

One-Step Precoat-Free Surface Filtration of Raw Brine

Challenge

Vinnolit GmbH & Co. KG is the leading manufacturer of PVC in Germany and, with worldwide sales and licensing activities, one of the key players in the European PVC business. In the field of PVC products for special applications Vinnolit is the global market leader. In 2001, the reconstruction and upgrade of chlorine production capacities began at the Vinnolit plant in Chemical Park, Knapsack, Germany.

To increase the chlorine production to 280.000 t/a a membrane electrolysis plant was added. In order to achieve a higher brine quality for the membrane electrolysis, a change in technology from cloth filters to a modern, completely automatic, precoat-free filtration system became necessary.



Dr. Helmut Lademann,
Plant Manager CAE/EDC Vinnolit GmbH & Co. KG, Knapsack

„If you have any problems in a project, I wish you a partner like Gore®“



Dr. Markus Hamm,
Production Manager, CAE/EDC Vinnolit GmbH & Co. KG, Knapsack

“We are again and again marvelled what the Gore® filter socks can withstand even after 3 years of operation and without any loss of filtration quality.“

Success Story

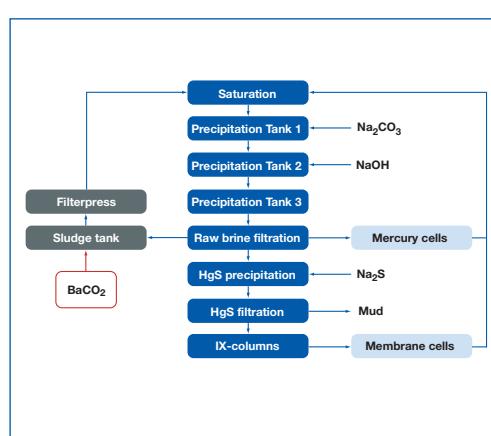
Solution

After carefully investigating different filter suppliers and systems (one-step versus two-step), it became clear that ZYLON™ surface filtration technology (formerly GORE backpulse filtration) offered decisive technologic and economic advantages. The Vinnolit plant installed a precoat-free, completely automatic (4+0) ZYLON filter system with GORE™ high durability liquid filters made of 100% PTFE. "It is a very good feeling to know that the GORE™ filter socks are made of 100% PTFE. In spite of the presence of free chlorine in the brine we can feel absolutely safe", commented Uwe Leihbecher, Manager Process Engineering at Vinnolit, Knapsack.

Since start-up of the ZYLON-filtration in the fall of 2001, there are four vessels installed, each containing 420 filter elements. In the summer of 2005, the plant was upgraded to 499 filter elements per vessel. Total throughput currently is 650 m³/h (to be upgraded in the summer of 2006 to 700 m³/h).

The following block flow diagram shows the principles of process.

After saturation of the brine with rock salt, the usual precipitation reaction of calcium and magnesium by means of sodium carbonate and caustic is performed. Then, the raw brine is fed directly to the ZYLON system. No clarifier or pre-filtration is necessary. 350 ppm of total suspended solids (TSS) in the feed are reduced to less than 0.5 ppm in the filtrate.



Benefits

The change from a cloth filter system with seven vessels (flow rate 600 m³/h with TSS filtrate ~ 5 ppm) to a ZYLON system with only four vessels did not require extensive reconstruction in the existing building. Furthermore, the ZYLON system produces brine that meets the quality requirements for TSS of the membrane cells, and this is accomplished in a single filtration step, without use of a clarifier or prefiltration.

In summer 2005, a cost-saving extension of the filter area was achieved by changing the pitch of the tubesheet. This made it possible to increase the filter area again without modification of vessels and piping. Additionally another filter vessel was implemented in order to process the planned throughput.

The Vinnolit plant in Knapsack, Germany



Installation of the filter

