeds eight parallel-linked ultrafiltration units, where the small particles and certain dissolved substances are

removed from the water. As a third step, the water is upgraded to demineralised water using eight reverse-osmosis units. This reverse-osmosis step removes the main part (>99%) of the salts in the water. The permeate from the reverse-osmosis units is led through a decarbonisation unit, where the carbon dioxide (CO₂) is removed using a counter current air flow. From the decarbonisation unit the demineralised water is transported to a buffer tank of 1,000 m³. The demineralised water is then pumped to the storage tank of Kisuma. A heat exchanger in the transport pipeline ensures that the demineralised water is heated up. As a back-up, the water-purification plant is connected to the drinking-water network of Waterbedrijf Groningen. The drinking water can feed three reverse-osmosis units.



Process-water quality

| Parameter | Unit | Value |
|----------------|--------|--------|
| Acidity | | 5 - 8 |
| Turbidity | FTU | < 0,1 |
| Conductivity | µs / m | 20 |
| Iron | mg / l | < 0,01 |
| Chloride | mg / l | < 5 |
| Sulphate | mg / l | < 10 |
| Magnesium | mg / l | < 1 |
| Calcium | mg / l | < 1 |
| Sodium | mg / l | < 5 |
| Carbon dioxide | mg / l | < 30 |

Technical details

| | | | |
|--------------------------------|---------------------------|---------------------------------|--------------------------|
| Capacity flocculator | 180 m ³ / hour | yield | 90 % |
| number | 3 | Ultrafiltrate buffer tank | 200 m ³ |
| Buffer tank | 200 m ³ | Capacity RO unit | 55 m ³ / hour |
| Capacity ultrafiltration plant | 50 m ³ / hour | number | 8 |
| number | 8 | recovery | 75 % |
| recovery | 82 % | Demineralised-water buffer tank | 1,000 m ³ |

