

Lenticular Filters for Microbreweries

Overview

For years breweries have been using sheet filtration to provide a clear and polished product while in the same step remove yeast and spoilage bacteria from beer.

Filter sheets can be used in two conventional types of filter system, one uses just plates to support the filter sheets and is known as a Sheet filter. The second uses filter sheets, filter plates and special spacers called 'frames' to allow space for the use of filter aids such as diatomaceous earth (DE) or perlite, these are called Plate & Frame filters.

Filter sheets are placed in a sheet filter machine, as beer passes through the sheets it removes unwanted protein and debris associated with the yeast metabolism as ultrafine particles, as well as the unwanted yeast and/or bacteria. Many different grades of filter sheets can be used in one machine making the filter assembly very versatile. By adding filter plates you are able to increase the amount of filter sheets the unit holds and you increase the filter surface area. So as your brewery increases capacity, so can your filter.

One drawback of the sheet filter is that the filters are open to the atmosphere. The filters can pick up bacteria as well as foreign matter by entering the side of the sheet. Another drawback is that it takes a long time to load and unload sheets. Some sheet filters can hold over 100 sheets. When the sheets are left in the press for extended periods of time the

filter sheets grow mold. These types of systems also leak beer on the ground if not properly sealed. It is not a very sanitary design. Even though sheet filter machines have some drawbacks, they still are widely used. Sheet filter systems come in all sizes. The most common sizes are 40 x 40cm, 60 x 60cm and 1m x 1m. These different sizes make it possible to filter either very large or very small batches of beer.

The Challenge:

Pall Corporation was challenged to develop a filter system that is as versatile as sheet filter technology- but also sanitary. The cost of the system must be expandable and comparable to plate and frame. To make a system sanitary, the filter sheets must be in an enclosed sealed housing. Adding filter area as production increases was also considered. The filters must be easy to use and easily changed out.

The Solution

Pall Corporation designed the Supradisc™ II — a fully enclosed modular filter sheet system. These filter sheets are constructed in a modular design and can easily be inserted into the filter housing. This special modular design is based on the Inside – Outside Separator technology. Two polypropylene support discs enable to support the filter sheet

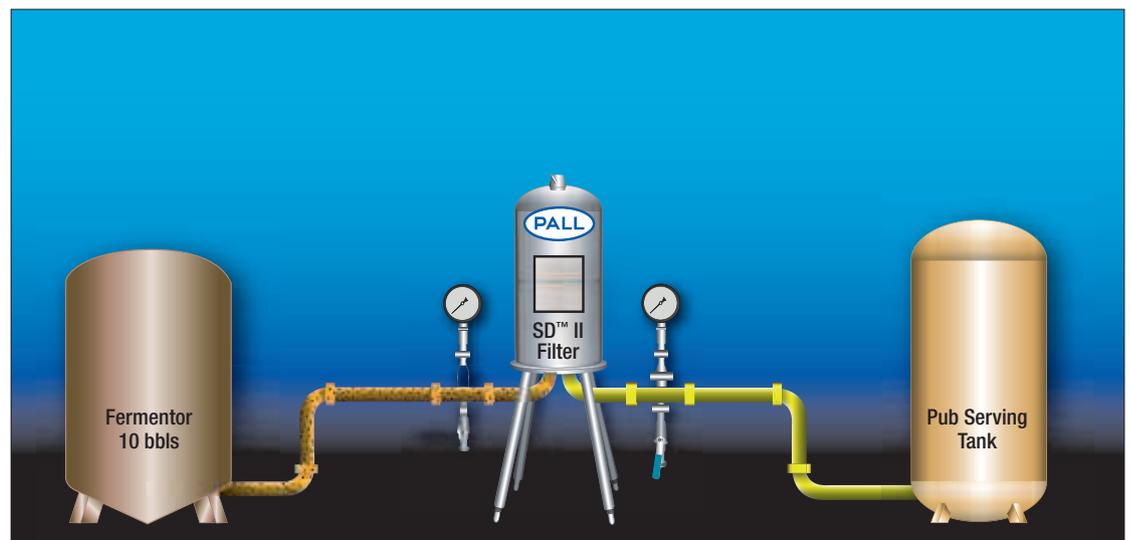


Figure 1: caption:

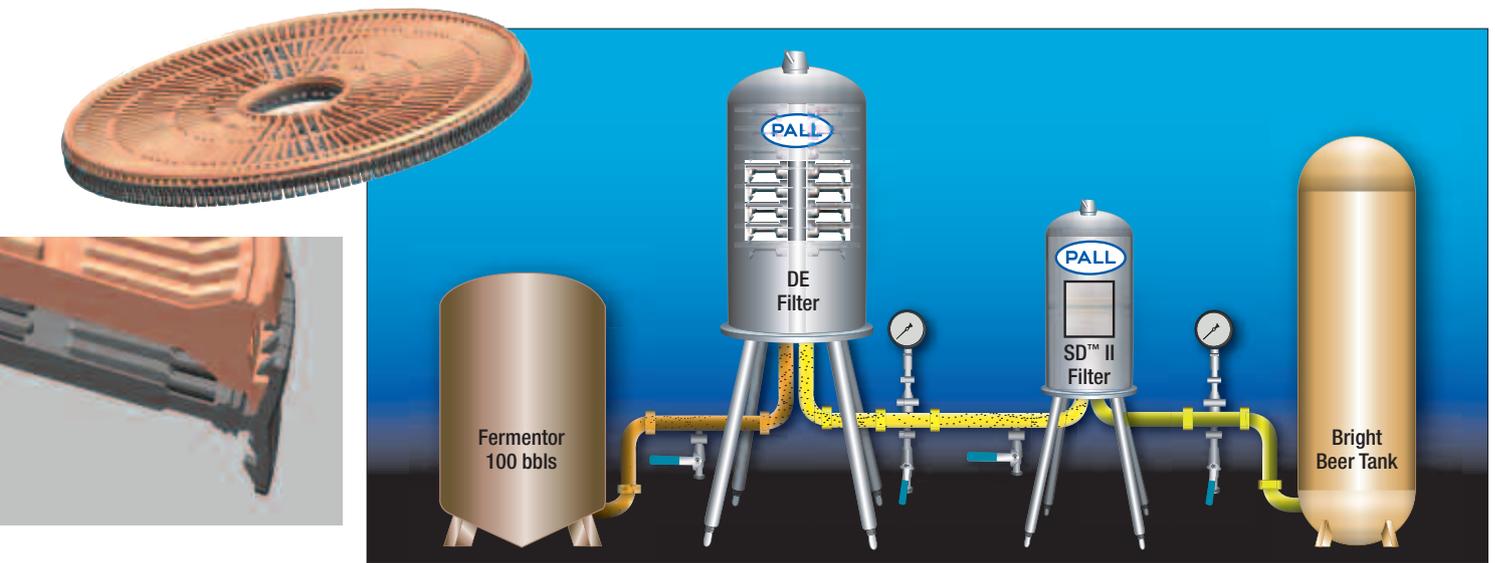


Figure 2: caption:

from the top and bottom, making it possible to back flush the modules and reuse them many times. The Inside-Outside Separators support also aids during filtration. If pressure shocks or high pressure is encountered during filtration, the polypropylene cage gives the filter sheet the extra support needed to prevent flexing, therefore the already captured particles do not unload into your filtered product.

This modular design also has several other advantages for breweries. The modules can be stored in the housing for extended periods of time, which aids in cost savings. Once filtration and cleaning/sanitizing are finished simply apply 5–7 pounds of CO₂ pressure to the housing. As long as the filters have CO₂ pressure on them they can stay this way until needed.

Another advantage is extremely low beer losses. When the batch is finished simply apply CO₂ pressure to the inlet of the filter and almost all the beer is pushed out of the housing to the next process step. Since the housing is enclosed you no longer have constant leakage of beer onto the floor.

The housing that holds the filter modules can also be expanded. By adding a spool piece to your already existing filter housing you can double the amount -of filters the housing holds. This comes in handy when production starts to increase and more capacity is needed.

The Supradisc II modules are available in 12" and 16" sizes. Each 12" module has 1.8 square meters of surface area. Therefore, a 4 high system has a total of 7.2 square meters. This is equivalent to forty-five 40 x 40 filter sheets. Each 16" Supradisc II module contains 5.0 square meters filter area that equals 20 square meters in a 4-stack housing. This enables to replace up to sixty 60 x 60 filter sheets. The handling and changeouts of the Supradisc II compared to classical sheet filters are very easy and quick, (about 15 min per 4 stack housing) and filter line downtime is reduced to a minimum.

The variety of filtration grades is another huge benefit of this technology. Supradisc II filters can be used in all phases of the brewery filtration process.

About Pall Corporation

Pall Corporation is the largest and most diverse filtration, separation, and purification company in the world. Pall serves the food and beverage industries with advanced membrane filtration technology and systems engineered for reliability and cost effectiveness. Membrane processes can concentrate products without heat, purify and clarify, selectively remove constituents, and minimize effluent. Unique space-saving membrane filtration systems are easy to install, simple to use, and satisfy a wide range of filtration requirements—from removing particulates and spoilage microorganisms to providing high-quality air and gases.



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