Separation of the 50% NaOH product stream (Mercury removal from caustic soda)

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.

This meant a partial change to membrane electrolysis for production and, at the same time, an increase in chlorine production to 280.000 t/a. The caustic soda does contain mercury in an amalgam process. In order to debottleneck the mercury removal and to become more economic a completely automatic precoat-free filtration system was implemented.

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 technological and economic advantages. The Vinnolit plant installed a precoat-free, completely automatic ZYLON filter system with GORE™ high durability liquid filters (ePTFE/PP).

The plant is performing NaOH/Hg filtration with ZYLON since start up in 2001. There is one vessel containing 235 filter elements with a total throughput of currently 60 m^3/h.

The mercury is filtered directly, without the addition of precoating media or activated carbon (liquid/liquid separation). A precipitation is not necessary, since the mercury exists in the form of fine dispersed drops. For viscosity reasons the caustic is filtered at typically 80 °C. The mercury content in the feed is 500-5000 ppb, and is reduced to 20-30 ppb in the filtrate.

Benefits

For this application, it is possible to eliminate precoating or the addition of activated carbon completely. Furthermore, the direct separation of the metallic mercury drops enables the recovery of mercury and its return to the amalgam cells.