Food and beverage industry

Water treatment for all applications

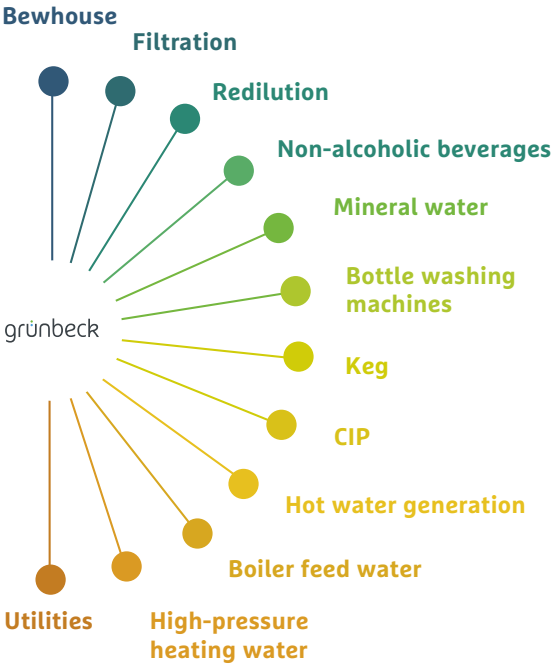
grünbeck

A clear goal: pure water for our food

Regulations such as the German Drinking Water Ordinance and the Mineral and Table Water Ordinance clearly define specifications for water used in the production of food and beverages. And Grünbeck accordingly develops efficient solutions and provides proven technology and water treatment processes for various applications. This creates clarity: for health and enjoyment.

Breweries for example

With a quantitative share of about 90 %, water is the most important raw material for beer production. It takes at least 2.5 litres of water to make 1 litre of beer. Only if the water quality is ideal, the brewing result can be impressive, too.



Brewing water

The residual alkalinity of the water is an important parameter. A value of +10 already increases the pH value of the wort by 0.3. Although the solubility of the α-acid increases at higher pH values, in addition to enzymatic degradation processes, however, the protein coagulation is negatively affected as well. To avoid poor fermentation, turbidity or a reduced shelf life, a residual alkalinity of -1 to +5 or a ratio of NKH : KH (non carbonate hardness : carbonate hardness) of 3 : 1 is aimed for. By adding 58.5 mgl/l CaCl2, the NKH can be increased by 1 °dH. In order not to exceed the limit values, the brewing water nowadays is softened by means of reverse osmosis and blended to a carbonate hardness of about 2.8 °dH.

GH (total hardness) = Carbonate hardness + Non-carbonate hardness
CH = Calcium hardness + Magnesium hardness

$$\text{m value}\left(\frac{\text{mval}}{\text{l}}\right) \times 2.8 = \text{Carbonate hardness (°dH)}$$

$$\text{RA (residual alkalinity)} = \text{Carbonate hardness} - \frac{\text{(Calcium hardness + 1/2 Magnesium hardness)}}{3.5}$$

Process water

To produce 10 hl of wort, you need about 15 hl of brewing water. The remaining water is used in CIP, filling and utilities. Most processes involve heating water, which leads to scale precipitation. The consequences are increased energy demand and costly cleaning. Even a scale layer of only 1 mm results in an energy loss of 10 %. In order to prevent this, the water is softened to about 4 to 5 °dH by means of an ion exchanger. In steam generation, this process is often coupled with reverse osmosis to achieve values of < 0.1 °dH and low salt rejection rates.

Conversion of mg/l into °dH (sample calculation)	
HCO_3^-	265 (mg/l) / 61 (mmol/mg) x 2.8 = 12.2 °dH
Calcium	50 (mg/l) / 20 (mmol/mg) x 2.8 = 7.0 °dH
Magnesium	20 (mg/l) / 12 (mmol/mg) x 2.8 = 4.6 °dH

TECHNOLOGIES FOR YOUR NEEDS

GENO-fine filter FME

EURO system separator GENO-DK 2-Maxi

GENO-activated carbon filter AKF

Reverse osmosis system osmoliQ:LB

Membrane degassing

Municipal water → **Fine filter** → **System separator** → **Dechlorination** → **Hardness stabilisation and reverse osmosis**

Well water → **Gravel filter** → **Ultrafiltration**

Hardness stabilisation and reverse osmosis → **Brewing water** → **Brewing process**

Brewing water → **Softening** → **Steam generator**

Hardness stabilisation and reverse osmosis → **Softening** → **Process water** → **Utilities**

Process water → **Disinfection** → **Bottle cleaning**

Brewing water → **Degassing** → **Mixing Non-alcoholic beverages**

Filtration

Rack-mounted modular system GENO-OSMO-X p

Ultrafiltration system ultraliQ:SB2000

Disinfection system violiQ:UV80i

Water softener GENO-mat duo WE-X

GENO-Baktox MRX

Proven processes for reliable water quality

- Filtration (fine filters, backwash filters, automatic filters, gravel filters, ultrafiltration)
- Removal of heavy metals (e.g. iron, manganese, arsenic, uranium, nickel)
- Activated carbon filtration (dechlorination, removal of CFCs, halogenated hydrocarbons, etc.)
- Deacidification, desulphurisation
- Membrane degassing
- Membrane processes (ultrafiltration, nanofiltration, reverse osmosis)
- Ion exchange processes (softening, removal of nitrate, demineralisation)
- Disinfection (UV systems, chlorine dioxide generation systems)
- Re-use (water saving potential with various filter stages, membrane technology)
- Neutralisation

All product illustrations are exemplary. Grünbeck provides customised solutions for your needs. We will be pleased to advise you.

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QUALITY
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German Standards
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