pure beer

mark bosley, technical director, discusses the use and importance of pure water in the brewing industry

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Beer production requires four main high quality raw materials: malt, hops, yeast and water, which is more commonly referred to as 'liquor' in the brewing industry, and all of these ingredients have a direct impact on the character and quality of the beer produced. This is especially true of water, as its chemical composition, i.e. the quantity and variety of dissolved minerals in the water supply, can considerably influence the taste and appearance of the beer.

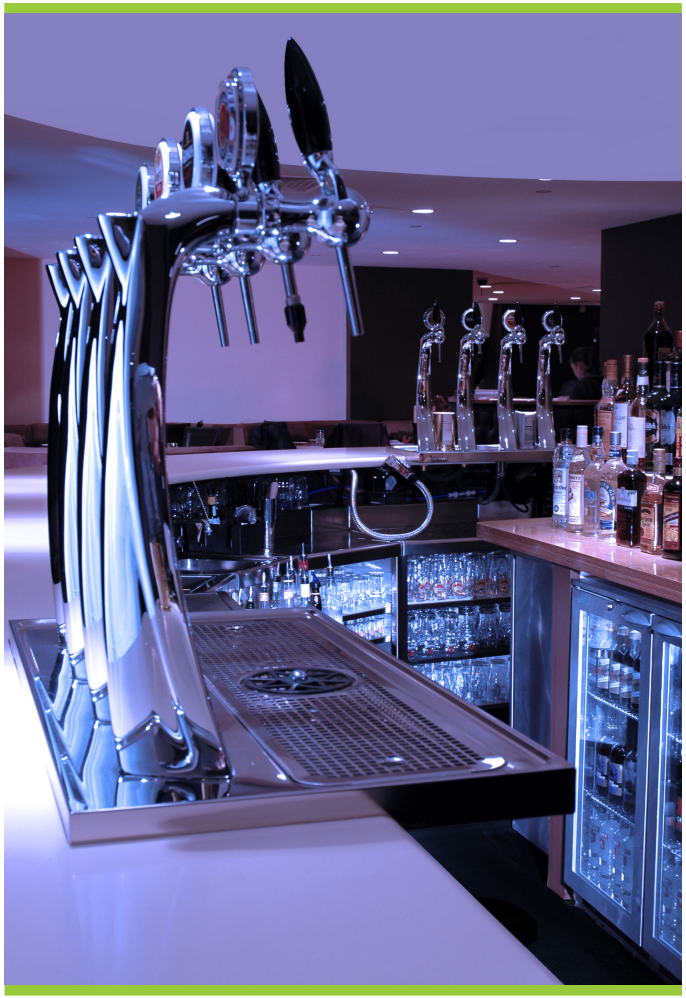
Due to the global nature of the industry, many key brands are produced locally to improve the speed of distribution and reduce costs. In such a competitive marketplace, where global brand values are crucial, it is critical that the quality and taste of beer, regardless of where it is produced, remains consistent.

Potable (mains) water typically contains elements that can cause beer spoilage, such as chlorine, bacteria and wild yeasts; although not harmful in drinking water, these can adversely affect the taste and appearance of beer. For example, sulphates can enhance the bitterness of beer while chlorides can increase sweetness. In addition, although traditional beers may still make use of wild yeasts, many brewers prefer to control the yeast culture, enabling them to guarantee consistent product quality.

Additionally, the chemical composition of water can vary considerably from region to region. Traditionally, local brewers who are often producing beer for regional or national use may obtain their water supply from bore holes or wells. For large scale national and international brewers, the huge requirement for water means that they often have to look for alternatives, such as mains water, which then requires treatment using technologies such as softening, filtration and reverse osmosis to achieve the desired water quality and composition.

Many UK beers, for example, that were destined for wider national markets, were initially produced in Burton on Trent, which is still regarded as the capital of the brewing industry in the UK. Gypsum deposits in the area made the local well water high in calcium sulphate which is particularly good for brewing.

As brewers expand their manufacturing sites throughout the world, it is essential that the water used is accurately reproduced. This typically involves water being demineralised, to remove all the minerals and salts that could affect the taste of the beer, and then carefully re-mineralised to restore the salts and minerals to match precisely the desired water composition. In doing so, a consistency of flavour and quality can be achieved globally for a given brand.



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A combination of pre-filtration, softening, carbon filtration and reverse osmosis can be used to remove 98% of minerals and salts from a raw water supply and up to 99% of bacteria, resulting in a consistent and high quality supply of pure water.

Demineralised water is required for a range of brewing processes and for certain cleaning duties. For example, in manufacturing methods such as high gravity brewing, only purified water can be used to dilute or 'cut' the beer back to the required strength. If mains water was to be used for dilution purposes it would re-introduce variables that could adversely affect taste and appearance.

CIP (clean in place) procedures also require purified water. For example, the final rinse water of many CIP processes uses water. This could introduce contaminants or micro-organisms that may taint the beer, therefore, purified water is frequently used for this final CIP stage. In addition, high purity water can be used for cleaning cans, bottle tops, kegs and storage vessels to ensure that bacteria or contaminants present in the water cannot affect the beer quality. In essence, any beer contact areas can benefit from using purified water as the final rinse process to prevent cross contamination.

Effective control over the purity of incoming water for use in processes, cleaning duties and as a constituent part of the final product is a vital part of the brewing process. Water is just one variable element in the production of beer, yet it can have a significant impact on the quality and stability of the product. For small and large brewers alike, the consistent taste and appearance of beer is crucial as this can affect brand values and, ultimately, customer loyalty. Achieving reliable and repeatable water quality is, therefore, an essential element in the modern brewing process.

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