

# Beer Brewing Process



## MILLING

Milling the grains - the **malt**.

It is important to crush the grains just enough to expose the starchy center of the barley seeds, without damaging the grain hulls. Once finished with the mashing process, the granulated grains are also used to filter the wort. During the beer brewing process, the starch will convert to sugars and later to alcohol.

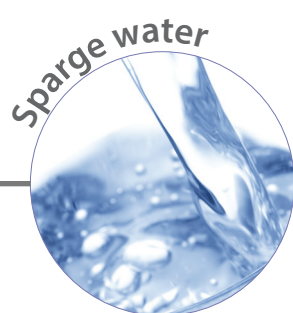


## MASHING



The crushed malt is added to a **mash tun (MM-LT)** and mixed with hot water to form the **mash**.  
The mash inside the tank is gradually heated to create optimal conditions for the activation of enzymes that break down the starch and convert it to simple water-soluble sugar molecules. Temperature and mashing time must be continuously monitored.  
The liquid obtained from the mash is called the **wort**.

## LAUTERING



Lautering is the process of separating the wort from the insoluble parts of the mash (grain) which are sparged with hot water to obtain any residual extract. The wort is drained through the perforated bottom, while the grain stays behind. The spent grain is removed once the mashing process is completed.



## BOILING



The sweet liquid called wort is pumped into the **kettle (K-W)**, where it is boiled in order to kill any microorganisms that may be present in the liquid.  
This is also the stage at which hops are added to the beer. Hops require boiling water in order to release their aromatic components.

## WHIRLPOOL



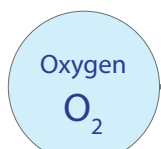
At the end of the boil, the solid particles must be separated from the liquid.  
When activated, the whirlpool effect makes the solid particles gather in the center of the tank bottom, so that they can be easily removed.

## COOLING



The wort must then be cooled down to fermentation temperatures before yeast is added.  
The wort cooling process is carried out using a plate heat exchanger.

## AERATION



Sterile air is then added to the solution to provide additional oxygen, which is needed for the yeast to function and helps the yeasts to split into multiple cells.

## FERMENTATION



Once the wort is sufficiently cooled and aerated, it is transferred into the fermentation tank. Yeast is then added to start the fermentation process.  
It is during this stage that the sugars that were released from the malt are converted to alcohol and carbon dioxide.



## MATURATION / CONDITIONING



Fermentation produces "**green beer**" which contains suspended particles, lacks sufficient carbonation, taste and aroma, and is microbiologically unstable.  
Young beer needs to be matured to fully develop its flavor. There are two main maturation techniques.  
The first option is **secondary fermentation** of the remaining fermentable extract at a reduced rate, controlled by low temperatures.  
The second technique is the so-called **cold storage** - short-term storage of young beer at very low temperatures.

## FILTRATION

Most beers are then filtered. The filtration process removes the remaining solid particles, which improves the beer's flavor, shelf life, and appearance.

## PACKAGING



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