WATER REUSE FOR A HIGHER PURPOSE

THE NEW DEFINITION OF THE GERMAN BEER PURITY LAW

Beer Brewing: An old method of water disinfection processed in a new way.

In former times, where pathogen-free and clean water was not granted, converting raw water into beer was an appropriate method to avoid waterborne diseases and make use of natural water sources for human consumption.

Nowadays many of us are used to having high quality tap water available, but times are changing. Climate changes and urbanization threaten and stress our water resources.

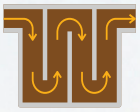
The need to explore new water supplies due to scarcity is becoming more prevalent.

Municipal wastewater is a source that is available in every city. A multi-barrier concept combining several state-of-the-art technologies can convert this effluent into a precious source of drinking water, and - even better - into refreshing beer to quench the thirst.

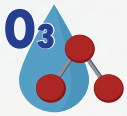
Xylem showcases how far technology has reached in order to convert wastewater to drinking standards, and help alleviate water scarcity.

THE TREATMENT

1. CONVENTIONAL WASTEWATER TREATMENT PROCESS



Conventional wastewater treatment consists of mechanical and biological treatment to separate solids and remove organic matter, phosphate, nitrates. The final effluent is suitable for discharge into surface water bodies, but still contains organic micropollutants and pathogenic microorganisms.



2. OZONATION

Weißenburg is the first WWTP in Bavaria with an additional advanced treatment to remove organic micropollutants. The WEDECO SMO Evo ozonation system from Xylem eliminates > 80% of indicator chemicals specified in the proposed revision of the EU Urban Wastewater Treatment Directive. In addition, ozonation provides additional disinfection with inactivation of bacteria and viruses by >99%.

3. BIOLOGICALLY-ACTIVE ACTIVATED CARBON FILTRATION

The filter is populated by microorganisms and serves as a biological step to degrade biodegradable products formed during ozonation. Furthermore, adsorption to activated carbon provides additional removal of certain organic micropollutants.

4. NANOFILTRATION

A membrane filtration method that is partially softening the water, reduces micropollutants, and disinfects the water.

5. XYLEM MIPRO ADVANCED OXIDATION PROCESS

The final safety barrier is advanced oxidation, which uses hydrogen peroxide and ultraviolet irradiation to produce hydroxyl radicals and remove 99.9999% of pathogens and another 90-99% of residual chemicals.

6. WATER TESTING

Water is tested by the laboratory of the Technical University of Munich to ensure water meets the high standards according to the German drinking water ordinance.

THE BREWING PROCESS

1. MASHING

Grinded malt is added in water and breaks down starch to sugar and complex proteins to simple nitrogen compounds, at different temperatures from 35°C to 78°C.

2. LAUTERING

The mash is moved to the lauter tun that extracts liquid, called wort, from the grain. The grain is then sparged with water to derive as much as 12% wort extract.

3. BOILING

Hops are added and boiled for flavor and aroma.

4. CHILLING

Wort is cooled as quickly as possible in a plate cooler.

5. FERMENTATION

Yeast is added to turn sugar into carbon dioxide and alcohol.

6. RIPING & FILLING

After fermentation, beer is transferred to another tank with limited oxygen exposure and stored in a cold, dark room and filtered once more. Bottles are filled, labeled and capped.

7. BEER TESTING

Beer is tested by the competent government agency and gives approval that it meets the standard fit for human consumption.

Drink moderately and enjoy.

TUM brau & getränke technologie

xylem
Let's Solve Water