

Constant climate chamber HPP shows behaviour of paper under humid conditions

At the Labelexpo 2009 in Brussels, visitors to the trade fair stand of the Swiss Cham Paper Group experienced live, through the glass doors of a constant climate chamber how the new, environmentally-friendly backing paper Silico Premium stayed dimension-stable, even at different levels of humidity.

More than 2000 years separate the invention of handmade paper in China and today's highly modern machines in a **paper mill**, hundreds of yards long, producing high-quality paper by the ton at speeds of close to 2000 metres per minute – up to one thousand tons per day. The basic idea of **paper production** has remained almost unchanged, however, and water is a constant topic, whether as a necessary medium in preparing the fibres, or as a hazard for the quality of the paper.

Paper is alive. It is continually absorbing or giving off moisture due to the ambient climate. Paper that is too damp or whose **moisture content** increases during storage is less easy to print and paint, has a greater tendency to form blisters and is less **dimension-stable**. Especially for the heavily technical applications of the special paper of the Cham Paper Group an excellent dimension stability is absolutely essential.

Through the glass doors of two Memmert **constant climate chambers**, visitors to the Cham Group trade fair stand were able to observe how different paper behaves under humidity – and how this environmentally-friendly trade show innovation, which does without the standard coating with polyethylene, comes out of the chamber as the clear winner.



An experiment in the **constant climate chamber** was waiting for the visitors at the Labelexpo



Water dominates today's **paper mill** just as it dominated **paper production** thousands of years ago

A cooled incubator is part of the basic equipment in every

paper mill

Environmental goals in paper production: improving wastewater quality while drastically reducing wastewater

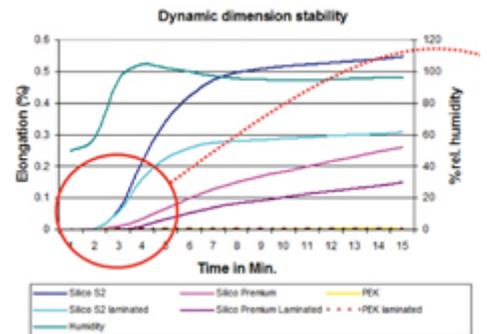
Up to 20 cubic metres of fresh water are used in industrial countries per ton of paper manufactured, according to a study by Voith Paper Environmental Solutions from 2007, and considerably more than this in developing countries. At the end of production, almost the same amount of waste water flows back into the sewerage and water system. Even if this waste water is biodegradable, precious oxygen is removed from the water, burdening the habitat of fish and other water creatures. Machine and plant manufacturers are working flat out on eco-friendly and resource-saving procedures to drastically reduce the amount of waste water – target amounts here are 1 to 2 litres per kilogram of paper manufactured according to Voith Paper – and to keep the amounts still needed as pollutant-free as possible.

Determining the biochemical oxygen demand

One of many key indicators for assessing **wastewater quality** is the so-called **BSB 5**, the “**biochemical oxygen demand**“, in accordance with DIN EN 1899-1, which is used within five days by bacteria and other **microorganisms** to break down organic substances at a temperature of 20 °C. The water sample is mixed with oxygen-saturated water containing bacteria, and then its oxygen content is determined. After five days in the incubator, the oxygen content is again measured and the result – that is, the oxygen consumption – is specified as **BSB 5** in mg O₂/l.

In the fight against microorganisms: colony count is a part of quality management

Microorganisms such as yeast, fungus and bacteria can make life really difficult for a **paper mill**, because the production process with fluid media, heat and organic raw materials is an ideal culture medium. In the worst case,



Even when exposed to different levels of humidity the Silico Premium stays **dimension-stable** (Source Cham Paper Group; 2009)

The Memmert Incubator range

- Incubator I
- Peltier-cooled incubator IPP
- Cooled incubator ICP

biofilms are deposited in the equipment, corrosion occurs, raw materials can go off, the equipment may not function properly or there is a drop in product quality. Starting with the fibre materials and ending with the finished products, the spreading of **microorganisms** is constantly monitored in the laboratory, among other things, via the surface **colony count** in accordance with DIN EN 54378, as well as the total **colony count** in accordance with 54379.

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