

# Drinking Water

Desalination of ground or surface water, including rivers, lakes, wetlands and oceans, is increasingly being done to provide drinking water due to the shortage of fresh water supplies. According to the World Health Organization (2011), shortage of fresh water supplies is "...estimated to affect one in three people on every continent of the globe, and almost one fifth of the world's population live in areas where water is physically scarce."

Municipal water supplies are often contaminated with a number of impurities that may be hazardous to human health; such as pathogens (microscopic biological organisms capable of causing disease, including viruses, bacteria, protozoa, toxins and cryptosporidium), chlorine (often added to the water supply as a disinfectant), heavy metals (byproducts from industrial processes and consumer waste) and nitrates from pesticides (runoff from fields where crops are sprayed).

While chlorine kills bacteria and oxidizes organics present in feed waters, pathogens such as cryptosporidium or giardia are resistant to disinfection and must be removed by other methods such as ultrafiltration (UF). UF has proven a successful alternative to conventional treatment for the removal of protozoan cysts. With proper pretreatment, UF membrane technologies provide complete removal (ranging from >4 log to 6 log) of all protozoan cysts of concern.

## REVERSE OSMOSIS & NANOFILTRATION

For further drinking water treatment, reverse osmosis (RO) and nanofiltration (NF) elements have proven to be a successful and cost-effective technology to remove harmful heavy metals, disinfectant byproducts, organics, hardness, TDS, nitrates and color to meet safe drinking water quality requirements.

For more information about color removal, disinfectant byproduct reduction, boron rejection and nitrate removal, please see below:

[Color Removal & THM Reduction](#)

[Boron Rejection](#)

[Nitrate Removal](#)

Drinking water systems typically require NSF/ANSI Standard 61-certified elements. The National Sanitation Foundation (NSF) International helps standardize sanitation and food safety globally to help improve overall public health. MICRODYN-NADIR offers a wide range of RO and NF elements that have been certified to NSF/ANSI Standard 61 for use in drinking water systems:

- [TRISEP® ACM2 RO Elements – NSF certified for drinking water applications \\*](#)
- [TRISEP® ACM3 RO Elements – NSF certified for drinking water applications \\*](#)
- [TRISEP® ACM4 RO Elements – NSF certified for drinking water applications \\*](#)
- [TRISEP® ACM5 RO Elements – NSF certified for drinking water applications \\*](#)
- [TRISEP® ACMX RO Elements – NSF certified for drinking water applications \\*](#)
- [TurboClean® Beverage – Cellulose Acetate RO and NF Elements \\*\\*](#)

*\* Note: Because chlorine and other oxidizing agents are often used to kill bacteria and oxidize organics, please be aware that the ACM2, ACM3, ACM4, ACM5 and ACMX RO membranes are of polyamide chemistry and should be used after dechlorination steps; these membranes cannot tolerate chlorine or other oxidizing agents (less than 0.1 ppm).*

*\*\* Note: TurboClean® Beverage – Cellulose Acetate RO and NF Elements may be used to deliver high quality water for drinking and bottled water. The patented TurboClean hard shell offers a safe and sanitary operating system with none of the stagnant areas created by the brine seals of fiberglass membrane elements where bacterial growth is often found. Because these elements feature a cellulose acetate (CA) membrane, these elements may tolerate chlorinated feed streams of 0.5 ppm nominal and up to 1 ppm chlorine. This is especially beneficial for systems to control biofouling, where free chlorine is used to maintain a sanitary environment or for systems that have feed streams containing trace amounts of chlorine (i.e. to kill bacteria and oxidize organics).*

## TECHNICAL APPLICATIONS

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If an NSF/ANSI Standard 61-certified element is needed for a drinking water system but is not found in the above list, please contact MICRODYN-NADIR.

Other products that have been used in drinking water systems include:

- TurboClean® Beverage UF 10K Elements may be used to remove larger particles present in the drinking water system to deliver high quality water. The TurboClean® Bev 8040-UF element features a 10 kDa membrane suitable to remove suspended solids, proteins and viruses.
- TurboClean® Beverage Thin-Film Composite RO Elements deliver high purity, low TDS (dissolved solids) water for bottled water and drinking water. TurboClean Beverage RO elements are available in several membrane chemistries: standard high rejection RO (ACM2), low-fouling (X-20™), and low-energy RO (LE).
- TRISEP® ACM2 High Rejection Brackish Water RO Elements offer high removal of harmful heavy metals, disinfectant byproducts, organics, hardness, TDS, nitrates, boron and color to meet safe drinking water requirements.
- TRISEP® X-20™ Low-Fouling Brackish Water RO Elements also offer high removal of harmful heavy metals, disinfectant byproducts, organics, hardness, TDS, nitrates, boron and color to meet safe drinking water requirements. X-20 membrane is a fouling-resistant membrane with a unique, proprietary formulation that results in low-fouling characteristics. The unique barrier layer chemistry does not degrade over time like some competitive “fouling resistant” membranes that are simply modified or coated standard membranes. X-20 elements are excellent when treating feed waters contain higher organic levels while offering consistent high salt rejection and lowering cleaning frequency.
- TRISEP® TS80 High Rejection NF Elements have proven to successfully remove color as well as harmful trihalomethane (THM) precursors from water while also removing hardness, alkalinity, sulfates, bacteria, organics and other impurities.

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