Brewing is the production of beer through steeping a starch (typically grain cereal) in water and then fermenting with yeast.

The Brewing Process

There are several steps in the brewing process, which include malting, mashing, lautering, boiling, fermenting, conditioning, filtering, and packaging. There are three main fermentation methods, warm, cool and wild or spontaneous. Fermentation may take place in open or closed vessels.

1. Water

Pure water is essential to good beer – and brewers pay close attention to the source and purification of their brewing water. The water used in brewing is purified to rigidly set standards. If it doesn't have the proper calcium or acidic content for maximum activity of the enzymes in the mash, it must be brought up to that standard.

2. Malt

World famous Canadian barley is used to make brewers' malt. To make malt, grain is first allowed to germinate. It's then dried in a kiln or often roasted. This germination process creates enzymes that convert the grain's starch into sugar. Depending on how long the roasting process takes, the malt will darken in colour. This is what influences the colour and flavour of the beer.

3. Mashing

Now malt is added to heated, purified water and, through a carefully controlled time and temperature process, the malt enzymes break down the starch to sugar, and the complex proteins of the malt break down to simpler nitrogen compounds. The mashing takes place in a large round tank called a "mash mier" or "mash tun", and requires careful temperature control. Depending on the type of beer desired, the malt is then supplemented by starch from other cereals such as corn, wheat or rice.

4. Lautering

The mash is transferred to a straining or "lautering" vessel, usually cylindrical, with a slotted false bottom two to five cm above the true bottom. The liquid extract drains through the false bottom and is run off to the brew kettle. This extract, a sugar solution called "wort", is not yet beer. Water is sprayed through the grains to wash out as much of the extract as possible. The "spent grains" are removed and sold for cattle feed.

5. Boiling & Hopping

Boiling takes place in a huge cauldron-like brew kettle that holds up to 1,000 hectolitres under carefully controlled conditions. The process to obtain the desired extract from the hops usually takes about two hours. The hop resins contribute flavour, aroma and bitterness to the brew. Once the hops have flavoured the brew, they are removed. Sometimes, highly fermentable syrup may be added to the kettle. Undesirable protein substances which have survived the journey from the mash mixer are coagulated, leaving the wort clear.

6. Hop Separation & Cooling
After the beer has taken on the flavour of the hops, the wort then goes to the hot wort tank. It's then cooled, usually in an apparatus called a plate cooler. As the wort and a coolant flow past each other on opposite sides of stainless steel plates, the temperature of the wort drops from boiling to about 50°F to 60°F (a drop of more than 150°F) in a few seconds.

7. Fermentation
This is where all the magic happens – where the yeast (those living, single-cell fungi) break down the sugar in the wort to carbon dioxide and alcohol. It's also where a lot of the vital flavour occurs. In all modern breweries, elaborate precautions are taken to ensure that the yeast remains pure and unchanged. Through the use of pure yeast culture plants, a particular beer flavour can be maintained year after year.
During fermentation, which lasts about seven to 10 days, the yeast multiplies until a creamy, frothy head appears on top of the brew. When the fermentation is over, the yeast is removed. At last, we have beer!

8. Cellars
For one to three weeks, the beer is stored cold and then filtered once or twice before it's ready for bottling or "racking" into kegs.

9. Packaging
In the bottleshop, machines can fill up to 1,200 bottles per minute. A "crowning" machine integrated with the filler, places caps on the bottles. Emerging from the pasteurizer, the bottles are inspected, labelled, placed in boxes, stacked on pallets and carried by a lift-truck to the warehousing areas to await shipment. Also in the bottle shop may be the canning lines where beer is packaged in cans for shipment.
Packaged beer may be heat pasteurized or micro-filtered, providing a shelf-life of up to six months when properly stored. Draught beer, since it is normally sold and consumed within a few weeks, may not go through this process. The draught beer is placed in sterilized kegs, ready for shipment.

10. Product Quality
Beer production is one of the most closely supervised and controlled manufacturing processes in Canada. Apart from brewing company expenditures on research and quality control designed to achieve the highest standards of uniformity and purity in the product, the production of beer is also subject to regular inspection and review by federal and provincial health departments. Substances used in the brewing process are approved by Health Canada.

http://www.thebeerstore.ca/beer-101/brewing-process