

CECO Peerless



INDUSTRIAL/SEWAGE WATER TREATMENT

**DELIVERING CONFIDENCE IN CLEAN
AND SAFE ENERGY SOLUTIONS**

CECO
ENVIRONMENTAL

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AND SAFE ENERGY SOLUTIONS**



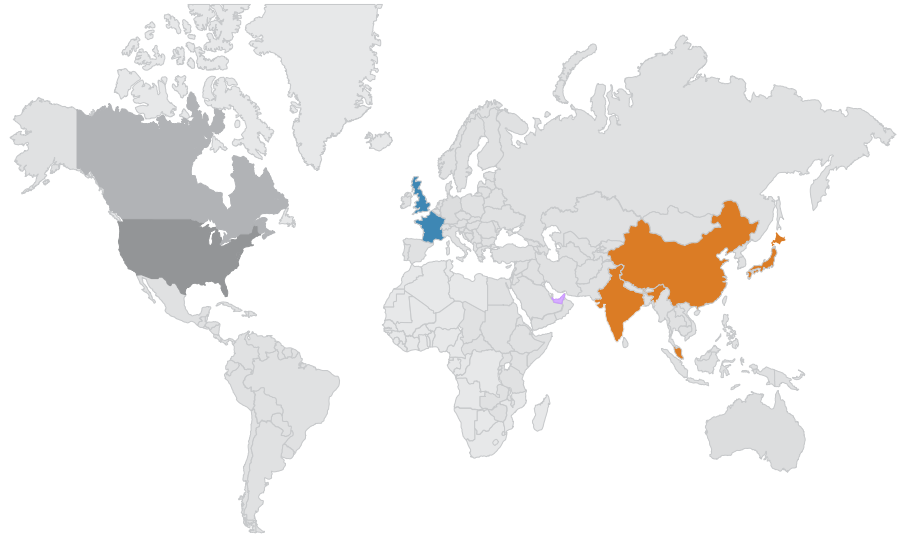
CECO
ENVIRONMENTAL

CECO Peerless provides sewage and industrial wastewater treatment packages to ensure safe disposal as per international regulations or to provide further purification for reuse purposes such as cooling water or boiler make up water.

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



PRIMARY TREATMENT

WASTEWATER HEADWORKS TREATMENT

The headworks treatment reduce the level of pollutants in the incoming domestic and industrial wastewater to a level suitable for further treatment to ensure that the complex treatment of physical, chemical and biological processes work effectively and efficiently.

The headworks treatment include different type of screening, oil removal, clarifications and other chemical physical process that help the influent wastewater to be suitable for further treatment and protect the downstream treatment from abrasion and clogging, the following systems are widely used:

- Primary treatment - wastewater screens
- Coarse screening and grinding
- Bar screening
- Fine headworks screens
- Washing and compacting
- Combined grease, oil, sand & grit removal



Applications:

- Screening industrial wastewater containing high level of oil, suspended solids, ammonia
- Protecting equipment from large objects at the headworks
- Cost effective alternative to traditional technologies
- Fine screening primary treatment strategies safeguard sensitive equipment like mbrs.
- Screening, washing & compacting separate fecal materials from inorganics and produce a clean, dry and compacted product of screenings
- Reducing sludge handling

SECONDARY TREATMENT

MOVING BED BIO-REACTOR

The Moving Bed Bio-Reactor (MBBR) process, introduced by the late 1980s, is a biological membrane process that uses an activated sludge process, but enhanced by floating bio-carriers where biofilm can grow. MBBR is widely used for municipal and industrial wastewater treatment.

Applications:

- Petrochemical, oil and gas process industrial wastewater—high levels of suspended solids, COD and BOD5
- Industrial wastewater from various industries, pharmaceutical, textile, chemical, food & beverage, etc.—high levels of suspended solids, COD and BOD5
- Sewage and municipal water treatment—suspended solids, COD and BOD5



MEMBRANE BIO-REACTOR

The MBR process, introduced by the late 1960s, it is biological membrane process that uses an activated sludge process combined with a membrane separation process and is now widely used for municipal and industrial wastewater treatment specially when wastewater recycling/reuse is taking place.

A MBR process is mainly used for wastewater treatment by using membranes (flat sheet/submerged or tubular/pressurized) and integrating them with a biological process like a suspended growth bioreactor. The membranes are mainly utilized for filtration and removal of solids, which are generated during the biological process, which will result in a clear product.

Applications:

- Petrochemical, oil and gas process industrial wastewater—high levels of suspended solids, COD and BOD5
- Industrial wastewater form various industries, pharmaceutical, textile, chemical, food and beverage, etc.—high levels of suspended solids, COD and BOD5
- Landfill leachate—wide variety of dissolved and suspended organic and inorganic compounds.
- Sewage and municipal water treatment—suspended solids, COD and BOD5



ADVANCED OXIDATION PROCESS

Advanced Oxidation Process (AOP) is a chemical treatment procedure designed to remove organic and some inorganic material from water and wastewater by oxidation reactions. Used mostly for wastewater treatment, AOP usually refers specifically to a chemical process that employs ozone (O₃), hydrogen peroxide (H₂O₂), with or without UV light and Ferrate base chemicals.

AOP is widely used in industrial wastewater treatment and brings a number of benefits such as achieving disinfection, the process doesn't introduce any new hazardous substances into the water and it effectively eliminates organic compounds from wastewater among others.

Applications:

- Chemical treatment for sewage water
- Chemical treatment for COD and BOD for industrial wastewater
- Chemical treatment for pharmaceutical wastewater
- Chemical treatment for food and beverage industry
- Treatment of hazardous wastewater



Design Options:

Depending on customer requirements and specifications, CECO Peerless can provide systems that involve a mix of the following AOP technologies other than the Ferrate-based design:

- Ultraviolet
- Ozone
- Hydrogen Peroxide
- Fenton's Reagent
- Catalytic O₃+H₂O₂+UV
- Chlorination
- Permanganates
- Chlorine Dioxide

OXIDANT	REDOX POTENTIAL
Ferrate	2.20
Ozone	2.08
Hyd. Peroxide	1.78
Permanganate	1.68
Hypochlorite	1.48
Perchlorate	1.39
Chlorine	1.36
Dissolved O ₂	1.23
Chlorine Dioxide	0.95

TERTIARY 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 multilayers of media such as sand, anthracite or granite, and gravel all arranged according to its 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 & H₂S gas removal



ULTRAFILTRATION

Ultrafiltration is an advance 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 the 1990s that the 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 (CM)

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 were produced in the 1980s were 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 condensate water
- Oil and gas
- Textile industry



LOW FOULING MEMBRANE

Low fouling composite elements combine neutral surface charge (unlike the negative charge in other reverse osmosis membrane types) providing significant reduction in membrane fouling rates and increasing membrane efficiency by restoring nominal performance after cleaning.

The low fouling membrane is designed to minimize the organic fouling on the membrane surface, in addition, it is easy to restore when membrane is chemically cleaned. The low fouling membrane has made from polyamide membrane like other reverse osmosis membranes; therefore, free chlorine cannot be used in the system.

Low fouling membrane is also available in cationic charge, this type used when feedwater has cationic surfactants, the flux can be restored easily after chemical cleaning

Applications:

- Sewage / industrial wastewaters
- Surface water
- Severe and difficult feedwaters requiring significant pre-treatment
- Wastewater reuse



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.



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