Committed to Protect Life and Preserve the Environment

Water Purification and Wastewater Treatment Solution Provider
Company Profile

Corodex Industries has been a pioneer in engineering, manufacturing, assembly and fabrication of various water purification and wastewater treatment equipment. Corodex Industries was one of the first companies in the Middle East to offer water treatment services along with extensive research and development focused on developing the necessary technologies in water purification and wastewater equipment and plants.

Concorde - Corodex Group, parent company of Corodex Industries, is one of the Middle East region’s pioneering providers of fire protection, water purification, wastewater treatment and environmental services. Established in 1974, the company has evolved to become a group of 20 individual companies offering a diverse portfolio of products and services such as, water treatment services, marine and industrial chemical cleaning, and firefighting equipment.


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EfloSAF  Submerged Aerated Filter
EfloDAF  Dissolved Air Floatation
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This table outlines the core activities of Corodex Industries, focusing on water treatment solutions, grey water recycling, wastewater treatment, sludge treatment, and operation and maintenance services.
For water purification applications, Corodex provides a number of turnkey and package systems. Corodex Industries specializes in the supply of water treatment systems for desalination, industrial water reuse and recycle, potable water supply, and food and beverage industries.

**Corodex RO (Reverse Osmosis)**
Superior Quality Reverse Osmosis Units designed and constructed to meet all demands for ultra pure water. Five different families of RO units are introduced as standard models of RO systems with production capacity up to 20,000 m³/day.

**TWRO**
Tap Water Reverse Osmosis Units with raw water, TDS up-to 3,000 ppm

**HBWRO**
Highly Brackish Water Reverse Osmosis Units with raw water, TDS up-to 15,000 ppm

**SWRODP**
Double Pass Sea Water Reverse Osmosis Units with raw water, TDS up-to 70,000 ppm
Corodex Filters

Media Filtration is the most effective method for removal of suspended organic and inorganic solids from water. The media filters operate on the same basic principle as nature’s own ground water filtering process. Contaminated, unfiltered water enters the system through a deflector at the top of the filter and flows, under pressure, through the media where solid particulate is entrapped.

Types of media filters include:
- Sand, multi-media and AC filters for reduction of total suspended solids
- AC filters: Carbon Filters are used for the removal of organic matter, contaminated properties, chlorine and improve aesthetic qualities such as color, odor, and taste
- Greensand Iron/Manganese filter: used for the removal of Iron and Manganese
- All filters are available in epoxy coated steel or fiberglass construction material with automatic/manual operation and back-wash
- Manual plastic or cast iron valves and electrically actuated valves are also available. Automatic top-mounted or side-mounted heads can be fitted, with stager and nest of air-operated diaphragm
- Upon request, pressure steel filters are available in either vertical or horizontal configuration in single or multiple parallel units

Corodex Softeners

When water is hard, it can clog pipes, damage boilers, damage heat exchangers, and many other components. Water softening can prevent these negative effects. Hard water causes a higher risk of lime scale deposits in industrial, commercial and household water systems. Calcium and magnesium are often referred to as “hardness minerals”. Softeners mainly remove calcium (Ca$^{2+}$) and magnesium (Mg$^{2+}$) ions.

Various types of hardness removal softeners with different control and automation options are available. Material construction of softener tanks include rubber or special epoxy coated steel, stainless steel and polyethylene lined fiberglass. Hardness exchange resins used are only from reputed manufacturers to ensure consistent production of hardness-free water. Single, twin, duplex, and multiplex softener configurations are available to the required capacity and intermittent or continuous mode of operation. Timer and meter initiated regeneration process is available using standard softeners, heads, stagers, or PLC based control systems. In special cases, where raw water hardness varies, an on-line hardness monitoring system is used to initiate the regeneration.
**Corodex Deionizers (DI)**

Deionization is the process of removing mineral (inorganic) ions (cations and anions) from water and exchanging them with hydrogen ($H^+$) and hydroxide ($OH^-$) to produce a high purity water that is similar to distilled water. Deionized water quality is used in applications such as boilers, electronics manufacturing, and pharmaceuticals. The complete deionization process is automatically controlled by means of automatic heads or factory designed and built PLC based control systems. Material construction of DI tanks can either be rubber or special epoxy coated steel, stainless steel and polyethylene lined fiberglass. Hardness exchange resins used are only from reputed manufacturers to ensure consistent hardness-free water.

**Corodex Forced Draft Degasifiers**

Forced Draft Degasifiers are used to remove unwanted gases (i.e. Hydrogen Sulfide and Carbon Dioxide) from supply water. The degasifier removes the gases by passing the water over a packing media that helps the water form a thin film over the surface area of the tower. A counter current airflow is introduced at the bottom of the tower and travels up.

**Benefits of Forced Draft Degasifiers:**

- Removes $H_2S$ from RO effluent, thus enhancing effluent quality (reduces odor, corrosion, and membrane sulfate fouling potential)
- Strips $CO_2$ from RO effluent, thus increasing permeate buffering capacity
- Strips VOCs from RO effluent
- Increases the dissolved oxygen level in RO effluent

Corodex forced draft degasifiers are constructed from Polyethylene (PE) or Glass Reinforced Plastic with SS 316 distribution nozzles and polypropylene stripping media. The degasifier is factory assembled, complete with blower. Collection tank, circulation pump, chemical injection system and control panels are available as optional items.

**Corodex Chemical Injection Systems**

Chemical injection systems typically consist of multiple chemical services with associated single or multi-compartment storage tanks or pressure vessels. The chemicals are transferred from the tank to the injection point by means of chemical injection pumps, while flow rates can be adjusted locally or remotely in order to ensure that the correct amount of chemicals is injected.

Corodex Industries manufactures and supplies custom-built injection systems for a wide range of process applications, including pH adjustment, chlorination and dechlorination.
Corodex River Pure

The treatment of raw river water is conducted as per World Health Organization (WHO) drinking water standards. River Pure packaged units are designed and constructed to achieve purified water with quality that meets or exceeds WHO standards from turbid and salty raw river water. The units are simple to operate with a low maintenance cost.

The units include coagulation and flocculation, lamella plates settling, sand and activated carbon filtration, polishing 5 or 10 micron cartridges, in addition to a dual oxidation system using UV and chlorine for efficient disinfection of treated water. The treated water quality is monitored via pH and TDS meters. The plant operation is totally automated via PLC based control panel. Tanks and frames are constructed from epoxy coated steel with 304 SS available as optional construction material.

Features and Specifications:
- Compact, mobile, and easy to operate
- Coagulation and flocculation system for efficient precipitation
- Clarification system with lamella tube settlers for maximization of settling area
- Automatic (3 cycle) multimedia sand filtration system (NSF approved high performance FRP tanks) with automatic air scour aided backwash
- Micron cartridge filtration systems for removal of suspended solids
- Chlorine injection system with chlorine detection system for water disinfection
- Skid mounted system (MS epoxy coated, NACE certified for maximum corrosion resistance)
- Automatic sludge disposal system
- Eyewash station for safety
Water Treatment Equipment and Systems

References

Client: Abu Dhabi Water and Electricity Authority and Abu Dhabi Distribution Company
Scope of Work: Design and build of Sea Water Reverse Osmosis including intake system
Capacity: 7 US MGD
Application: Supply, design, installation and commissioning of 7 US MGD Sea Water Reverse Osmosis plant at Delma Island to serve the population demand of potable water
Construction Time: 24 months

Client: Occidental Mukhaizna LLC, Sultanate of Oman
Scope of Work: Supply, supervision of installation, testing and commissioning of water treatment plant
Capacity: 6000 m³/day
Application: Supply of desalinated water to thermal plant on site for steam generation, specially designed to address the issue of H₂S in the water
Construction Time: 16 weeks potable water supply
References

Client: PARSONS, Iraq
Scope of Work: Supply, supervision of installation, testing and commissioning of water treatment plant
Capacity: 6000 m³/day
Application: Domestic Water / Potable Water
Construction Time: 4 months

Client: Zakum Development Company (ZADCO)
Scope of Work: Design, manufacturing, supply, including FAT for Sea Water Reverse Osmosis Plants (SWRO) and Sewage Treatment Plants (STP) for four Islands (South, North, Central, West)
Capacity: 4x240 m³/day (SWRO) and 2x100 m³/day (STP)
Application: Potable drinking water (SWRO) for disposal off-site (STP)
Construction Time: 10 months
Grey Water Recycling

EFLO Conventional Greywater Treatment Plant

Domestic water usage continues to put higher demands on municipal supplies and bigger costs on consumers. Only a very small fraction of daily water consumption is used for drinking and cooking. Grey water recycling is used for toilet flushing, irrigation and wash water. Grey water is usually considered to be all the wastewater from residence bathroom sinks, showers, tubs and washing machines but excluding any water that has come into contact with feces. Ideally suited to new build developments where dual drainage can be designed in an early stage. The grey water is collected and treated separately from the black water. The use of treated and recycled grey water within a development will require a separate pressure supply from the potable water supply. This is already commonly used in some Far East nations.

Benefits:
- Save / reduce amount of fresh water demand
- De-centralized treatment
- Volume reduction in water
- Automatic, skid mounted process including residual disinfection
- Systems 10m³ per day upwards to district size
- LEED and PEARL benefits
Grey Water Recycling

References

Client: Gulf District Cooling LLC (ETA)
Scope of Work: Design, manufacturing, supply, supervision of installation and commissioning for Dubai mixed use development
Capacity: 350 m³/day
Application: Cooling Tower Make-Up/WC Flushing
Construction Time: 4 months

Client: Larsen and Toubro, Oman
Scope of Work: Design, supply to site, supervision of installation, testing, commissioning and supply of spare parts for 1 year after warranty period
Capacity: 60 m³/day
Application: Toilet Flushing / Irrigation
Construction Time: 4 months
Corodex Industries in partnership with EFLO International, UK work together to fabricate and assemble packaged sewage treatment plants in the UAE.

EFLO has more than 40 years of experience in designing and building sewage treatment plants for both land and marine use. Installations include hotels, villages, hospitals, military camps, oil rig and accommodation platforms as well as cruise ships and war ships. Population served is 10 - 30,000 persons. EFLO has references in the region since 1972, and has more than 500 wastewater treatment plants in operation worldwide.

**EFLO International Standard Products**

- **EFLOCT**  Extended Aeration with Constant Transfer
- **EFLOSBR**  Sequential Batch Reactor ‘Filandraw’
- **EFLOSAF**  Submerged Aerated Filter
- **EFLODAF**  Dissolved Air Floatation
- **EFLOSEP**  Oily Water Separator
- **EFLOMBR**  Membrane Bioreactor

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**Wide Range of RO and Packaged Wastewater Treatment Systems**

![Diagram showing various products and solutions offered by Corodex Industries and EFLO International](image-url)
EFLOCT Extended Aeration with Constant Transfer

The EFLO Constant Transfer process is conventional extended aeration followed by settlement. It’s most significant advantage over gravity transfer plant is that there is no direct connection between inflow and outflow. All surges of inflow, regardless of rate, can be stored in aeration which doubles as a massive balancing tanks.

EFLOSBR Sequential Batch Reactor ‘Filandraw’

Sequencing Batch Reactor (SBR) is a product developed from “Fill and Draw” processes. SBR carries out the functions of equalization, aeration, clarification and effluent evacuation in a time sequence rather than in PLC controllers all functions can be conducted automatically. This allows SBR technology to be designed with the ability to treat a wide range of influent volumes giving SBR a higher degree of flexibility.
EFLOSAF Submerged Aerated Filter
High Rate Biological Sewage Treatment

EFLOSAF is a biological treatment process based on submerged aerated biofilter using a fixed film, with an attached biological growth process. It is designed to achieve a final effluent of 10/10/2 in terms of $\text{BOD}_5/\text{TSS}/\text{N-NH}_3$. The high rate biological oxidation process is performed using an extremely efficient Submerged Aerated Filter with a very high specific surface area.

The flow of raw sewage to treated final effluent is as follows:
- Raw sewage is lifted by a pump at average flow rate and delivered to a primary settling tank
- The settled sewage passes to the Biozone Submerged Aerated Filter
- Biologically treated liquor discharges from the Biozone to settlement
- Biologically treated liquor passes by gravity through the final settlement tank
- Effluent discharges from the settlement tank to a chlorination
- Final effluent is filtered via pressure sand filters prior to discharge or reuse
EFLOSAF Submerged Aerated Filter - Advantages

- Small footprint
- Low sludge production
- No moving parts
- High efficiency
- Stable high quality effluent of 10 BOD and 10 TSS
EFLOSEP Oily Water Separator
High Performance Single Stage Oil Interceptor

EFLOSEP Oily Water Interceptors are used for the separation of free floating oils for wastewater streams. Applications include industrial sites where rain or wash down water can wash spilt oils into storm drains and food processing factories. Other uses include pre-treatment to further water treatment processes, where oil contamination will cause process problems. EFLOSEP is a key process component in industrial water reuse systems. Enhanced oil removal to greater than 50 mg/L can be achieved by incorporating and utilizing plastic oil attracting media. All EFLOSEP units are available as packaged, steel fabricated systems. Larger systems can be built using concrete tanks with pre-fabricated internal components.

EFLODAF Dissolved Air Flotation
Dissolved Air Flotation for FOG, BOD, COD and SS Reduction

EFLODAF uses the principle of air flotation to separate contaminants from wastewater streams. Contaminants such as emulsified oils and greases are first broken from suspension using coagulant dosing. These small contaminating particles are united using flocculant dosing to create larger particles. These particles are not dense enough to settle by gravitational methods but are instead persuaded to float to the surface of the tank by the introduction of minute air bubbles. The bubbles emerge at the base of the tank and attach themselves to the flocked particles and float to the surface as a thick scum.

This surface scum is scraped to a collection chamber, leaving a clean water discharge.

Typical applications would include:
- Food manufacturing
- Oil field produced water
- Metal finishing, cargo and car wash
- Mining
- Brewery and vegetable oil production

EFLODAF is a key process component in industrial water reuse systems achieving significant oil and solids removal as well as reductions in COD/BOD.
EFLOMBR Membrane Bioreactor
High Rate Biological Wastewater Treatment

EFLOMBR is designed with special submerged flat sheet membranes, with membrane pore size of 0.2μm. The membranes are made of Polyethersulfone, for enhanced performance in the presence of greases. EFLOMBR achieves the TSS Removal of up to 99.7%.

Typical applications for EFLOMBR include municipal and domestic sewage treatment, mobile or temporary sewage treatment, industrial wastewater biological treatment, and grey water treatment.

The system can be installed above or below the ground, or it can be mobile if it is skid mounted for temporary/emergency use.

EFLO International can provide the required ancillary upstream and downstream equipment for EFLOMBR. Upstream equipment include grit removal, inlet sewage pumping, flow control and 3mm inlet rotating drum screen. Downstream equipment include disinfection systems (UV or chlorine dosing), irrigation/water storage, pumped distribution and further treatments that allow for water reuse.
### Client:
Sharjah Municipality

### Scope of Work:
EPC contract to design, supply, install, commission, operate and maintain EFLOMBR unit

### Capacity:
10,000 m³/day EFLOMBR

### Application:
Domestic Sewage Treatment for Dibba Al Hisn

### Construction Time:
18 months
Wastewater Treatment Systems

Client: Atlantis - Palm Jumeirah, Dubai, UAE

Scope of Work: Fully packaged and compact sewage treatment plant. The plant consists of 4 modules, each of 500m³/day capacity. The effluent will be used for restricted irrigation

Capacity: 2,000 m³/day

Application: Restricted Irrigation

Construction Time: 4 months
## Wastewater Treatment Systems

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<th><strong>Client:</strong></th>
<th>Al Barari Development / Abwab Real Estate</th>
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<td><strong>Scope of Work:</strong></td>
<td>Design, construction, manufacturing, supply, installation and commissioning</td>
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<td><strong>Capacity:</strong></td>
<td>Temporary sewage treatment plant 300 m³/day, polishing plant 7500 m³/day, super polishing plant 1500 m³/day</td>
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<tr>
<td><strong>Application:</strong></td>
<td>Superior effluent quality for lakes / irrigation</td>
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<tr>
<td><strong>Construction Time:</strong></td>
<td>4 months</td>
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Odor Control System

Odor control solutions have become critical as a result of growing concerns for HSE, corrosion problems in the sewage collection systems, rising costs for sewer rehabilitation work, and complaints from citizens living near existing pumping stations and sewage treatment plants.

In the sulfur cycle of the sewage networks, anaerobic bacteria reduces sulfates to sulfides, and oxidizing bacteria converts hydrogen sulfide to sulfuric acid. At high concentrations, hydrogen sulfide presents a serious HSE hazard and corrodes network assets.

There are a wide variety of odor control products available, however the majority can be grouped into three categories:

- Chemical Scrubbing: Acid and caustic wet scrubbing
- Biological Oxidation: Bio-trickling filter and bio-filter
- Adsorption: Activated carbon and other adsorptive medias

And a fourth category – Combined Technologies: Often, the most effective solution for most cases is combining one or more of the three major technologies referred to above.
**Chemical Scrubber**

The most common method of control for H₂S gas is to pass the odorous gas through a vertical, packed bed wet scrubber. The air passes up the tower as the scrubbing liquid, containing caustic (NaOH) and an oxidizing agent (most often bleach or NaOCl, sodium hypochlorite) flows down the tower in counter-current fashion. The high pH provided by the caustic drives the mass transfer from gas to liquid by solubilizing H₂S as HS⁻ bisulfide and S²⁻ sulfide ions. Once in solution, the reaction between hydrogen sulfide and oxidizing agent is almost instantaneous.

This reaction converts the sulfide to sulfate (SO₄²⁻) ion.

The overall chemical reaction is described by the following equation:

\[ \text{H}_2\text{S} + 4\text{NaOCl} + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 4\text{NaCl} + 2\text{H}_2\text{O} \]
**Biological Odor Control**

Biological oxidation is a process by which bacteria and other types of micro-organisms consume dissolved oxygen and organic substances in wastewater, using the energy released to convert organic carbon into carbon dioxide and cellular materials.

**Biological oxidation is broken into two broad categories:**
- Bio-oxidation using inorganic media: Bio-scrubbers or bio-trickling filters
- Bio-oxidation using organic media: Traditionally referred to biofilters

**Activated Carbon Filters**

In terms of odor control, adsorption typically refers to the use of activated carbon to adsorb odorous compounds into the activated carbon material. This is accomplished by passing the odorous air across a bed of activated carbon, allowing the adsorptive process to occur, and releasing the now clean air into the atmosphere.

Adsorption, again primarily in the form of activated carbon (other adsorptive materials used include zeolite, potassium permanganate, and activated alumina) has been used in odor control at least since the mid-1970’s. Activated carbons for odor control are not all created equal, but can be broken down into several classes.

**Biological oxidation is broken into:**
- Standard Activated Carbon Utilizing Physical Adsorption
- Caustically Impregnated Carbon Utilizing Chemisorption
- Blended Medias Utilizing Chemisorption
- Catalytically Enhanced Carbons: Water regenerable carbon
Odor Control System

References

Client: Dubai Municipality
Capacity: 150,000 m³/hr
Scope of Work: Turnkey design, supply, construction, installation, testing and commissioning H₂S 300/800 ppm (Average/Peak); 99% removal efficiency
Application: Municipal STP
Construction Time: 15 months

Al Aweer Sewage Treatment Plant - Biological Odor Control

Client: Dubai Municipality
Capacity: 25,000 m³/hr
Scope of Work: Supply, installation, testing and commissioning H₂S 400/800 ppm (Average/Peak); 99% removal efficiency
Application: Municipal STP
Construction Time: 8 months

Sewage Treatment Plant Extension - Biological Odor Control
Concorde - Corodex Group

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