

## A comparison of the methods for bleaching chemical pulp. ECF versus TCF

### Two developed technologies

Following the abandonment of chlorine as a bleaching agent due to environmental considerations, two technologies were developed. The first is Elemental Chlorine Free (ECF) and the second is Total Chlorine Free (TCF). The distinguishing factor between the two processes is the use of chlorine dioxide, which is used in ECF but not TCF. To compensate for the lack of chlorine dioxide, TCF will either add higher dosages of hydrogen peroxide, or supplement the process with ozone. (Learn more in the research paper *Environmental systems analysis of alternative bleaching sequences with focus on carbon footprint* by Pia Jour, Karin Halldén and Eva Wackerberg).

In 2012, ECF pulp constituted 93% of the world share of bleached chemical pulp market. TCF, although decreasing slightly in market share, has remained at approximately 5% of the bleached chemical pulp market.

Initially TCF appeared to hold promise as an alternative to ECF with respect to the generation of environmentally harmful substances. However, several studies have shown no significant difference between the two technologies when best available techniques is used. No measureable levels of dioxins are present with either ECF or TCF. TCF's problems with weaker fiber strength, lower brightness potential, lower yield and higher energy requirements have further eroded its promise as a successor to ECF.



#### Get in touch!

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