CHLORINATED COMPOUNDS

EFFECTS OF DECREASED WATER USE ON CHLORINATED COMPOUNDS

Pulp Washing and Bleach Chemical Consumption

Pulp is washed between bleaching stages to remove soluble organic and inorganic materials from the pulp mat. When wash water is reduced, more dissolved material is retained with the pulp, which can consume costly bleaching chemicals in subsequent bleaching stages. Larger wash liquor ratios produce a cleaner pulp, reducing the chemical requirements for delignification, bleaching, and neutralization reactions. The wash liquor ratio is defined as the amount of wash liquor entering the system divided by the amount of water leaving the system with the pulp mat. A common rule of thumb is that 1 kg of sodium sulfate (Na_2SO_4) carryover consumes approximately 0.5 kg ClO_2.

Table W17 shows the effect of wash liquor ratio on chemical consumption in the extraction and hypochlorite stages of a (CD)EHDED bleaching sequence when direct counter-current washing is employed.

Table W17. Effect of Wash Liquor Ratio on Chemical Consumption in the E1- and H-Stages of a (CD)EHDED Bleaching Sequence (Dence and Reeve 1996)

Washer	Wash Liquor Ratio	Chemical Consumption (% on pulp, Cl_2 for H stage, NaOH for E1 stage)
H	1.25	3.0
H	1.15	3.3
H	1.00	4.7
E1	1.30	1.45
E1	1.15	1.60
E1	1.00	2.40

Washing following delignification stages is the primary method of removing lignin from pulp. In a bleaching sequence such as DED, inefficient extraction stage washing will result in carryover of colored material to the final chlorine dioxide stage, which can increase chemical consumption of chlorine dioxide. Figure W4 shows the effect of efficient inter-stage washing. Washing efficiency in the figure is defined as the percent of dissolved solids generated in the extraction stage removed by the washer (i.e., a washer with 83% efficiency would removed 83% of the dissolved solids generated in the E-stage)

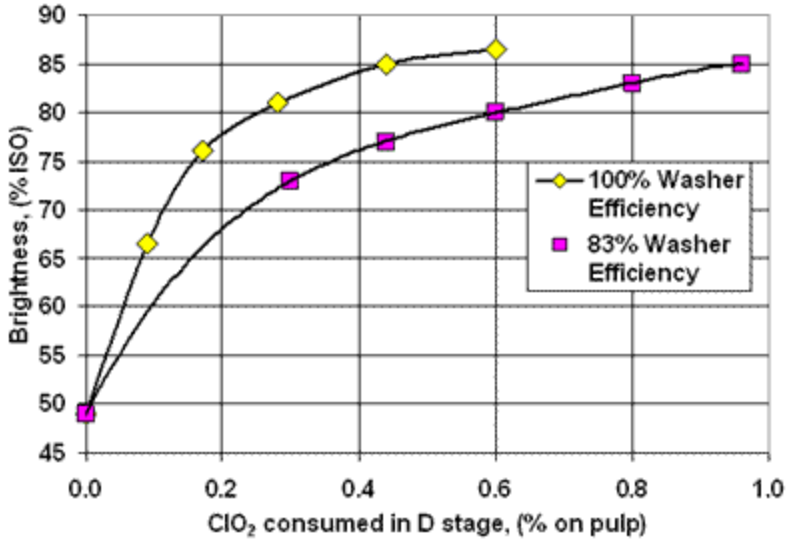

Figure W4. Impact of Washing Efficiency on D-stage Bleaching Chemical Requirements for Partially Delignified Softwood Kraft Pulp (Dence and Reeve 1996)

References

Dence, C.W. and Reeve, D.W. (eds) 1996. Water reuse and recycle. Section VI, Chapter 6 in *Pulp bleaching principles and practice*, 647-673. Atlanta, GA: Tappi Press.