

**CECO Peerless**



# PROCESS/POTABLE WATER TREATMENT

**DELIVERING CONFIDENCE IN SAFER, CLEANER  
AND MORE EFFICIENT ENERGY SOLUTIONS**

**CECO**  
ENVIRONMENTAL

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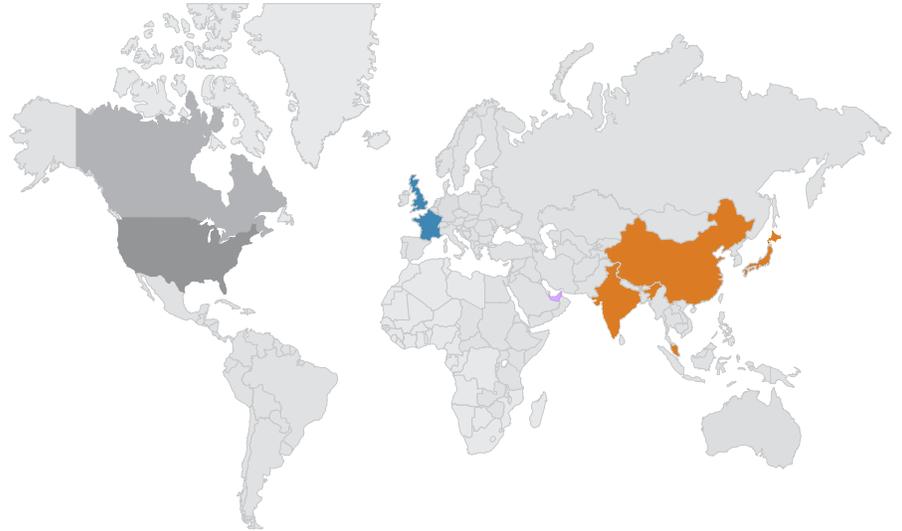
**CECO**  
ENVIRONMENTAL

CECO Peerless provides customized industrial process and potable water packages to meet customers performance guarantee and provide high quality process and potable water using the latest technologies to ensure smooth operation and long lifetime to downstream equipment.

CECO Environmental's energy solutions include leading technologies such as CECO Peerless separation and filtration, Burgess Manning oil and gas processing technologies and Skimovex oily water separation.

**Key CECO Peerless Facts**

- Experienced in technology, process, engineering and turnkey solutions
- Expertise from concept through commissioning stages
- Worldwide delivery capability and vast network of local/regional/global partners
- Global presence, multi-cultural teams with localised approach to attain clean, safe, efficient and sustainable solutions within budget and schedule



CECO Peerless provides you with the seamless end-to-end solution. We combine our technologies, process experience and R&D with our multi-disciplined engineering experience to give you every advantage:

- Concept/FEED studies
- Detailed engineering
- Engineered packages
- Modular/skid design and supply
- Fast track delivery
- Achieve overall performance
- Customer satisfaction
- After sales service



# PRE-TREATMENT

## DUAL AND MULTIMEDIA FILTRATION

Multimedia filtration is a method of filtering sediments and particulates from water by applying pressurized feed water to push liquid through filtration media. Multimedia filters are employed to eliminate suspended solids and reduce the turbidity level of the water by entrapping impurities within the media. It contains multiple layers of media such as sand, anthracite or granite, and gravel, arranged according to their densities where the lighter density is placed on the top.

### Applications:

- Surface water filtration
- Pre-treatment to RO System
- Tertiary filtration for wastewater treatment system.
- Cooling water filtration (side stream filters)
- Irrigation
- Industrial water and wastewater treatment
- Produced water treatment



## GRANULAR ACTIVATED CARBON FILTRATION

Activated carbon works via a process called adsorption, wherein a highly porous pattern in the granulated carbon media adsorbs and entraps contaminants from the water. Another element is added to the filtration process using activated carbon, in granular form, as a filter media.

GAC filtration is very effective in eliminating impurities and contaminants causing bad taste and foul odors, sediments, chlorine and other organic compounds. GAC filter is commonly used for water purification, air filtering and other industrial gas processing.

### Applications:

- Drinking water
- Condensate water treatment
- Industrial water treatment
- Polishing filter for iron removal
- Applied after multimedia filter to protect RO membranes from chlorine
- VOCs & H<sub>2</sub>S gas removal



## SPECIAL MEDIA FILTRATION

Special media filtration is developed to handle Iron, H<sub>2</sub>S, and heavy metals dissolved in water and in high concentration where conventional filtration is not enough. Special media filters are designed to reduce the contaminant concentrations in water to an acceptable level.

### Applications:

- Mining industries water treatment
- Industrial wastewater treatment
- Manufacturing wastewater
- Surface water and groundwater treatment
- Process water treatment
- Commercial and municipal water treatment
- Condensate treatment (heavy metals)



## CARTRIDGE FILTRATION

Cartridge filtration uses simple modular filters inserted into a housing and is used to remove particles or chemicals from water or fluid. Cartridge filters can be made from number for materials such as polypropylene or cotton wound or spun type, also can be made activated carbon in block.

Microfiltration is used as a polishing filter for granular media filtration and as pre-treatment for other membrane filtration like Reverse Osmosis to protect the RO membranes from damaging and fouling. Example of microfiltration is the use of Cartridge Filters which are available in different pore sizes (100 - 0.1 micron). Cartridge filters are mainly used in drinking water, surface water, seawater desalination applications, in addition to some other special applications such as:

### Applications:

- Pre-treatment to RO system
- Chemicals filtration
- Beverages filtration
- Solvents filtration
- Pharmaceutical industry



## ULTRAFILTRATION

Ultrafiltration is an advanced pre-treatment using membrane technology in removing suspended solids from water as well as viruses, algae, bacteria and other microorganism contaminants.

Ultrafiltration was initially applied in chemical and pharmaceutical industries. It was not until 1990s that water treatment industry was able to develop rapidly. Today, ultrafiltration is widely used either as a pre-treatment to RO system, a final treatment or a stand-alone system for water treatment.

### Applications:

- Pre-treatment to RO system
- Drinking water
- Dairy, food and beverage industries
- Industrial and municipal water
- Food and beverage industry
- Pharmaceutical and medical applications
- Electronics industry
- Wastewater treatment and recycling
- Seawater desalination



## CERAMIC MEMBRANE

Fluid flows through the tiny pores in the ceramic filter element and particles larger than the pores of the ceramic filter are trapped on the surface. The first ceramic membranes (CM) were produced in the 1980s, ceramic filtration made from inorganic materials (such as alumina, titania, zirconia oxides, silicon carbide ).

CM is now progressively recognized in water treatment industry and is used for oil-water separation, sediment filtration, water purification and for chemically aggressive fluid and high-temperature applications. Ceramic membrane is a good choice for extreme applications.

### Applications:

- Industrial wastewater
- Dairy, food and beverage industries
- High-temperature wastewater
- Oily water treatment
- Chemically aggressive wastewater treatment
- Wastewater treatment and recycling



# POTABLE

## REMINERALIZATION

Remineralization is one of the essential processes in the potable water, especially for the RO permeate in water produced from desalination plant. Remineralization is usually done using calcite or lime, complemented with magnesium salts and for certain cases magnesium salts or carbon dioxide.

### Applications:

- Reduce pipe network corrosion due to alkalinized pH
- Balance the potable water pH value will improve the human body immune system
- Improve potable water taste



## UV DISINFECTION

UV Disinfection is a physical treatment technology and chemical-free process of purifying water. It is extensively used as an effective treatment to eliminate or inactivate viruses and other bacterial contaminants in water.

UV disinfection takes place when the water is exposed to the UV light which alters the microorganism's DNA and inactivates its cells to reproduce. UV disinfection for water treatment was first implemented in the early 1900s and been commercialized in 1960s .

### Applications:

- Drinking water
- Swimming pools
- Pharmaceutical
- Food and beverage industry
- Wastewater treatment



## OZONE DISINFECTION

Ozone's O<sub>3</sub> structure was discovered in 1865, Ozone Disinfection for water treatment is a chemical water treatment technique based on the infusion of ozone into water. Ozone is a gas composed of three oxygen atoms (O<sub>3</sub>), which is one of the most powerful oxidants, Ozone in the water and wastewater applications is widely used in industrial, commercial and even in residential applications.

### Applications:

- Drinking water
- Pharmaceutical
- Food and beverage industry
- Wastewater treatment



# MEMBRANE TREATMENT

## REVERSE OSMOSIS TREATMENT

The reverse osmosis process successfully applied in the mid-1950 and played a major role in water treatment and wastewater recycling. The process uses a partially permeable membrane to remove ions, unwanted molecules and in some special application a selective ion removal such as total hardness and sulfate from different water types such as brackish, seawater and wastewater.

### Applications:

- **Nano membrane:** widely used for water softening for potable and process applications
- **Reverse osmosis membrane:** used for brackish and sea water desalination for potable and process applications
- **Sulphate removal membrane:** used for sulphate removal from seawater for injection water applications
- **Reverse osmosis membrane:** used as tertiary treatment for wastewater recycling for process (boiler, cooling) water applications



# DEMINERALIZATION

## DEMINERALIZATION BY ION EXCHANGE RESIN

The Demineralization process is the removal of dissolved minerals that form salts when water is evaporated. These salts have corrosive properties and must be removed for the industrial processes so as to protect downstream equipment from corrosion, scale deposit and others. In ion exchange demineralization applications, ion exchange resins will remove all mineral salts, except for traces of sodium and colloidal (undissolved) silica.

Typical applications targeted for removal are calcium ( $\text{Ca}^{++}$ ), magnesium ( $\text{Mg}^{++}$ ), sodium ( $\text{Na}^+$ ), potassium ( $\text{K}^+$ ) and iron ( $\text{Fe}^{++}$ ). Typical anions targeted for removal are bicarbonate ( $\text{HCO}_3^-$ ) chloride ( $\text{Cl}^-$ ), sulfate ( $\text{SO}_4^{--}$ ), nitrate ( $\text{NO}_3^-$ ) and silica ( $\text{SiO}_2$ ). The IOX technology used to produce high purified water ( $< 0.02 \mu\text{m}$ ) when followed by mixed bed ion exchange column are used for a range of industries.

### Applications:

- Steam generation for petrochemical, chemical, oil and gas industries
- Injection of water for pharmaceutical and autoclave steam disinfection
- Steam generation for combined cycle power plant, thermal power plants
- Food and beverage especially within the win industries
- Semi-conductor industries



## DEMINERALIZATION BY ELECTRO DEIONIZATION

The electro-deionization (EDI) process is mainly used to produce (demineralized) high-purified water required for different industries, the process which combines semi-impermeable membrane technology with ion-exchange media.

The electrical current is used to continuously regenerate the resin, eliminating the need for using harsh chemicals required for the regeneration of ion exchange resin. The EDI technology used to produce high-purified water ( $< 0.01 \mu\text{m}$ ) mainly for the following industries.

### Applications:

- Steam generation for petrochemical, chemical, oil and gas industries
- Injection water for pharmaceutical and autoclave steam disinfection
- Steam generation for combined cycle power plant, thermal power plants
- Food and beverage specifically within the win industries
- Semi-conductor industries



## **CECO Peerless**

CECO Peerless is an experienced and reliable global leader in designing and supplying a wide range of compact, high-efficiency, separation and filtration equipment. Founded in 1933, CECO Peerless also serves the oil and gas production, gas pipeline transmission and power generating industries around the world.



[www.cecoenviro.com](http://www.cecoenviro.com)

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