BREWING PROCESS PRODUCTS

Your Grain-to-Glass Solution

Cole-Parmer®

MESLO

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Have questions?

We have answers.

The Cole-Parmer technical support team works with the Meslo support team, to ensure product expertise is available. They are here to help you select products, troubleshoot existing products, and solve regulatory compliance issues. Call or email us today so we can help you.

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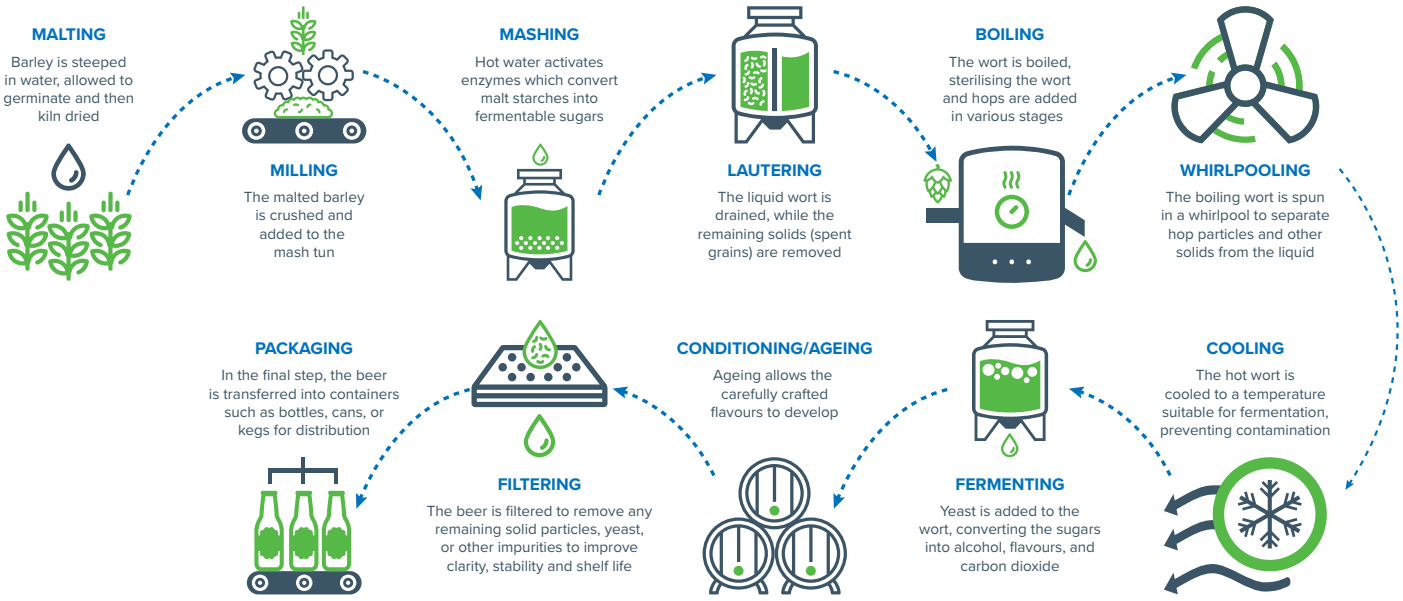
The Beer Brewing Process

Beer brewing is a meticulous process that relies on a range of specialised equipment and consumables to ensure each step is carried out with precision. From mashing and boiling to fermentation and filtration, tools like fermenters, pH meters, and filtration systems play a crucial role in maintaining consistency and quality. Accurate temperature control, appropriate sanitation, and efficient filtration are all key to producing a well-balanced brew. By utilising the right equipment and materials, brewers can achieve the desired flavours, aromas, and textures that define their unique creations.



Products Used in Multiple Brewing Production Steps

	Process Steps									
Product	**Malting**	**Milling**	**Mashing**	**Lautering**	**Boiling**	**Whirlpooling**	**Cooling**	**Fermentation**	**Conditioning/ Ageing**	**Filtering**
Jenway 3510 Digital pH Meter Kit - Compact unit provides accurate and reliable readings 			✓	✓	✓			✓	✓	
pH Buffers - Used for calibrating pH meters to ensure accurate pH reading 	✓	✓	✓	✓	✓	✓	✓	✓		
Traceable Precision Monitoring Thermohygrometer - 7 days of temperature and humidity data 					✓	✓	✓	✓	✓	
Digital Thermometers - For accurate temperature measurement during each process 	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Filter Paper - For any additional filtration if needed 	✓	✓	✓	✓	✓	✓				✓
Cheesecloth Lab Wipes - Designed to absorb 6 times their own weight 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Process Steps									
Product	**Malting**	**Milling**	**Mashing**	**Lautering**	**Boiling**	**Whirlpooling**	**Cooling**	**Fermentation**	**Conditioning/ Ageing**	**Filtering**
Industrial Wipes - Designed to absorb a variety of liquids and effectively remove residue 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Micro Green Cleaner - Ideal for removing sticky residues such as hops extract 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ultrasonic Cleaner - To effectively remove dirt and grime 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Digital Thermometers - allows dependable readings even in wet environments 	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Glassware Brushes - To clean glassware 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Aprons - For protection against liquid spills 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Process Steps									
Product	**Malting**	**Milling**	**Mashing**	**Lautering**	**Boiling**	**Whirlpooling**	**Cooling**	**Fermentation**	**Conditioning/ Ageing**	**Filtering**
Beakers and Flasks - Measuring, mixing and handling liquids 	✓	✓	✓							✓
Bottles and Jars - Storing and transferring samples 	✓	✓		✓	✓			✓		✓
Funnels - For transferring liquid without spillage 	✓	✓	✓		✓	✓	✓	✓		✓
Hydrometers - Measure specific gravity of the sample during a variety of steps in the process 			✓	✓	✓			✓	✓	
Refractometers - Quick checks on sugar content or specific gravity 			✓	✓	✓					
Tubing and Fittings - To aid in the transfer of liquids without spillage 				✓		✓	✓	✓		✓
Temperature Controller and Probe - Maintain desired temperature throughout the process 					✓	✓	✓	✓	✓	

Malting

During the malting step, barley or other grains are soaked in water to begin germination. The grain is then dried in a kiln to stop the germination process, thus producing malt.

The Three Key Steps of Malting:

Steeping – The raw barley is soaked in water to begin germination. Enzymes begin to activate, preparing the grain to convert its starches into fermentable sugar.

Germination – The grains are spread out and allowed to germinate for several days. The grain begins to sprout. The enzymes created during this process, (malt) are essential for breaking down starches into sugars.

Kilning – The germinated barley is dried in a kiln which removes moisture and preserves the enzymes that were produced.

Malting Products

Find out what other products we have for this process

Microscopes

Examine sprouting grains and assess germination quality and root development

Drying Ovens

For drying malt samples and ensures consistent drying condition and results

Laboratory Mixers

Blending and homogenising samples, ensuring even distribution of enzymes and other additives during malting

Temperature and Humidity Data Loggers

Devices track environmental conditions crucial for the germination phase, ensuring the ideal environment for enzyme activation

Milling

The malted barley is passed through a machine that crushes the kernels into a coarse powder called the grist and added to the mash tun. The goal of the milling process is to break down the grain kernels while maintaining the integrity of the husks.

- The malted barley is crushed to a specific size, the goal being to break open the grain husks, exposing the starch without completely pulverizing the husks.
- Milling maximises the amount of fermentable sugars extracted from the grains during the mashing process and increases the efficiency of starch conversion by providing better access for enzymes.

Milling Products

Find out what other products we have for this process

Mills and Grinders

Fine grinding and crushing grains to achieve desired particle size

Balances and Scales

Accurately measure the weight of grains and other ingredients ensuring consistency

Sample Containers

Collecting and storing milled grain samples

Stainless Steel Scoops

For taking samples without contamination

Mashing

The grist is mixed with hot water to create a mash. This activates enzymes which converts the malt starches into fermentable sugars. The result is a sugary liquid called wort.

- The sugars are essential for fermentation, as yeast will consume them to produce alcohol and carbon dioxide.
- The mash is held at a specific temperature for a period of time to allow the enzymes to fully convert starches into sugars.
- Mashing also extracts proteins, amino acids, and other components from the grain, contributing to the body, head retention and flavour of the beer.

Mashing Products

Find out what other products we have for this process

Refractometers

Quick measurement of sugar content and specific gravity in the wort

Strainers

For additional filtration if needed

Hydrometers

Measure specific gravity of the mash and wort helping in assessing the concentration of sugars

Lautering

The wort is separated from grain husks in a vessel called a lauter tun. The liquid wort is drained, while the remaining solids (spent grains) are removed.

- The mash is placed into the lauter tun - a vessel specifically designed to separate liquid wort from grain solids. Slotted plates allow liquids to flow through, retaining the grains.
- The milled husks form a grain bed at the bottom of the lauter tun which filters out solid particles as the wort is drained. Wort is then drained and recirculated to clarify the wort.

Lautering Products

Find out what other products we have for this process

Tubing and Fittings

To aid in the transfer of liquids without spillage

Refractometers

Quick checks on sugar content

Flow Meters

Measuring the rate of wort flow to ensure proper extraction and avoid clogging

Boiling

The wort is boiled in a kettle where hops are added in different stages for bitterness, flavour, and aroma. Boiling sterilises the wort.

- The wort is added to a large kettle and brought to a rolling boil. The process typically takes 60 to 90 minutes. Boiling sterilises the wort killing any bacteria or wild yeast.
- Hops are added at different stages for various effects. Early-stage addition is for bittering, mid-stage addition is for flavour, and late-stage addition is for aroma.
- During the boiling stage, some water evaporates concentrating the sugars and other components.

Boiling Products

Find out what other products we have for this process

Temperature Controller and Probe

To measure the temperature of the wort directly

Flow Meters

Measure the rate of liquid flow if transferring wort or adding ingredients during boiling

Hydrometers

Measure specific gravity in the wort before and after boiling

Whirlpooling

The boiling wort is spun in a whirlpool to separate hop particles and other solids from the liquid. The spent hops collect at the bottom for removal.

- The primary goal of whirlpooling is to remove hop particles, coagulated proteins and other solids (trub) from the wort, ensuring a clearer, cleaner final product.
- The trub collects into a cone shaped pile in the center of the vessel by whirlpooling which allows for easy separation of solids and maximises the amount of clear wort that can be recovered.

Whirlpooling Products

Temperature Controllers

Maintain desired temperature throughout the whirlpooling process

Overhead Stirrers

Suitable for larger volumes or wort; can create a whirlpool effect with adjustable speeds

Tanks and Vessels

Essential for separating hop particles and trub from the wort

Whirlpooling

Whirlpooling Products (continued)

Tubing and Fittings

To aid in the transfer of liquids without spillage

Pipettes and Pipettors

Essential for precise measurement and transfer of fluids

Graduated Cylinders

Take samples of the wort for analysis

Hoses and Clamps

Secure hoses and connections and easy assembly and disassembly of filtration equipment

Cooling

The hot wort is cooled to a temperature suitable for fermentation. This prevents contamination, avoid undesirable flavours and create the right conditions for yeast to be added. The worth is then transferred to fermenters.

- Cooling the wort rapidly helps prevent bacteria or wild yeast from growing which could spoil the brew.
- If the wort is not cooled quickly enough, unwanted chemical reactions, such as the formation of dimethyl sulfide (DMS), can occur, leading to off-flavours in the final brew.
- Cooling the wort to the correct temperature is essential for yeast health. If the wort is too hot when yeast is added, it can stress the yeast, leading to poor fermentation or undesirable flavours.

Cooling Products

Immersion Cooler

Stainless steel probes are immersed in the wort to cool it down quickly

Cooling Baths

Used to cool samples quickly; useful for small-scale brewing or testing

Recirculating Chillers

Precise temperature control by circulating a chilled coolant around the wort

Fermentation

Yeast is ”pitched” into the wort, converting the sugars into alcohol, flavours and carbon dioxide giving the brew its alcohol content. Starting the fermentation process converting sugars into alcohol can take several days to weeks.

- Yeast activity is noticeable as the beer bubbles and froths as the carbon dioxide is produced
- The process not only produces alcohol but also contributes significantly to the flavour, aroma and palatability of the beer

Fermentation Products

Recirculating Chillers

Maintaining constant temperature

Graduated Cylinders

For gathering samples

Stainless Steel Tanks

Vessels for brewing large quantities of beer

Conditioning/Ageing

Conditioning/ageing is the final maturation step that allows the carefully crafted flavours to develop. Carbonation can occur naturally or be added artificially during this stage.

- Conditioning allows the brew to rest, mature and clarify.
- Conditioning allows the beer to achieve full flavor potential.
- Carbonation levels and clarity ensure the brew is enjoyable to drink.
- Conditioning time varies depending on the style of brew – ales take a few days to a few weeks, lagers require longer conditioning time between 4 and 12 weeks, high-alcohol brews require several months, and sometimes even years.

Conditioning/Ageing Products

Dissolved Oxygen Meters

Ensure the right amount of oxygen is present

Stainless Steel Tanks

Vessels for brewing large quantities of beer

Refractometers

Quick checks on sugar content

Filtration

The brew is filtered to remove any unwanted solids like yeast, hop particles and proteins. Filtration ensures a clean appearance and refined taste.

- The process must be carefully controlled to avoid stripping away desirable flavors or aromas while ensuring the beer remains visually appealing and stable for packaging
- Filtration levels vary based on the style of brew – lagers and pilsners require extensive filration since they are expected to be crystal clear, while wheat beers and IPAs can maintain some of their haze as part of their characteristics and flavour profile.

Filtration Products

Microscopes

Examine filtered beer to check for remaining particles or contaminants

Filtering Flasks

For liquid and solid separation

Hoses and Clamps

Secure hoses and connections and easy assembly and disassembly of filtration equipment

Tubing and Fittings

Transferring liquids through filtration systems

Filtration

Filtration Products (continued)

Storage Tanks

Holding beer before or after filtration

Sampling Handling

For taking samples without contamination

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