

## **Case Study: A reverse osmosis plant guarantees the quality of the water used to make beer and minimizes energy costs**



Water treatment is of fundamental importance for the food and drink industry. The Gold Ochsen brewery in Ulm has invested approximately 200,000 euros in a reverse osmosis (RO) plant for the desalination and treatment of water it uses to make its beers. This is to prevent low chemical-biological water quality which reduces overall product quality, disturbs the processes, generates unnecessary costs and can have negative repercussions on the environment. The brewery has made a significant step forward for the quality of the water it uses to make its beers, energy efficiency and environmental protection. The new plant replaces the ion exchanger technique it had used up until now with a membrane process, which offers major technical and process advantages over the ion exchanger system.

### **Tradition and innovation**

The historic Gold Ochsen brewery has been run by the same family since 1868. The Swabians produce about 600,000 hectolitres of beer and non-alcoholic drinks every year and supply the surrounding areas as far as the Swiss border. The water used to make the beer is pumped up from the deep factory well. What is particularly important for the Ulm brewers is not just to satisfy the quality requirements of German drinking water regulations, but also to make the taste and characteristics of their products unmistakable. This is thanks to the constantly elevated quality of the water they use to make their beers which, in terms of chemical-biological composition, generally varies – from producer to producer, on the type of beer and on the origin of the untreated water. Moreover, constant availability of water must be guaranteed during production.

In order to satisfy these strict requirements, the brewery contacted Grünbeck Wasseraufbereitung GmbH, Höchstädt a. d. Donau, a company which enjoys a leading position in the water treatment sector. In partnership with ITT Lowara, Großostheim, a company specialized in pumping systems, a solution was developed which, due to the process engineering used, was particularly eco-friendly, easy to use and cheap to run. Just the variable-frequency pumps model SVH4606 supplied by ITT Lowara, with the plant running, should reduce over 30% of electricity consumption, an enormous saving for Gold Ochsen.

In this context, Armin Eisenhofer, the Drinks Sales and Food Technology Director of Grünbeck, illustrates the details of the plant:

**Mr Eisenhofer, what is the plant used for? How does it work?**

The plant, which is used to produce water for our beers, desalinises the well water. This is then mixed with 10% filtered well water in order to create an excellent water for making beer. The value  $m$  is set to approximately  $0.8 - 1 \text{ val/m}^3$ .

**What does an RO plant mean?**

An RO plant means a reverse osmosis plant. This process physically desalinises the well water by pressurising it with a semi-permeable membrane, thus producing pure and sterile water with hardly any salt.

**What does the plant give to the Gold Ochsen beer factory?**

The company decided to abandon its ion exchanger technique and adopt the membrane process. The main advantage of RO plants for customers is that no aggressive products, such as acids or alkaline solutions, need be used. Moreover, use of the Lowara variable-frequency pumps leads to other important benefits: regardless of the pressure variations in the RO plant inlet duct, operating pressure remains constant. The elimination of water hammering considerably prolongs the useful lifetime of the reverse osmosis membrane. Unlike an ion exchanger, an RO plant operates continuously.

**How much beer water can the new RO plant produce?**

The permeate capacity of the RO plant with graduated concentrate is  $42.5 \text{ m}^3/\text{h}$ . Total production of the water treatment plant is therefore  $50 \text{ m}^3/\text{h}$ .

**Customer conclusions:**

“The plant constantly provides exceptional quality water for our beer with power consumption reduced to a minimum. Thanks in particular to the use of decidedly quiet Lowara variable-frequency pumps, advantages are obtained not only as regards electricity savings, but also mechanical benefits given that operating pressure remains constant even in the event of pressure variations in the RO plant input duct. The elimination of water hammering considerably extends the useful lifetime of the reverse osmosis membranes. Moreover, given that aggressive products, such as acids or alkaline solutions, do not need to be used, we actively contribute towards protecting the environment.”