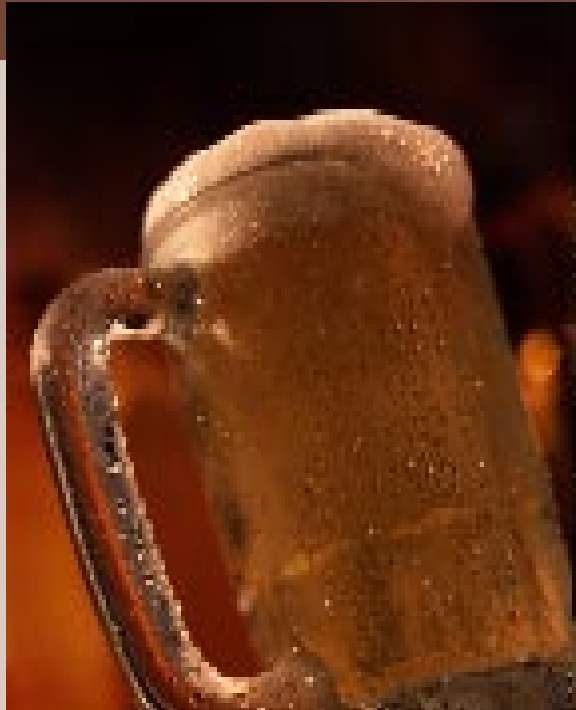


# Marketing Applications Publication

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## APPLICATION:

Filtration for Microbreweries



## BACKGROUND:

The brewing industry has recently experienced phenomenal growth in small, local breweries called microbreweries or brew pubs. Brew pubs make small volumes of beer for consumption in on-site restaurants. Sometimes they provide small containers for customers to take home. Since these tasty, craft beers are consumed shortly after the brewing process the only filtration required is for clarification (removal of residual yeast and brewing sediment). This is accomplished with a small filter press.

As the popularity of his beers grow, the owner of the brew pub expands the operation by marketing it to local restaurants, stores and even outside the local community. At this point two changes occur: 1) the establishments becomes known as a microbrewery and 2) it becomes necessary to "stabilize" the beer.

Stabilization is the process by which beer spoilage organisms (bacteria) are removed. This is necessary to preserve the taste of the beer over an extended time period. All beers contain bacteria such as *lactobacillus* and *pediococcus* which, if not removed, alter the taste of the beer. These bacteria are not harmful, they simply change the taste. Stabilization in large breweries is accomplished by heat pasteurization. In microbreweries, stabilization can be accomplished with membrane microfiltration.

## CASE STUDY:

In the brewing process, specialty grains (wheat, barley, rice, etc.) are mixed with hops and water. Yeast is added to begin fermenting the grains to alcohol. Following fermentation, the beer is separated from the grains and aged to develop the desired flavor. It is then filtered with a filter press using filter pads rated from 1 to 10 micrometers as needed. Some wheat beers are not filtered.

For beers requiring stabilization (also called "cold filtering"), the beer is filtered through a two stage filter system. The first stage contains cartridge filters rated at 1  $\mu\text{m}$  absolute. These are Parker Abso-Mate<sup>®</sup> pleated polypropylene cartridges which act as pre-filters for the second stage. The second stage utilizes Parker Advantage PS Ultra-Pure polyethersulfone microporous membrane cartridges rated at 0.45  $\mu\text{m}$  absolute. These effectively remove all beer spoilage organisms. Both pre-filter and membrane



cartridges are contained in Electropolished 316L Stainless Steel Filter Housings with sanitary design. The number of cartridges required is dependent on the filling rate required. The accompanying table provides recommended sizing and component part numbers.

It is also important to filter the incoming water to maintain a quality, consistently flavored beer. Incoming water should be filtered with Parker Fulflo® MBC melt blown depth cartridges rated at 20µm absolute. The incoming water filters should be sized to accommodate 3 - 5 gpm (10 - 20 lpm) per 10" (254 µm) MBC cartridge length.

**MEDIA:**

Incoming water:	Melt blown depth cartridge	MBC20
Pre-filter cartridge:	Abso-Mate pleated polypropylene	PAB010
Final filter:	Advantage PS Ultra-Pure polyethersulfone membrane	PSRB
Filter Housings:	Sanitary Electropolished 316L SS	PS Sanitary Series

**Microbrewery Filter Sizing**

Typical Filling Rate			Housing Size	Housing P/N
Bbl/hr	hL/hr	gpm		
1	1.2	0.75	1 Round x 10"	PSC01N18TX00H0S
5	6	2.5	1 Round x 30"	PSC01N38TX00H0S
10	12	5	3 Round x 20"	PSC03N28TW00K0S
15	18	7.5	3 Round x 30"	PSC03N38TW00K0S
20	24	10	5 Round x 30"	PSC05N38TW00K0S
30	36	15	7 Round x 30"	PSC07N38TY00K0S
50	60	25	12 Round x 30"	PSC12N38TY00L0S
75	90	40	12 Round x 40"	PSC12N48TY00L0S
90	105	50	21 Round x 30"	PSC21N38TY00N0S
120	140	60	21 Round x 40"	PSC21N48TY00N0S

**Recommended Filter Cartridges**

Length	Pre-Filter	Final Filter
10"	PAB010-10FS-TF	PSRB10STFU
20"	PAB010-20FS-TF	PSRB20STFU
30"	PAB010-30FS-TF	PSRB30STFU
40"	PAB010-40FS-TF	PSRB40STFU

**Filtration in the Microbrewery**

