

## **Advanced Water Treatment and Recycling Solution Case Studies for Low Water Consumption Paper Mill**

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### **Introduction to Paper Mill Water Use**

Pulp & paper industry has traditionally consumed a lot of fresh water and energy. During the past decades increased attention has been paid to overall efficiency of paper mills and also to the environmental footprint that the pulp & paper industry leaves. Especially water management has become a more and more important factor in the industry. There are several reasons for an increased interest in the water sector of which major factors are cost savings, limited water resources, environmental impacts and legislation as well as pulp and paper making line and end product quality. Future trend is that energy costs will continue to rise, environmental legislation tightens all around the world and shortage from water resources culminates in many parts of the globe. This trend has led to decreasing fresh water usage in the paper industry and increase in water recycling. One could imagine that just increasing water recycling by adding treatment units in a paper mill is a relatively simple task, but in reality it is not that easy. Building most of water recycling processes and at the same time handling possible risks and pitfalls requires an overall understanding of processes, chemistry and conditions, not only in the paper industry in general, but also of the particular mill in question. A particular risk in water recycling is that certain impurities and substances will concentrate in process waters, causing serious problems in equipment, processes and product quality. With the knowhow and correct technology, water management in paper mills has many opportunities in form of water recycling.

Water consumption varies from  $<5 \text{ m}^3/\text{t}$  up to  $>100 \text{ m}^3/\text{t}$  between mills, depending on production, raw materials and technologies used in pulp & paper making and related processes. In tissue production, water consumption is higher than in many other grades. This is because tissue products have very high quality standards in odor, brightness and texture, which leads to washings and higher demand of fresh water. Tissue mills using recycled paper as raw material have a lot of challenges in tackling quality issues and therefore water management is crucial. With suitable technology fresh water can be replaced in many production points even at tissue mill with recycled process water without compromising quality or runnability. Usual points where fresh water can be replaced are for example different dilution waters in pulping and stock prep, and shower and washing waters in the machine area. Generally today's way of utilizing process water in paper machines is counter current to fiber line, so fiber is re-used and water recycled backwards to different points mentioned earlier.

### **Case Study**

- Background information of the case study mill.
- Reasons for upgrading their water management system.

### **Water Solutions**

- Earlier water management concept
- Upgraded water management concept
- Raw water treatment
- Internal water loops
- Boiler feed water and condensate treatment

### **Wastewater Treatment**

- External water recycling: from wastewater treatment plant to production

### **Implementation and Results**

- Investment
- Rebuilds
- Final achievements