Sartoflow®
Crossflow Filtration System for Beer
Sartoflow® Crossflow filtration system – a true alternative to diatomaceous earth filtration

**Application**
The Sartorius Crossflow Filtration System is the ideal solution for filtering beer in an efficient and environmentally responsible way. Using membranes specially designed for clarifying beer, breweries can now conduct beer filtration with a process that is a true alternative to the use of non-recoverable diatomaceous earth (DE). Both the development and the distribution of this new system take place in a cooperation of Sartorius and Alfa Laval.

**Features**
Sartorius provides a fully integrated solution complete with filtration membranes and process control. The fully automated Sartorius Crossflow System features high performance and low energy consumption.

The system uses inert filtration membranes that are easy to regenerate using only a hot caustic solution. It is constructed to allow complete cleaning-in-place (CIP) procedures and the modular design makes it easy to expand the system to meet future requirements.

**Benefits**
The Sartorius Crossflow System provides brewers with many significant benefits, including:

- Consistent beer quality in every batch
- Elimination of waste disposal and related disposal costs
- Same costs or less than DE filtration
- Steady, consistent filtration flow
- Simple operation and maintenance
- Elimination of health hazards associated with DE filtration

**System capacities**
The Sartorius Crossflow Filtration System is available for capacities between 100 hl/h and 500 hl/h.

**Filtration cassettes**
Our Sartocon® Filtration Cassettes consist of polyethersulfone membranes specially designed to meet the particular requirements of filtering beer. This membrane makes it easy to remove yeast, other microorganisms and haze without affecting the taste of the beer or the aroma compounds. In addition, the high performance of the cassettes means that they are economical in operation.

Features include:

- Inert beverage-grade material
- High flux rates
- Easy regeneration using only hot caustic solutions
- Retention of potentially damaging microorganisms
- Membrane highly resistant to chemical, thermal and mechanical stress
- Low adsorptive material
- Low energy consumption during filtration
Principle of Crossflow filtration

In static filtration, the product feed direction and the direction of filtration are identical. By contrast, in dynamic filtration the direction of filtrate is perpendicular to the feed direction. In the process, the product to be filtered (feed) flows tangentially across the membrane. This is known as "crossflow".

Under the influence of transmembrane differential pressure (TMP),

$$\text{TMP} = \frac{P_{in} + P_{out}}{2} - P_{filtrate}$$

smaller molecules and colloids pass as filtrate through the membrane, according to its pore size. However, larger colloids and particles are retained as retentate at the membrane surface.

As filtration progresses a cake layer, known as fouling, builds up on the membrane, decreasing the filtrate flow rate. In static filtration fouling continues to build, ultimately resulting in the complete blockage of the membrane.

By contrast the self cleaning effect in dynamic filtration guarantees that the filtrate flux is substantially boosted to a consistently high level and the in-service life of the membrane is considerably prolonged.

The following parameters determine the performance of crossflow filtration:
- The composition of the product to be filtered
- The operating parameters, such as tangential flow, transmembrane pressure (TMP) and temperature
- The properties and structure of the membrane

Modern beer filtration from Sartorius

In traditional beer filtration and bottling, after fermentation the stored beer is driven across a separator and then a kieselgur filter. After this pre-clarification step the beer goes through a polishing filter and is stored in a pressurized tank. This bright beer is then bottled and pasteurised.

With the Sartorius Crossflow Filtration system, after fermentation the stored beer is also driven across a separator for pre-clarification. From this step the beer goes directly to a pressurized tank, which feeds the Crossflow system. This process eliminates the kieselgur filtration and polishing filtration steps of traditional beer filtration. Bright beer from the Crossflow system goes to a pressure tank, which is driven through a Sartocool PS sterile filter to the bottling machine. The final product is cold filtered beer of the highest quality.

For additional information contact your local Sartorius field engineer.