

2 Fundamentals

The values listed in this guideline are based on beer brewed to an original gravity of 12 °P. Data for beer brewed to higher or lower original gravities can vary substantially.

Membrane filtration of beer is a complex, technical process step in beer production, the success of which can be measured using specific quality attributes of the filtered beverage as well as with data for yield and for losses. In this regard, the quality of the unfiltered medium (unfiltrate), the design of the membrane modules and the filtration technology play a crucial role and are therefore described below.

2.1 Unfiltrate

Defined according to a brewery's internal standards, unfiltrate is beer that has completed maturation and possesses the desired composition that is characteristic of a particular beer style. The beer is in a state in which the production process itself has concluded and all preparations for filtration (treatment with stabilizing and clarifying agents) have been completed.

2.2 Filterability

Filterability refers to how the composition and other properties of the beer influence the quality of filtration. The analyses and limit values recommended by MEBAK® for evaluating filterability can be found in analysis methods 2.20ff in the MEBAK® volume "Wort, Beer, Beer-based Beverages", published in 2012.

2.3 Membrane Filters: Materials and Design

A variety of membrane materials and designs find application within the realm of filtration for clarification.

Both ceramic and polymeric membranes are used for this purpose. The polymeric membranes consist primarily of PES (polyethersulfone). Both kinds are utilized as membranes for microfiltration with pore sizes in the range of 0.5 μm .

Regarding the designs, tubular and capillary modules are commercially available, though in clarifying filtration, capillary modules with an inner diameter of 1.5 mm are the most prevalent. Typically, tubular ceramic filtration modules are more likely to be utilized for beer recovery.

2.4 General Layout of a Filtration System

The following schematic diagram (fig. 1) shows one possible configuration for a modern membrane filtration line with the recommended points for collecting samples and gathering measurement data (numbers 1 to 10). The centrifuge, additive dosing vessel and PVPP filter are considered optional.

In this schematic, the pre-run/post-run collection tank is not shown, since crossflow membrane filtration is normally employed in breweries where high gravity brewing is practiced. The post-run liquid, which accumulates as the system is being purged using de-aerated water (brewing liquor), can be fed directly into the filtrate tank without diluting the beer beyond the desired concentration. If high gravity methods are not employed and a separate pre-run/post-run collection tank is installed, an additional sampling port must be added.