

*Falat Sanat Ideh* offers an extensive range of anode and cathode modules with various types of platinum group precious metal oxide (catalyst) coatings suited to a host of electrochemical processes with long life times & low operating potentials for service in ...

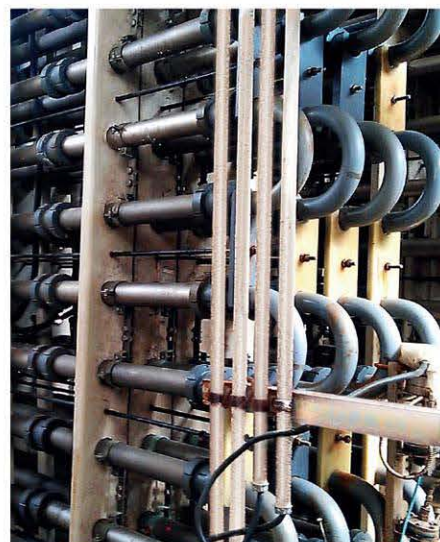
- **Hypochlorite cells for Monopolar or Bipolar arrangements.**
- Chlorine anodes for membrane, Mercury (runner, rod & strip) And Diaphragm Cells.
- Chlorate & Perchlorate anodes for Plate type, Diaphragm, Modular & Tank Cells.
- Anodes for Iodate & Bromate cells.
- Anodes for Cathodic protection.

Substrate: The anode substrate is Titanium and the cathode substrates may be Titanium, Hastelloy, Nickel, normal Mild steel, or Ultra-Low Carbon steel. The anodes are known as Dimensionally.

**Catalyst:** coating systems are based on a range of nano-structured multi-layers of metal oxides, they include Ruthenium, Iridium, Platinum, Palladium, Titanium, Tantalum; offer increased performance over conventional materials by maximizing catalytic phases and surface area interactions. By adding doping agents to the catalysts, we are able to make them more selective and further improve performance.

The developed High Density coating technology allows for very thin layers to be deposited increasing cost effectiveness. The Mixed Metal Oxide Coated substrate will undergo multiple thermal treatments at elevated temperatures. This process will achieve very good bonding properties between the mixed metal oxides coating and substrates.

**Refurbishment:** Refurbishment includes recoating, rebuilding the standoff and/or replacement, depending on the condition of the anodes and Electrolyzers. Low current output, damaged standoffs, leaking seals or damaged mounting threads are the symptoms of refurbishment.



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**FALAT SANAT IDEH**

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### Spares to refurbished or Replaced:

Following parts are also to be replaced or refurbished, based on the customer's request.

- \* DSA Titanium Anode substrates all in the form of plate, tube, mesh and custom fabricated.
- \* Any Cathod substrates irrespective of MOC like titanium, Steel, Nickel alloy (Hastelloy).
- \* Mixed Metal Oxide or Platinum coating on DSA anodes.
- \* CPVC, Clear PVC, PVC with GRP Cell housing.
- \* Rubber lined steel shell housing.
- \* PTFE (Teflon), Silicon, Neoprene, EPDM Gaskets.
- \* PVDF, PTFE, PVC Spacers.
- \* Titanium, Steel, Copper & Brass Hard wares.
- \* Hydrogen vent nozzles.
- \* Titanium Heat exchangers to maintain the temperature of electrolytes between 5 to 27° C
- \* Titanium Piping and fittings.

### Advantages:

- > Recoating leads double the life of Electrolyzers (anode & cathode assembly) with half of the cost, buying new one.
- > Electrolyzers can be refurbished to new specification.
- > FALAT hands-on knowledge of anode recoating & well-equipped in-plant infrastructures can help customers prolong the life of expensive anode structures through repair & recoating, rather than replacement.
- > Further to expedite the delivery of refurbishment, FALAT keeps most of the raw material of Platinum group precious metals, Substrates in stock.

### General Cell Maintenance:

All cells require cleaning. This must be carried out before the calcium buildup within the cell housing becomes one big block. (6-8 months gap). Left for too long it will do two things.

#### 1- Break the cell housing.

#### 2- Shorten the cell life.

cell using a diluted solution of hydrochloric acid and water can do cleaning. The dilution of acid to water should be 1 (one) part acid and 8 (eight) parts water, mixed in a separate container, then poured into your cell cleaning container. The cell cleaning process can take between 15 minutes and a few hours, depending on how much scale is on the cell. The cell must be completely free of any rinsed in clean water by Jet (high pressure). On average, it will need to be cleaned every four weeks.

### **We refurbished & recoated the electrochlorination plants and its Electrolyzers, which was originally made by...**

Seven Trent DeNora, Titanor, Titan, Chlortec, Cumberland, Pepcon, Chloropac, Seacolor, Sanilec, Diaki, Mitsubishi, Sespi, Siemens, US Filter, Sanichlor, Electrocatalytic, Nippon, Water Engineers.







## FALAT SANAT IDEH

### ZLD System Catalogue

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## Z.L.D. (ZERO LIQUID DISCHARGE) PILOT PLANT FOR THE TREATMENT, RECYCLE AND RECOVERY OF INDUSTRIAL WASTE WATERS.

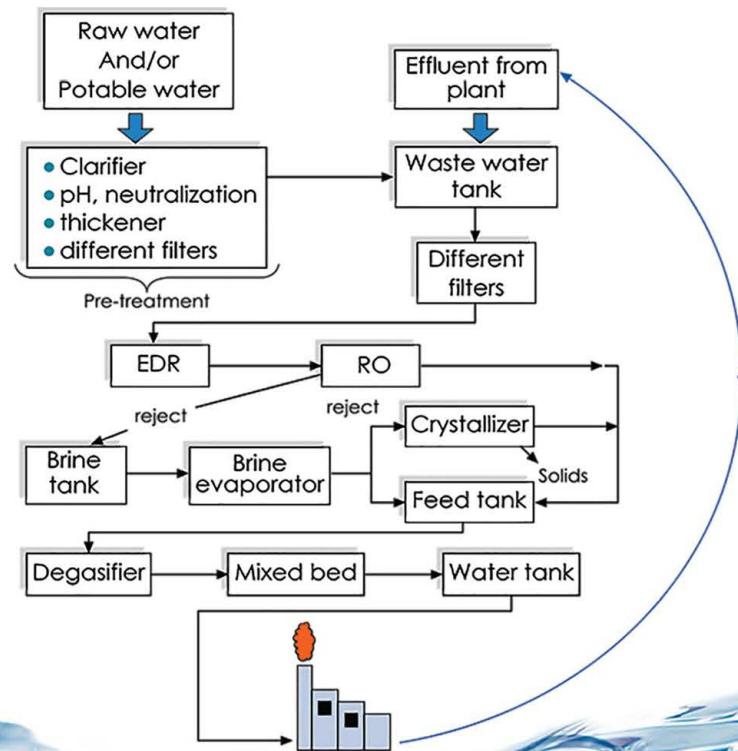
This kind of plants has been developed in order to overcome the fresh water shortage that affects many industrial compounds, with the aim to reduce the fresh water consumption ( both surface and underground) and also to minimize the waste , mainly in areas where there are strong limitations to discharge process effluents.

FALAT has been continuously committed in the research and development of this type of plants, and in particular takes part to a research program together with official partners specialized in this field.

Furthermore, a main scope of this research program, is to reduce the plant area, to simplify the operation and minimize both the investment and the operating costs, and ultimately, the unit cost of the recovered water.

The outline of the process to obtain a total wastes recovery, after several steps, is the following:

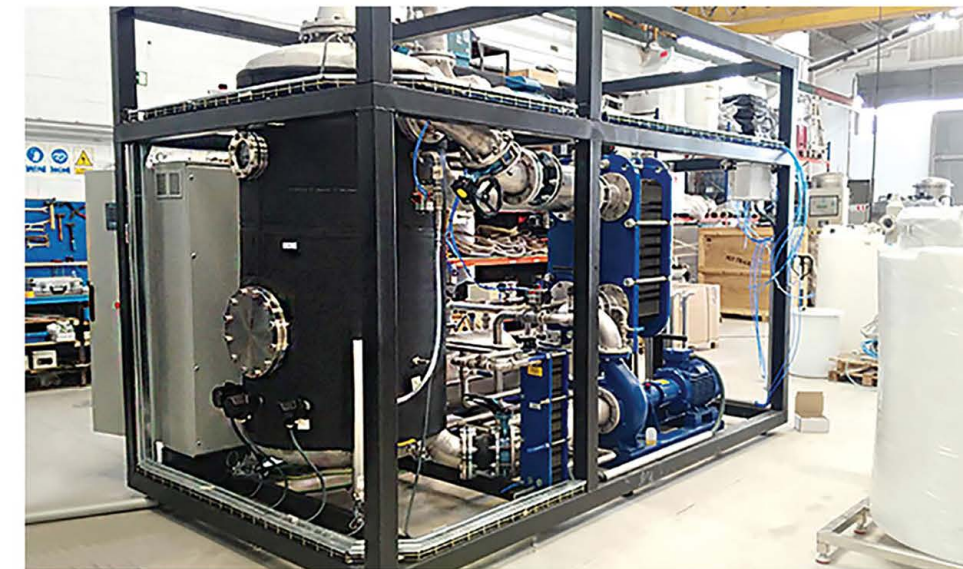
- Treatment Unit of the feed freshwater, for the power plant start-up
- Oily waters treatment unit (if required)
- Biologic wastes treatment unit (if required)
- Neutralized waters treatment unit.



After the above mentioned treatments, using up to date and highly efficient processes, the several waters are fed to the water recovery unit, which consists of:

- Micro/Ultra filtration pre-treatment unit
- R.O. section
- Demineralization with the electrodeionization process
- The concentrate discharged by the R.O. unit is then processed by a low energy consumption Evaporator/crystallization unit.

The recovered water is then recycled both as process water and as boiler feedwater. The advantages of this technology are mainly the near total water recovery, up to 90%, minimal plant area, reduced investment and operating costs, low energy demand, low impact on the ambient, and maximum dependability.







## FALAT SANAT IDEH

### Portable Demin Water System

#### System introduction:

Demin's portable water system, built in a container(both 40 & 20 feet), use the Dual Pass RO and EDI technology to produce the Demin water needed for various projects(Power plants, Oil, Gas, and Petrochemicals,...), especially in Industrial boilers pre-commissioning and commissioning of these industries on a temporary basis.

The EDI system has no chemical wastewater and without regeneration requiring, the system water production is continuous.

Falat Sanat Ideh Company with many years of experience in the design and construction of Boiler Feed Water Plants, provides for mentioned services in various forms including package, monthly renting, selling DM water per cubic meter.

Package delivery time for rental or sale of water is immediately and for package sale is max. one month.

#### Some Experiences in Producing Portable Demin Water System:

1. SAMANGAN Combined Cycle Power Plant  
( Client : KERMANIAN ELECT.GENERATION Co.)
2. BEHBAHAN Combined Cycle Power Plant  
( Client : Khuzestan Mapna Generation Co.)
3. JAHROM Combined Cycle Power Plant  
( Client : MATIN ENERGY)
4. SIRJAN Combined Cycle Power Plant  
( Client : GOHAR ENERGY SIRJAN Co.)
5. Masjed Soleiman Petrochemical Complex (Phase I)  
( Client : Wuhuan Engineering Co)

### سیستم پرتابل تولید آب دمین

#### معرفی سیستم:

سیستم پرتابل آب دمین که به صورت کانتینری ( در ابعاد استاندارد ۴۰ و ۲۰ فوت) ساخته می شود با استفاده از فناوری Dual Pass RO و EDI امکان تولید آب دمین مورد نیاز برای پروژه های مختلف (نیروگاهی، نفت، گاز و پتروشیمی...) به ویژه در مراحل پیش راه اندازی و راه اندازی بویلر های صنعتی این صنایع را به صورت موقت فراهم می نماید.

سیستم EDI فاقد پساب شیمیایی بوده و نیازی به انجام عملیات Regeneration ندارد، لذا تولید آب از این سیستم به صورت پیوسته می باشد.

شرکت فلات صنعت ایده، با سال ها تجربه در طراحی و ساخت سیستم های تولید آب دمین صنعتی (Boiler Feed Water) امکان ارائه خدمات فوق به صورت های مختلف شامل فروش پکیج، اجاره ماهیانه پکیج، فروش آب دمین به صورت متر مکعبی را فراهم نموده است.

زمان تحویل پکیج برای اجاره و فروش آب به صورت فوری و برای فروش پکیج حداکثر یک ماه می باشد.

#### برخی از سوابق این شرکت در زمینه سیستم های پرتابل تولید آب دمین:

- ۱- نیروگاه سیکل ترکیبی سمنگان  
(کارفرما: شرکت نیروگاهی سیکل ترکیبی کرمانیان)
- ۲- نیروگاه سیکل ترکیبی بهبهان  
(کارفرما: شرکت تولید برق خوزستان مپنا)
- ۳- نیروگاه سیکل ترکیبی جهرم  
(کارفرما: شرکت متین انرژی)
- ۴- نیروگاه سیکل ترکیبی سیرجان  
(کارفرما: شرکت شرکت گهر انرژی سیرجان)
- ۵- پتروشیمی مسجد سلیمان، فاز ۱  
(کارفرما: Wuhuan Engineering Co)



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## Containerized Demin Water System

Model No: FLT-2DM



### Technical Specification:

System:	Dual pass RO+CEDI
Dimensions: (40')	(2.44x2.91 x12.19 m)
Capacity:	18.7 m <sup>3</sup> /hr (Max) 12.5 m <sup>3</sup> /hr (Norm) 5.7 m <sup>3</sup> /hr (Min)
Pretreatment:	Disk Filter
Recovery: RO pass#1:	80%
RO pass#2:	85%
EDI:	95%

Inlet / Outlet connections: ANSI Flanges  
RO pass#2 & EDI reject water to be recycled.

### Feed Water Specifications:

Brackish water with max 4000 ppm TDS	
Temp: Min:	5°C
Max:	45°C

### Chemical Dosing Packages:

SMBS Dosing Package  
Anti Scalant Package  
Hypochlorite Dosing Package  
Caustic Soda Dosing Package

### Electrical Specification:

Power Consumption:	60 KW
Main Supply:	3 phases, 400V,50Hz
Control Supply:	230 VAC, Client UPS
EDI DC Amperage:	0-13.2A
EDI DC Voltage:	0-600

### I&C Specifications:

VFD for high pressure pumps  
LCD HMI for operator  
Automatic start/stop/shutdown  
Automatic RO Flushing  
Automatic Stop from DM water tank high level  
Alarm system

### Product Water Specifications:

Conductivity:	better than 0.1 µs/cm
Na:	better than 20 ppb
Silica:	better than 10ppb

### Accessories:

Container internal coverage with insulation  
Container electrical sockets  
Fire extinguisher  
First aid box  
Operator bench and chair

## Containerized Demin Water System

Model No: FLT-1DM



### Technical Specification:

System:	Single pass RO+CEDI
Dimensions: (20')	(2.44 x 2.59 x 6m)
Capacity:	18.7 m <sup>3</sup> /hr (Max) 12.5 m <sup>3</sup> /hr (Norm) 5.7 m <sup>3</sup> /hr (Min)
Recovery: RO pass#2:	85%
EDI:	95%

Inlet / Outlet connections: ANSI Flanges  
RO pass#2 & EDI reject water to be recycled.

### Feed Water Specifications:

Permeate water with max 40 ppm TDS	
Temp: Min:	5°C
Max:	45°C

### I&C Specifications:

VFD for high pressure pump  
LCD HMI for operator  
Automatic start/stop/shutdown  
Automatic Stop from DM water tank high level  
Alarm system

### Electrical Specification:

Power Consumption:	35 KW
Main Supply:	3 phases, 400V,50Hz
Control Supply:	230 VAC, Client UPS
EDI DC Amperage:	0-13.2A
EDI DC Voltage:	0-600

### Product Water Specifications:

Conductivity:	better than 0.1 µs/cm
Na:	better than 20 ppb
Silica:	better than 10ppb

### Accessories:

Container internal coverage with insulation  
Container electrical sockets  
Fire extinguisher  
First aid box  
Operator bench and chair

### Chemical Dosing Packages:

Caustic Soda Dosing Package





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Industrial Pressure Vessels & Storage Tanks

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Falat Sanat Ideh (FSI) was established in 2000 and move to commissioning of water treating plants in 2002. FSI developed its structure and organization in water and waste water treatment industry and was recognized as EPC Company in 2005. Today FSI is known as one of the professional EPC contractors in the AVL of Oil/ Petrochemical and Power Plants industries.

Since our establishment, Falat Sanat Ideh Company (FSIco.) has designed and manufactured various types of atmospheric & pressure vessels for different services and application in process industry especially in Water and Waste water industries

We designs, manufacture, fabricate, builds, tests & inspects of high-quality and API storage tanks to exacting standards for use in the most demanding industrial environments. We deliver quality workmanship based on your required technical standards.

### Types of Vessels and Tanks

We specialize in custom fabricating:

- Process equipment
- Knockout drums
- Oil and gas pressure vessels (up to 35 mm Thk.)
- Filter tanks
- Mixing tanks
- Storage tanks

### Type of our routine products:

- ✓ Sand Filters
- ✓ Active Carbon Filters
- ✓ Cartridge Filters
- ✓ Demine Storage Tanks

We construct pressure vessels to the precise requirements of our customers. We are considered an industry leader for providing expert engineering services and the production of custom ASME/API fabricated process tanks, and pressure vessels. When our customers need custom fabricated process tanks, storage tanks and pressure vessels they rely upon The FSI Company to fabricate these products to their exact specifications.

### Our POLICY

It is our Policy to provide products and services that fully satisfy customers and regulatory requirements. Therefore, FSI Company. implements a Quality System that strives continuous improvement and promotes a strong Safety Culture.

### Our MISSION

We believe in investing our best effort to fully satisfy our Client's demand We continually strive for excellence by offering high-tech products with customized and innovative solutions ensuring technological leadership and cost efficiency.







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System Catalogue  
Industrial Water & Waste Water Solutions







## Introduction:

### About Falat Sanat Ideh

Falat Sanat Ideh (FSI) was established in 2000 and move to commissioning of water treating plants in 2002. FSI developed its structure and organization in water and waste water treatment industry and was recognized as EPC Company in 2009. Today FSI is known as one of the professional EPC contractors in the vendor list of main clients in Iran.

Sustainability and innovation have become the keywords defining Falat Sanat Ideh history. FSI continues to hold its leading market position by implementing innovative approaches to new solutions in water and waste water treatment field. Our solutions cover design, equipment & technology selection, manufacturing, procurement, construction, installation, commissioning & start-up and after sale services.

### Quality:

Falat Sanat has adopted the principle of providing the best quality in water treatment systems as well as high level technical support since 2009. The technical staff with great expertise, increases and improves production quality and capacity by pursuing new developments and researches continuously.

This is the key to maintain the costs at reasonable rates while the quality and performance are improved.

### New technologies:

Falat Sanat Ideh aims to find the most effective solutions such as Reverse Osmosis, Electro Deionization, Electrochlorination systems, etc. In order to facilitate technology transfer and material supply, we are in technical and business agreement with European companies which are expert in water and waste water industry.

In sale and marketing, our goal is to introduce new technologies and equipment practically. We develop and customize the processes to find the best solution technically and economically for customers' requests and keep them updated by utilizing of modern technologies.



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## WHAT WE DO:

To provide the best solutions and products for our clients, the following are activities and services in brief that performed by our expert team.

### Consulting

Falat Sanat Ideh provides consulting services on all water & waste water treatment matters. If you use certain technologies or make products which need water of a certain quality, if you want to save water, recycles it or increase efficiency, contact us. We will always find an optimal solution and will offer the necessary technologies.

### Design of water & waste water treatment systems

Falat Sanat Ideh designs water & waste water treatment systems which ensures to achieve the required parameters of the treated water based on specific customer requirements as well as optimum price. We provide design of water treatment system, estimate and the detailed manufacturing and installation plan for client. During the design steps the Client is announced for the detailed engineering and their points will be implemented in design.

### Automation of Water Treatment Process

Water treatment is a complex process, consisting of many steps and depends on many factors. Smooth functioning of the equipment requires continuous monitoring of the equipment, condition, water treatment parameters and supporting of necessary operating modes as well. So, the systems and equipment provided by FSI are automated. Usually the water treatment should be part of more extensive production process, then the provided water treatment systems are easily integrated with other systems. Our equipment/systems can be monitored and controlled remotely to ensure the convenience and efficiency.

### System manufacturing and tests

Falat Sanat Ideh has own modern factory which has been constructed in a land of 7000 square meters in Parand Industrial Zone in Tehran. FSI uses high quality certified materials and components in system and equipment manufacturing. All systems are assembled and tested in our factory prior to installation. Accurate planning and design, thoroughly selected components, standardized process of equipment manufacturing and quality assurance, certified professionals and implemented ISO 9001 and ISO 14001 quality management system ensure the quality of the equipment and the necessary parameters of water & waste water treatment.

### Installation and Commissioning

The job includes on-site construction, installation, pre-commissioning, commissioning, necessity controls and maintenance, personnel training by Falat Sanat Ideh engineers for all domestic and abroad systems.

### After Sales Service

Falat Sanat Ideh customer satisfaction policy does not end with the sales of the system. We support and solve all problems and questions of customers during design, installation, operation and maintenance with our professional supporting team.





## Our Products

### Demineralization System (Ion Exchange)

Design & Manufacturer: Falat Sanat Ideh



Natural water contains, in various concentrations, dissolved salts which dissociate in water to form charged ions. Positive and negative ions are called cations and anions respectively. Ionic impurities can seriously affect the reliability and operating efficiency of a boiler or process system. So the ionic impurities shall be removed from the supplied water before it is used as boiler feed water. Ion exchange systems are used for efficient removal of dissolved ions from water. This system removes ions in anionic and cationic resin beds. The beds shall be regenerated periodically by using acid and base.



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## Continuous Electro De-Ionization (CEDI) System

Design & Manufacturer: Falat Sanat Ideh



CEDI is a reliable system replacing traditional ion exchange resin mixed bed to produce demin water continuously without chemical regeneration. CEDI is a water treatment technology that has innovated and developed for two decades. The process does not need chemical treatments. Also the system, has nearly no moving part. Water passes through positive and negative electrodes. Then, semipermeable ion-exchange membranes separate positive and negative ions to produce deionized water. CEDI is designed as multi train arrangements depend on plant capacity from small size water treatment plants to large scale plants.





## Reverse Osmosis (RO System)

Design & Manufacturer: Falat Sanat Ideh



RO is a water purification technology that uses a partially permeable membrane to remove ions, molecules and larger particles from water. In reverse osmosis, an applied pressure is used to overcome osmotic pressure. Reverse osmosis can remove many types of dissolved and suspended chemical species as well as biological ones (principally bacteria) from water, and is used in both industrial processes and the production of potable water.



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## Condensate Polishing Plant (CPP)

Design & Manufacturer: Falat Sanat Ideh

Condensate Polishing Plants (CPP) is designed for polishing of condensate of high pressure boilers and process heat exchangers in power plants and oil & gas industries. CPP treats physically the condensate that contaminated not chemically like once through Cooling Systems (On Shore Plants). Also CPP by utilizing coalescer filters, removes hydrocarbons contaminations in oil & gas condensates return from process heat exchangers.





## Electrochlorination Plant

Design & Manufacturer: Falat Sanat Ideh



The Electro chlorination plant is designed to produce Sodium Hypochlorite ( $\text{NaOCl}$ ) from seawater. Heavy duty, high performance cells use an injection moulded PVC casing and a bipolar electrode arrangement for maximum energy efficiency and Hypochlorite production. High quality coated titanium electrodes inside the electrolyzer cell is utilized to achieve maximum cell operation life time. Indeed, reliable hydrogen removal system is designed to ensure safe operation of plant.

## Filtration Skids

Design & Manufacturer: Falat Sanat Ideh





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## Mobile RO & CEDI Water Treatment System

Design & Manufacturer: Falat Sanat Ideh



Mobile Reverse Osmosis (RO) & CEDI system produces demin water for temporary usage like pre-commissioning and commissioning period of plants. The system is assembled in truck container.









