

The Beer

History

The oldest written documents, was found 2500 years before our time in Babylon. From this epoch are the laws of the Hammurabi.

In this documents we can see, that the beer was already beverage for everybody with specified regulations. The landlord had already a certain limit for their beer sale. For those who sell beer, which was of inferior quality and out of the price limit, should be through into the water.

According the legend, the King Gambrinus has discovered the beer and therefore until now he is still the patron saint of the brewers. Indisputable, the monasteries play a very big roll for the beer discovering (like Weihenstephan – in Germany). To keep the very high standard of the beer, some regulations was already issued in the middle age.

In the year 1516, the two Bavarian dukes Wilhelm the IV. and Ludwig the X, said:

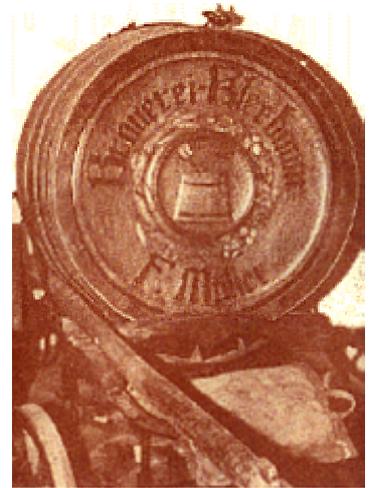
“ Especially we want, that from now on in our towns, markets and in the country the following will used only for the beer brewing, Barley, Hops and Water”

This rule is worldwide well known as the **German Beer Purity Rule**. It's also the oldest food rule, which we know in the European history.

In Germany its still have to whole weight.

Just the concrete of additional Beer yeast for the fermentation was not usual at this time

During this time the fermentation starts alone. The brewers was just waiting until the beer spice starts to ferment



How to get beer from malt, hops yeast and water?

We only get the brew malt from the summer barely. She actually gives fewer yields but because of the bigger seeds and the finer husks we can get a higher quality for the beer.

Water gives new life to the seeds:

We can't get beer from the rough barley. The valuable content from the seed have to come out first, to change the starch later to fermentable sugar

This happens in big container under additional water the seeds start to pour for 1 to 2 days

After the seeds come to big bud boxes. Under constant supply of oxygen and under temperature observing, the barley must sprout for 8 days. The result we get, we call green malt.

From the barley we got green malt and we will get brew malt from the green malt

In hot air the still germinate green malt will get dry on the Dryer (also knows as darre)

During this procedure the dry malt get his typical aroma. Through different temperatures, moisture and term of the dry process, we can get light or dark malt and after pale or dark beer.

The root germs will be removing and find the place as food for animals. After this procedure, the malt just has 3-4 % moisture, the growing process of the germs is finish already and the enzymes remain. The germ will be removed and the seeds polished. From now on, the brew malt is already prepared for the storage in big containers

Brew mixture – the first process

The process is located into the brew house. In the coarse mill the malt will coarse, so that the husks remain and can be used later as filter material during clear up in the tanks

The already coarse seeds will mix together with the water (brew mixture). The exactly proportion between water and a certain temperature, bring the malt enzymes back to life. The process happened in the brew mixture pan. Because of the enzymes, after a certain time, the water-soluble starch from the fermented barley is changing to water-soluble malt sugar. Without this natural process, the making of beer is impossible. After brew mixture process we will separate the water-soluble from the not water-soluble parts. The spice, the liquid part runs through the simmer bottom from the purifying tank or through the filter. The cover substances remain as filter material and use to food for the animals

Hons - The spice:

We have aroma and bitter hops. The valuable from those, is the aroma hops. He gives the beer, in the right mixture with the bitter hops, the typical flavour.

The world biggest cultivation area is located in the German Federal Land „Bavaria“, especially in the region of Hallertau in south of the river Donau. Only the female not fertilised blossoms will use for the beer brewing. The harvest is end of august

Hops and Malt the beer spice

The hops comes to the brew pan, with around 100 - 400 gram pro Hectolitre. We also call this spice cooking. Through the cooking process, the bitter parts of the hop are coming out, as well as parts of the natural proteins from the malt, which is unwanted for the beer. Through the cooking temperature from 100°C, the spice will be sterilised. Now they just have to cool down to 5 – 10°C, before they will transfer into big tanks for fermentation

In the fermentation cellar

In the tanks for fermentation and under addition of yeast we get the beer spice. That means, the added yeast change the dissolved malt sugar on a natural way to alcohol and carbonic acid

The process is what we call Fermentation. We distinguish 2 different kinds of brew yeast.

The lower fermented yeast ferments the malt sugar in around 8 days, with a temperature from between 4 – 8°C. The yeast goes down to the bottom. The result is lower fermented beer.

Die upper fermented yeast needs higher temperature between 15 – 20°C and the fermentation takes around 4 – 6 days. The yeast goes up to the top, after the fermentation and it will be removing there. The results are upper fermented beers. The young beer is finish. It will transfer now into big tanks in the cellar to store it on 0°C. The beer become silence, it gets his typical flavour and through the after fermentation, the CO₂ is tied on a natural way. The entire process takes around 5 – 12 weeks

The four main elements of the beer

Clear water gives good beer

Only on places with good and enough water we can produce good beer. The quality of the water is also decisive for the taste of the beer. Therefore breweries in the past was always located near to deep springs to guarantee the perfect water supply



Not only the cleanness of the water, but also hardness grade can have influence to the beer later. The hardness grade is telling us the content of the salts and minerals substances, which will come loose. The special characters of the different waters are also decisive for the final result after brewing as well as for the quality too.

Without enough water resources the beer brewing is impossible. Water is use to cleaning the facilities, the bottles and the barrels too (this takes the biggest part of the water). Besides we need the water for the entire brewing process. The brew water must be biological clean and also clear.

According our knowledge water is H_2O – but the in the water we can get straight from the nature in springs and wells we also find chalk, magnesia-salt and carbonic acid, as well as trace elements like pebble acid, iron and phosphorus sour chalk. The hard water has also too much salt content.

The German hardness grade also known as pH is defined as 1-gram calcium oxide in 100 ml water. The carbonates are mostly calcium and magnesium

The hardness grade is important, because during the brew process the water salts together with the other soluble substances from the malt and hops can influence the enzymes of the malt. Chemical, the water should be neutral, that means not sour and not alkali too. Hard waters change to beer colours and make them darker. They also change the taste from the hops and low down the enzyme process.

Since the breweries know this, they start to prepare their water to bring the hardness grade down from 2 – 5 grades

The barley gives the colour and body to the beer

Colour, power and taste are coming especially from the malt. But malt doesn't grow on fields; we have to take it from the brew cereals. The mostly used kind is the summer barley. This barley has a high part on starch, have low proteins but have actually not big yields



The specialist can recognise good brew barley first on the smell and on the light yellow colour.

The barley seed insist on sprout, the flour body (Endo-sperm) as well as the covering husks. Preferred are light yellow and shining husks. Besides, they also must be thin curled, bushy and short. Except the barley other kinds will be used too, especially for upper fermented beers they use also wheat as well as rye also. That kind doesn't have husks.

The breweries only use the, during the spring cultivated and low protein summer barley. The winter barley has more yields but the husks are bigger, having more protein therefore the extract is lower too.

The barley seed have 3 parts: the skin, the seed content and the sprout. The skin is made to protect the thin starch cells, which are covered from the thick cells, the protein adhesive and aleuron layer. Inside the sprout we can find the sleeping life of the grain. That's the place where the plant will be produced

The starch seeds can be dissolved totally during heating in water, without to produce paste. The starch content of the brewing barley is around 60 – 80%. The protein content is around 9 – 13%, is depend on the soil composition and the weather conditions during the year of cultivation. High protein contents are good for the animal food but not good for the brewing process. It's more difficult to purify the beer, but a minimum of the protein is necessary too. The dissolvable elements of the protein and their higher molecular waste products are responsible for the froth forming and keeping in the already brewed beer. The lower amino acids are important for the feeding of the sprouts during yeast nutrition.

Besides the barley still have mineral parts, especially pebble acid, calcium, phosphate and traces of chalk, iron and sulphur. The barley in their raw condition is impossible to use for the beer production. Through the process we get a slacking of the seed content and activation as well as forming of certain enzymes, which influence the bio-technical process of the brewing. Because for the brewing we need special enzymes, which can reduce the starch and protein from the barley malt. Enzymes or ferments are stimulating substances, which can release bio-chemical processes or make them faster. But the enzymes doesn't chance themselves, so therefore we can call them also catalysts.

A hop gives the aromatic bitter taste

The part of the hops, which we will use for the brewing is just around 200 – 500gram pro hectolitre, so its just an small part. But nevertheless the hop is still called as the soul for the taste. Without him, the characteristic and refreshing bitter taste from the beer is impossible. The quantity and the kind of hops depend on the kind of beer



Just since the middle age the hop is use to the beer brewing. The hop is an invention from the monks, which had played a big part for the brewing culture in their monasteries. Its up to them that the beer and the brewing is well known world wide, with this quality

The important substances inside the hops are so-called Lupulin seeds, which can find inside the blossom stack of the female hop plants. The small sticky seeds get a substance, which is based on hop oil, bitter aromas and tan substances

The hops (*humulus lupulus*) are climber of the group of nettle plants. He is two plants, that means his male and female blossoms growing on different plants

The hops shoots – two pro plants growing until the high of 8 meters. The hop cultivation needs special conditions for their growth with regard to climate, weather conditions and soil. The new cultivation of the hop needs a lot of experiences and expenditures. The best one for the hops are loamy, sandy and root- pervious soils

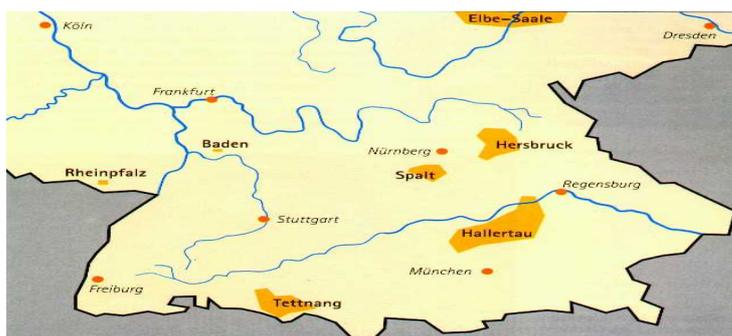
The best time for the hop harvest is between the end of August and middle of September. The hop will dry after the harvest and cool down as well as squeezed before preparation. Mostly already squeezed hops will use to pellets, because this conditions are better for the storage.

A fresh hop is a very delicate product of the agriculture. If he get to warm or he isn't stored airtight, he will loose during one year up to 35% of his brew value, because the fine aromas evaporate

After the brewing process is done, we still have around 20% of the hop bitter substances inside the beer. There are not just responsible for the taste but also for the stability of the froth. The hop oil gives the aroma for the beer and the tan substances having a positive effect of the durability from the beer.

Also the antiseptic effects from the Lupulin seeds, which stop the growth of the milk acid bacteria's, inside the beer, are important for the brewing too.

The cultivation areas from the hop in the Federal Republic of Germany



Yeast is in charge for the fermentation

To get an alcoholic beverage from a sugared liquid – in the case of the beer it is the beer spice – we need an alcoholic fermentation. This is coming through a microorganism, the yeast. For the brewing, we distinguish 2 different kinds of yeast. We have the upper ferment yeast (*saccharomyces cerevisiae*) and the lower ferment yeast (*saccharomyces carlsbergensis*)



The beer spice we get from this, will be later, with the lower ferment yeast, which changes the malt sugar into the alcohol, fermented. Because of the slowly and gentle working yeast, during cool temperatures, which goes down on the end of the brew process, we call this lower ferment beer, as opposed to the upper ferment beer, which will be fermented with other kinds of yeast and warmer temperatures.

The yeast is a one-cell fungus. He growth through shooting. He form one daughter cell which can get the size from the mother cells, than she separate from the mother cells and form their own sprouts

The beer yeast is the supplier for vitamin B1 and B2, but the most important function is to change malt sugar in alcohol, CO₂ and heat. For this process they need a lot of oxygen.

The lower ferment yeast work with temperatures from 5 – 12 °C. The upper ferment yeast needs temperatures for the main fermentation from 15 – 21°C (especially use to the making of wheat beers).

After each fermentation (the brewer call this leads), the yeast will be washed and stored cool. Because of his vegetative growth we have a danger, especially for lower ferment yeast, of degeneration or infection. To prevent this, the lower ferment yeast will mostly give up after 5 – 7 leads.

The brewer also calls the yeast „Stuff”. The notion is still coming from the time, as the brewers didn’t know yet, how the yeast makes this process of fermentation. The yeast gift is the “Stuff gift”. That means that for 100 hectolitres spice, they use around 75 – 100 litters thick pulpy yeast. That looks just a few, but its enough of yeast cells, because in 1cm³ we have around 10 millions of yeast cells. Each of them is just 6 to 10 μ; this is maximum just one hundredth millimetre big.

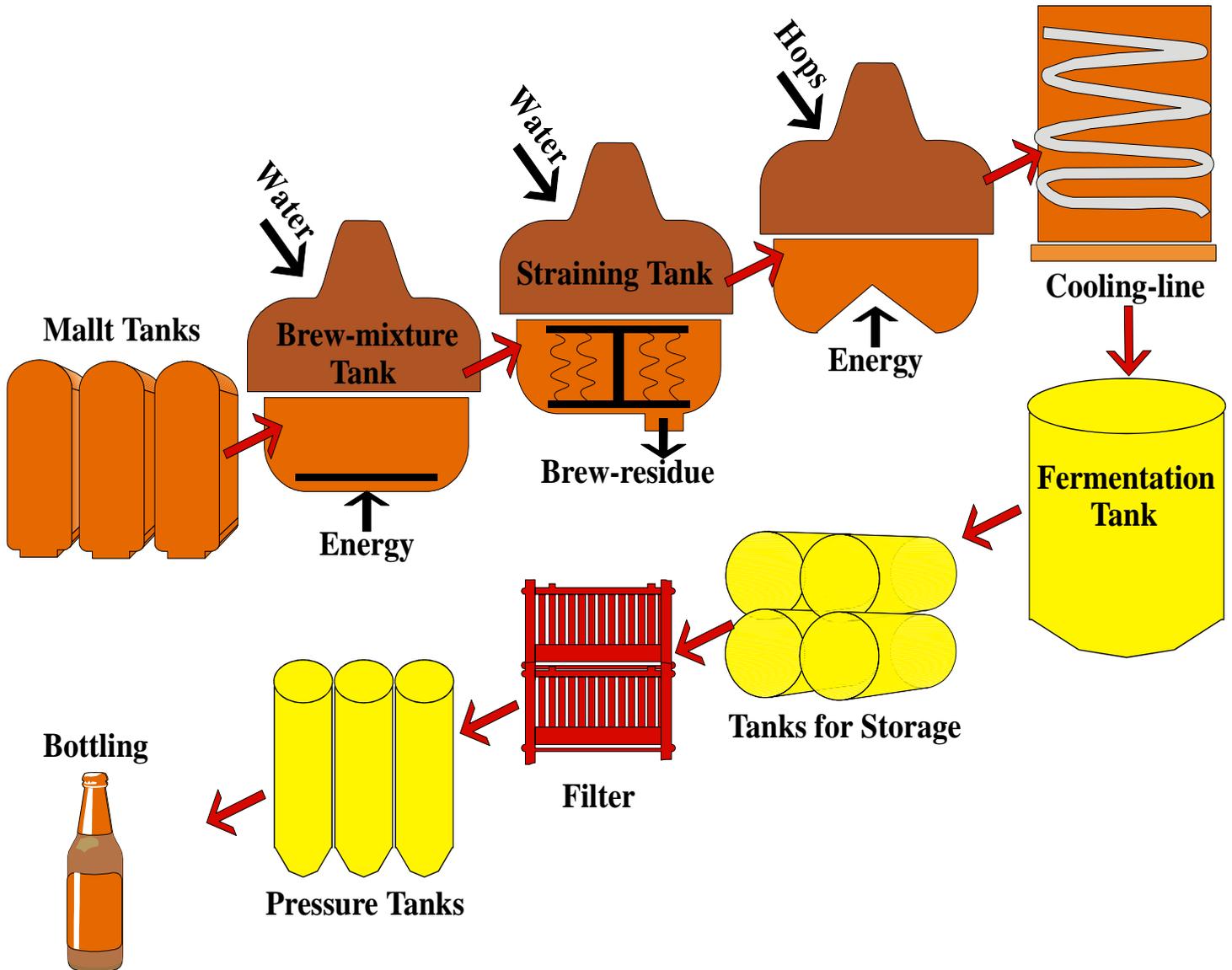
To get a good beer, we need a lot of things, like water, grain, a bit hops and yeast. The rest is technique. It’s an old technique, but during the last 500 years, the quality and the process of the developing didn’t stop. So the beer we can drink today is not the same anymore, than the one which we could get in the middle age. Also water is not just water, but the people in the middle age didn’t have this knowledge. The grain must be prepared in long and difficult processes. For the hops its important to know from which kind and which region it comes from. But last but not least the kind of yeast is responsible for the certain beer kinds. The beer brewing is a technology. The brewer use natural procedures to get from natural materials and natural beverage. The base is also a good knowledge about all the processes and the technologies as well as the keeping of hygiene rules and regulations and international standards.

Clear until the ripening

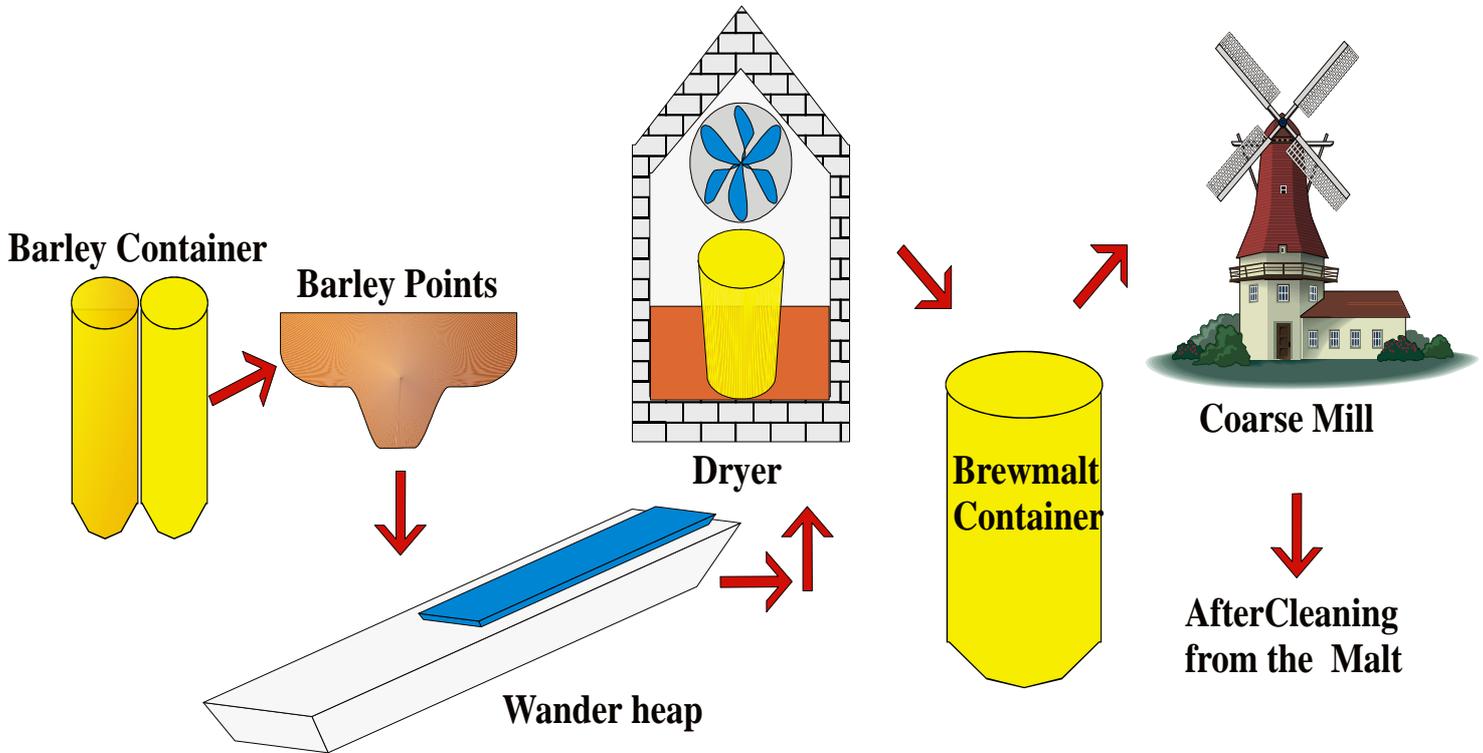
After the storage the already ripened beer must be filtered and it should be not in contact with oxygen. Before we can start we the bottling, all barrels and bottle must be cleaned first. Absolutely cleanness for the brew materials as well as for the procedure of beer making too, are very important.

Our beer will be brewed with very valuable materials, important ingredients like proteins and minerals with a lot of vitamins are going inside the beer during the process.

The Brewing process



The making of brew malts



The different kind and types of Beer

Beer will be subdivided in different types. The type depends on the regular spice content of the beer. This is also important for the payment of beer taxes. Until the 31.may in 1991, the notion Simple beer was still allowed. Since this date the following notion is requested
 "Beer with low regular spice content"

The beer types

Beer with low regular spice content under 7%	Normal beer 7-10%	Full Beer 11- to 16%	Heavy Beer 16%	Double Buck Beer 18%
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The different kinds of beer

Important for the kind of beer is the procedure of fermentation (upper ferment beer or lower ferment beer)!

The beer sorts

We distinguish, through of the different colours and characters from the beer

Lower ferment

Upper ferment beer

Pils beer	Old beer
Export beer	Malt beer
Märzen	Smoke beer
Light	Wheat beer
Dark beer	Steam beer
Diet beer	Porter
Buck beer	Stout
Double buck beer	Guinness

Survey over domestic beers

Pils beer	Light beer with strong hops StWG 11-14%
Export beer	Lighter than pils beer with aroma hops StWG 12-14%
Old beer	Upper fermented beer from the river Rhine region StWG 11,5-12%
Smoke beer	Regional special beer, the malt process starts over smoking fire from oak wood. StWG 13,5 %
Wheat buck beer	From wheat malt minimum- 16 % StWG
Double buck beer	Strong beer with more than 18% StWG.
Light beer	Alcohol and energy content up to 40% lesser than simple full beer
Diet beer	Light full beer, StWG ca. 11,5% , maximum 0,75 carbohydrates per 100ml, no rest sugar content. The carbohydrates content must be written at the label
Buck beer	Light- or dark coloured beer, StWG minimum 16 %
Wheat beer	Is based on wheat StWG ca. 13 % . The difference between yeast wheat and crystal wheat beer, for the yeast wheat beer, the fermentation is in the bottle or the beer will bottled unfiltered in this. The crystal yeast beer will be filtered before.
Steam beer	Amber coloured beer from Bavaria
Malt beer	Dark, upper fermented beer with an alcohol content from around. 0,5 - 1,5 % , but StWG 12 %
Märzen beer	Lower fermented full beer with about StWG 13 %
Alcohol poor beer	Maximum 1,5 Vol. % Alcohol content
Alcohol free beer	Maximum 0,5 Vol. Alcohol, the alcohol will be removed after the ripening as well as the fermentation finish earlier.
Spritzer	Beverage with beer and lemon soda

StWG = The regular spice content of the beer

Some different beer from the whole world



Brazil		Carioca
South Africa		Castell Lager
Australia		Fosters
Thailand		Singha
Japan		Kirin Beer
USA		New Yorker Beer

Ireland		Guinness
Jamaica		Red Stripe
Marokko		Casablanca
China		Tsingtao
Canada		Labatt Ice Beer
England		Ale

Which beer for which food?

Pils beer	3,9%	108	Hops - tart Splashy	Seafood, marinades, cook fish, steaks,
Export beer	4,2 %	115	Fine hop	Ragouts from game, mild cheese sorts
Märzen beer	4,1%	116	Mild bitter Malt taste	Veal legs, stews, cold cuts and roast goose
Buck beer	5,5%	154	Strong malt taste	Roast game T-bone steaks -, Porterhouse- , Beef steaks, strong cheese
Double buck Beer	5,7%	165	Strong malt aroma	Savoury roasts from dark meat Strong cold cuts and gingerbread
Wheat beer	4,0%	113	Splashy	Seafood, smoked salmon, caviar, cook fish, mild cheese
Old beer	3,8%	106	Tart fresh Fine spice	Mussels, chicken, turkey, veal, grilled Meat and Fish, deserts and cakes.
Malt beer	1,2%	114	Malty, sweet	Sweet soups, pudding, fruit desserts and Softcheese with fruits
Diet beer	3,6%	75	Tart fresh Refreshing	Light cold and warm foods. Suitable for diabetics (1,6 l = 1 BE)
Alcohol free Beer	Under 0,5%	70	Tart, hops	Summery and refreshing foods, food for car drivers.