
Abstract

Fiber cement manufacturing using the Hatschek process requires significant volumes of water for transporting raw materials, mixing ingredients, distributing constituents throughout the product, hydrating Portland cement, and supporting the curing process. However, water is an increasingly valuable and limited resource. Prolonged droughts, variable precipitation, and rising temperatures are intensifying water stress worldwide, while freshwater consumption by the fiber cement industry contributes to this challenge. Consequently, regulatory bodies in some regions have introduced restrictions on freshwater withdrawal that may affect industrial operations.

Although substantial volumes of water are recirculated during manufacturing, many factories continue to discharge process water, resulting in an unbalanced water system. The reasons vary according to the products manufactured, but contamination and the accumulation of dissolved substances in process water circuits are among the most relevant factors.

This study investigates the buildup of contaminants in process water circuits, their effects on the manufacturing process, and opportunities to reduce freshwater consumption. Small-scale laboratory tests and the characterization of process water samples collected from several factories were conducted to identify the most relevant contaminants. Based on the results, a model was developed to support manufacturing sites in reducing freshwater use. Pilot-scale experiments also evaluated the potential consequences of manufacturing with process water containing high ionic concentrations.

The knowledge generated enabled targeted technical support for factories and contributed to the implementation of closed water circuits under specific conditions. The developed solutions support the Group's objective of responsibly reducing its water intensity factor by 2030.
