WATER FOR LIFE

“There is always room for improvement”

COMPANY OVERVIEW

- Established in 1985 as Saudi Berkefeld Filter Company.
- Part of A. Abunayyan Group.
- Previous partnership with Berkefeld Germany.
- Current Staff: 70 Engineers and 200 Technicians.
- ISO 9001:2000 certified

OFFICE LOCATIONS

- Main office located in Riyadh.
- Manufacturing Facility located in Riyadh.
- Branch in Jeddah.
- Branch in Khobar.
- Branch in Qassim.
- Branch in Dubai.
- Branch in Algeria.
- Presence in Qatar.
- Presence in Iraq.
- Presence in Syria.
- Presence in Jordan.

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QUALITY POLICY

1. As a market-driven company, we commit to develop our customer base through global presence.
2. We will deliver quality, cost efficient operational systems by way of continual product improvement.
3. We commit to generate products and services that will satisfy the stated and implied need of our customers.

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SCOPE OF WORK

- Water Analysis – Our laboratories will produce a full analysis report in order to set the parameters for the appropriate plant design.
- Plant Design – The design engineers will evaluate the design conditions and recommend the appropriate design that will produce the client's required water quality within the specified budget.
- Manufacturing – Takes place at our factory in Riyadh where all work is inspected for compliance with our quality assurance program.

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SCOPE OF WORK

- Installation & Commissioning – By our team of qualified technicians under the supervision of the project Engineer.
- Training – Provided on and off site for the client's personnel in order to insure proper maintenance and operation.
- Customer Service – A response team is dispatched to the required site within 24 hours during and after the warranty period.

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PRODUCTS & SERVICES

- Water Treatment:
  - * Domestic.
  - * Industrial.
- Waste Water Treatment:
  - * Domestic waste.
  - * Industrial waste.
- Recreation and Leisure
  - * Swimming Pools.
  - * Fountains.
- Chemicals
  - * Water Specialty Chemicals.
  - * Consumable Chemicals.

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WATER TREATMENT

- Reverse Osmosis:
  - * Brackish Water.
  - * Sea Water.
- Ion Exchange:
  - * Demineralization.
  - * Softening.
- Filtration:
  - * Gravity Filter.
  - * Multimedia Filter.
  - * Cartridge Filter.
- Disinfection:
  - * Chlorination.
  - * Ultraviolet.
  - * Ozonation.

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WASTEWATER TREATMENT

- Domestic Wastewater Treatment.
- Industrial Wastewater Treatment.

<u>Both Treatments require the following:</u>

* PRIMARY TREATMENT.
* SECONDARY TREATMENT.
* TERTIARY TREATMENT.

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RECREATION AND LEISURE

- Swimming Pool:
  - Pool Fixtures
  * Pool Ladders.
  * Pool Lighting.
  * Pool Cleaning Equipment.
  * Electronic Control of pH and Chlorine.
  * Filtration.
  * Water Sanitation Equipment (UV and Ozone).
- Jacuzzi:
  * Jet Stream Pumps.
  * Heat Exchanger.
- Fountains.

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CHEMICALS

- Reverse Osmosis Chemicals.
- STP Chemicals.
- Filtration Chemicals.
- Heating & Cooling Treatment Chemicals.
- Boiler Treatment Chemicals.
- Swimming Pool Chemicals.
- Potable Water Chemicals.
- Resins and Polyelectrolytes.
- Consumable Chemicals.
- Laundry Chemicals.

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REVERSE OSMOSIS

- Sea or brackish water is driven under pressure through a semi-permeable membrane, usually of organic materials.
- The driving force must exceed the osmotic pressure of the brine.
- The process continues until the osmotic equilibrium is reached.

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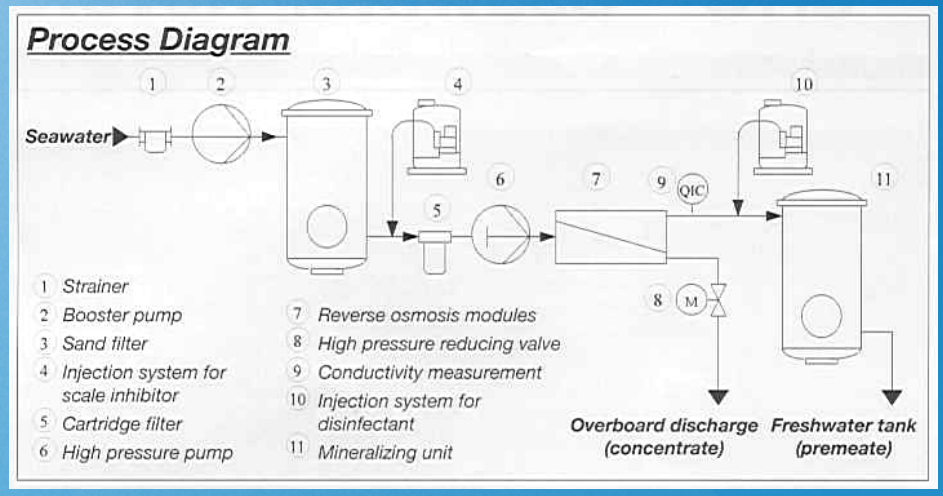
REVERSE OSMOSIS

- The R.O. system's process diagram and components are similar for both sea and brackish water applications.
- A blending line and flushing tank may be added to this process diagram.



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SEA VS. BRACKISH WATER R.O.

BRACKISH WATER

1. High pressure 316 L Stainless Steel (40 bar).
2. Filter Feed pump can be metallic or non-metallic.
3. Pressure Vessel (27 bar).
4. Membrane (27 bar).
5. Piping (40 bar).
6. High plant recovery (60 – 80%).
7. Normal Equipment Sizing.
8. Filters can be carbon steel.

SEA WATER

1. High Pressure Duplex Stainless Steel Pump (100bar).
2. Filter Feed pump is preferred to be non-metallic or NIALBR.
3. Pressure Vessel (90 bar).
4. Membrane (80-90 bar).
5. Piping (100 bar).
6. Low plant recovery (35 %).
7. Larger Equipment Sizing.
8. Non metallic Filters.

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REVERSE OSMOSIS

Our vast experience has allowed us to accurately serve the various needs of our customers while always assuring the best product quality. In order to maintain this customer confidence, WETICO only uses suppliers that meet its stringent Quality procedures.

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MAIN R.O. EQUIPMENT SUPPLIERS

Pumps:	* KSB - Germany * Grundfos - Denmark * DP - Holland * Goulds Pump Co. - USA
Pressure Vessel:	* Code Line - USA
Membranes:	* FilmTech - USA * Hydranautics - USA
Instruments:	* HANNA – Italy * Prominent – Germany * E & H - Europe
UV & O_3 Treatment:	* Various Suppliers – Europe & USA
Chlorination & Dosing:	* JESCO – Germany
Cartridge Filter Housing:	* WEDECO Puro - Italy

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ION EXCHANGE

DEMINERALIZATION

- Used mainly in industrial applications.
- Required to remove Cations and Anions.
- Uses Acid Cation and Base Anion resins.
- A combination used in a mixed bed exchanger or a series of resin beds is used for total demineralization.

SOFTENING

- Used in industrial, municipal, and commercial applications.
- Required to remove scale causing hardness Cations (Ca^{++}, Mg^{++}).
- Strong Acid Cation (SAC) resin is used to exchange the hardness ions with H^{+} ions.

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ION EXCHANGE

- The design of the system takes into consideration the regeneration cost of resin as a factor.
- Different types of resins are used, depending on the extent of treatment required.
- Systems manufactured by WETICO.

CATION	ANION
Ca^{++} Mg^{++}	HCO_3
	CO_3^{--}
Na	SO_4^{--}
	Cl^-
	NO_3^-
ORGANIC	
SiO2	

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FILTRATION

- Used to remove suspended solids from water.
- Filters particle sizes ranging from 15 Microns to 0.2 Microns.
- Used as pre-treatment for Water and final treatment for Wastewater.
- Operate by gravity and / or pressure.

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GRAVITY FILTER

- Used as a final treatment for Wastewater.
- Uses sand media to filter the suspended solids as a polishing step.

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SAND & MULTI MEDIA FILTER

- Used as a pretreatment for the Reverse Osmosis Plants.
- Can be used as a treatment for some surface water sources.
- Units used for swimming pools.
- Manufactured by WETICO.

Filter Dia mm	Filter Height	Sand Filter	Carbon Filter	Birm Filter
800 1000 1200 1400 1600 1800 2000 2200 2400 2600	1500	Sand Gravel Anthracite	Carbon Sand Gravel	Sand Birm Gravel

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CARTRIDGE FILTER

- Used as a pretreatment for the Reverse Osmosis Plants.
- Housing manufactured by WETICO.

Filter Length	No. of Cartridge	Cartridge Material	Cartridge Size
40 inch 30 inch 10 inch	Upto 5 round	Polypropylene Ceramic	0.2 micron 1 micron 5 micron 10 micron

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PRESSURE FILTERS

MULTI MEDIA

1. 15 Micron Filtration.
2. 4.5-5.5 bar working pressure
3. High water temp.
4. Sand, Gravel, Carbon, and Anthracite Media.
5. Epoxy coated carbon steel and S.S. housing.

CARTRIDGE

1. 0.2 Micron filtration.
2. 4-5 bar working pressure.
3. 45C water temp.
4. Polypropylene & Ceramic Cartridges.
5. S.S. & PVC housing.

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DISINFECTION

- The most common and widespread health risk associated with water is microbiological contamination.
- These organisms can be pathogenic *(disease causing)* and non pathogenic.
- Some common pathogens include bacteria, viruses and protozoa. Thus it makes it important to disinfect the water to ensure its safety.

There are many methods that available for disinfecting the water The most common disinfecting methods include:

1. Chlorination
2. Ozonation
3. Ultraviolet Light

CHLORINATION

- Used in Water and Wastewater Treatment.
- Most popular post treatment method in the Middle East.
- Agents of JESCO AG systems.

CHLORINATION

- Chlorination adds a concentration of the chemical chlorine or chloramines to the water, where the oxidizing ability of this chemical “ burns up” the organic contaminants in the water
- Chlorine can effectively treat biological pathogens like coliform bacteria and legionella
- It is ineffective against hard-shelled cysts like Cryptosporidium and Giardria lamblia.
- It is added to the product water that leaves the treatment plants.
- Low level chlorine (approximately 0.2 to 1.0 ppm) must be maintained in the distribution systems pipes and home plumbing to prevent the growth of microorganisms.

ULTRAVIOLET TREATMENT

- Used in Water and Wastewater Treatment.
- Uses a technology based on Ultraviolet lamps.

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ULTRAVIOLET TREATMENT

- Ultraviolet treatment units use a UV bulb in a clear quartz or plexigals housing, around which flows the untreated water.
- The UV light destroys the genetic material of pathogens like coliform bacteria and legionella,which effectively neutralizes them by preventing them from reproducing.
- Its not effective for the treatment of hard–shelled Cysts.
- The water enetering the UV must be prefiltered.

  Trace minerals and particles in the water can reduce the effectiveness because microorganisms can hide behind particulates.

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OZONE TREATMENT

- Ozone treatment oxidizes organic contaminants in much the same way the chlorine does.
- An ozone generator converts Oxygen in air to Ozone (O3)
- As with chlorination, proper concentrations and contact time; although minimal, are essential for disinfections , Ozone usually use retention tank to accomplish this.
- Ozone is effective for treating pathogens like coliform bacteria and legionella, but its not effective against hard-chelled crysts
- Ozone does not stay in the water after it leaves the treatment plant.

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COMPARISON CHART

	Ultraviolet	Chlorination	Ozone
Destruction	Physical	Chemical	Chemical
Capital Cost	Low	Low	Medium
Operation Cost	Low	Medium	Low
Maintenance Cost	Low	Medium	Medium
Maintenance Frequency	Low	Low	Medium
Disinfection Performance	Good	Good	Good
Contact Time	1 – 5 Sec.	10 – 45 Min.	1 – 5 Min.
Staff Hazards	Low	Medium	High
Toxic Chemicals	No	Yes	Yes
Water Chemistry Changes	No	Yes	Yes
Residual Effect	No	Yes	Yes

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WASTEWATER TREATMENT

Wastewater collected from municipalities, communities and industries must ultimately be returned to receiving waters and lands. Contaminants in wastewater must be removed in order to protect the environment and allow us to reutilize the treated water in many applications.

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WASTEWATER TREATMENT

- Ability to design, manufacture, install and commission.
- Sizes ranging from private compact units to full scale municipal plants.
- Ability to provide any type of treatment process required.
- Our plants will meet or exceed client specifications and international standards.
- Extensive reference list of successful installations.

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WASTEWATER TREATMENT

WETICO's Municipal and Industrial scale Wastewater treatments services include:

- Complete Plant Engineering
- Process and Hydraulic Design.
- Electro-Mechanical Equipment Selection and supply.
- Equipment installation.
- Plants commissioning and operation.
- Supervision.

DOMESTIC WASTEWATER

- Domestic wastewater is the water generated from:

1. Households.
2. Hotels.
3. Commercial Facilities.
4. Institutional Facilities.

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INDUSTRIAL WASTEWATER

Industrial Wastewater is the liquid generated from processes such as:

- Manufacturing (Chemical, Pharmaceutical, Steel, Paper Mills, etc).
- Food processing (Sugar Mills, Beverage Co., etc).
- Animal Husbandry (Slaughterhouses, Shrimp Farms, etc).

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WASTEWATER TREATMENT OBJECTIVES

- Removal of Suspended and Floatable Material.
- The Treatment of Biodegradable Organics.
- Elimination of Pathogenic Organisms.
- Removal of Toxic Compounds.
- Removal of Heavy Metals.
- Removal of Nutrient (Nitrogen & Phosphorus).

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WASTEWATER TREATMENT CHARACTERISTICS

- Physical Unit Operations.
- Chemical Unit Processes.
- Biological Unit Processes.

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PHYSICAL PROCESSES

- Screens (Coarse, fine, and sieve, Mechanical or manual)
- Primary clarifying units (primary separators, Clariflocculator, Dissolved Air Flotation (DAF) Tank)
- Surface or Submerged Aerators.
- Mechanical Sludge Dewatering Processes
  WETICO utilizes different sludge concentration mechanisms depending on the type of sludge (whether granular or crystalline, sticky, thixotropic, gelatinous, cohesive or fibrous), required consistency and cost of transport.
- Cooling Towers.
- Clarifiers.
- Separation Processes
  membrane separation processes are used for such applications as: removal, recovery or concentration of metals; sterile filtration in the medical industry; recovery or concentration of electrocoat paint; textile sizing; oil; and fractionation of whey.
- Filtration units (Rapid, Slow rate, Gravity, and Pressurized)

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CHEMICAL PROCESSES

Chemical-physical processes are used for removal of many metals through hydroxide precipitation and alkaline chlorination removal of oils and fats, removal of suspended solids and improving sludge consistencies.

- Chemical Dosing Systems (Polyelectrolyte, Caustic Lime, and Coagulant Dosing Systems) implemented in Physical Processes.
- Nutrient Dosing Systems (Phosphorus, and Nitrogen Dosing units).
- Odor Control Systems

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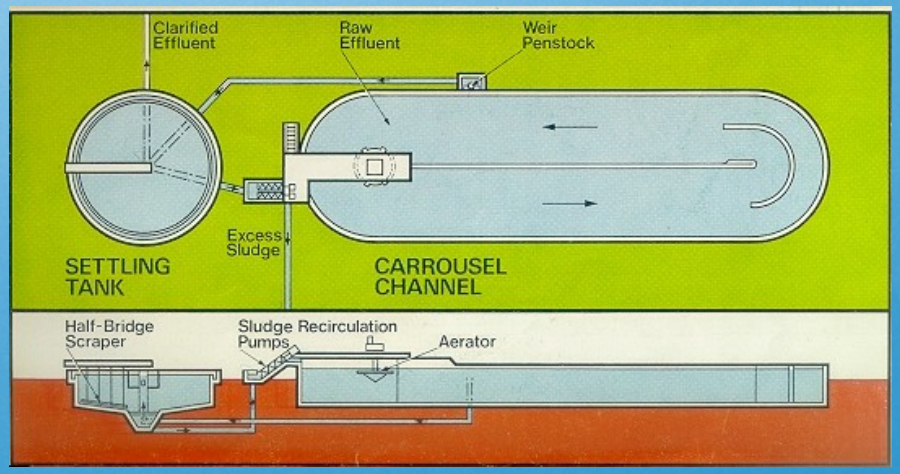
BIOLOGICAL PROCESSES

These processes are mainly used for removal of BOD, COD TKN and Organics (BTEX, MTBE, PCB, TCE, Pesticides, Chlorinated Solvents, Phenols, Aromatic Amines, etc).

- Conventional Activated Sludge Processes (based on sludge recycle to the Biological Reactors).
- Aerobic Ditches.
- Pond Processes.



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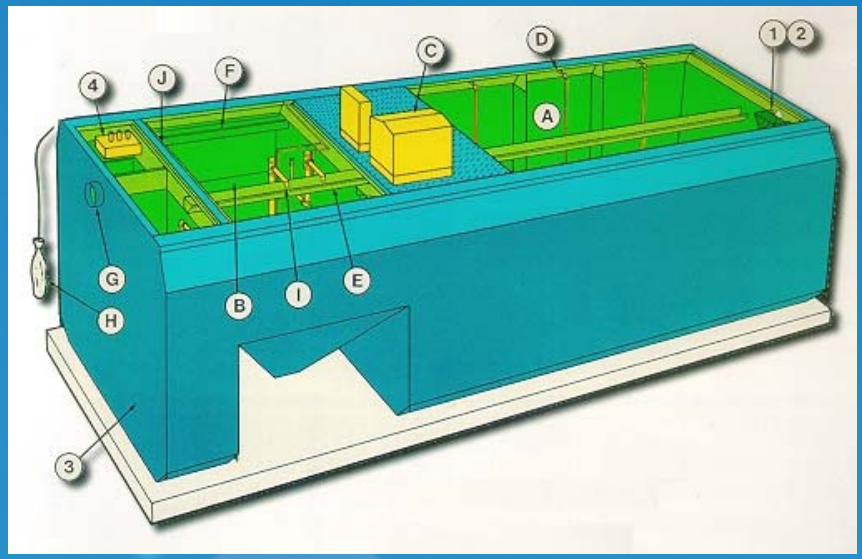
WASTEWATER TREATMENT METHODS

- ACTIVATED SLUDGE:
  1. Extended Aeration.
  2. SBR.
  3. Aeration.
  4. Step Aeration.
  5. Contact Stabilization. (see figure)
  6. MBR.

- PONDS.

- OXIDATION DITCHES.



A - Aeration compartment
B - Settling compartment
C – Air blower with shelter
D - Air diffuser piping
E - Sludge return / waste channel
F - Overflow launder
G - Outlet
H - Corrosion protection
I - Sludge airlift

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WASTEWATER PRIMARY TREATMENT

- Raw Sewage Pumping Stations (submersible, dry pit, screw, etc).
- Screens (Coarse, and Fine, Mechanical and/or manual racked).
- Flow Splitters, Distribution Chambers and Parshall Flume.
- Primary Clarifiers.
- Grit and Grease Removal units.

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WASTEWATER SECONDARY TREATMENT

- Mechanical Surface Aerators (Fixed or Floating), Submerged Aerators, Air Blowers, and submerged Diffusers for Aerobic Basins (Tanks, ditches or Ponds).
- Anaerobic Basins Attached or non- attached growth.
- Circular or rectangular Secondary Clarifiers (Three, Two Arm and Peripheral Type clarifiers).
- Trickling media-filters and rotating biological contactors.

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WASTEWATER TERTIARY TREATMENT

- Disinfections (Chlorine Dosing Set, UV filtration).
- Filtration (Gravity or pressurized single and multimedia filters).

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WASTEWATER SLUDGE HANDLING

- Sludge Handling and disposal Equipment:
- Sludge Digesters (aerobic and anaerobic).
- Sludge Dewatering Systems (Drying beds, belt presses, Gravity thickeners, vacuum filters, and screens)
- Screw pumps, and Sludge conveyors for sludge disposal

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WASTEWATER TREATMENT METHODS

Contaminant	Treatment System in Industrial &or Domestic Application		
Suspended Solids	Screening	Comminution	Grit Removal
	Sedimentation	Filtration	Polymer Addition
	Floatation	Coagulant Addition.	
Biodegradable Organics	Fixed Film Reactor	Physical Chemical Systems	Intermitted Sand Filters.
	Activated Sludge Variations		Lagoon Treatment
Volatile Organics	Air Stripping	Off Gas Treatment	Carbon Adsorption
Pathogens	Chlorination	Ozonation	UV Radiation
Nutrients (Nitrogen, Phosphorous)	Biological Nutrient Removal	Ammonia Stripping	Ion Exchange
	Break Point Chlorination	Malt Salt Addition	Biological P Removal
	Biochemical P Removal	Lime Coagulation Sedimentation.	
Heavy Metals	Chemical Precipitation	Ion Exchange	Natural Systems
Dissolved Organic Solids	Ion Exchange	Reserve Osmosis	Electro dialysis

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RECREATION AND LEISURE

Our recreational product line covers a large scope of products and equipment. Our leisure projects have included:

1. Swimming Pools.
2. Plunge Pools.
3. Jacuzzi’s.
4. Steam Rooms.
5. Sauna’s
6. Fountains.

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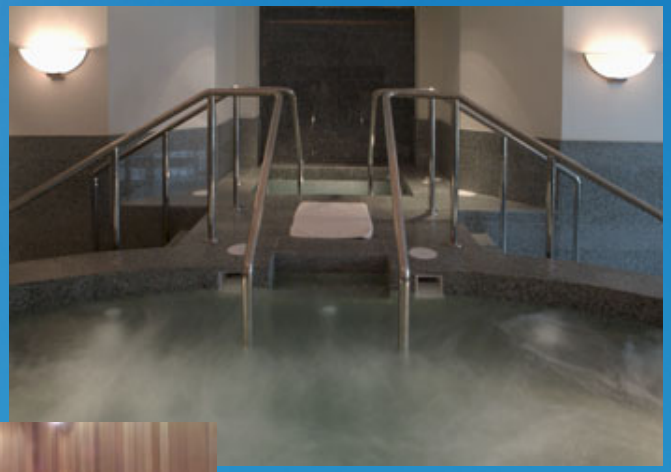
EQUIPMENT USED FOR RECREATIONAL PROJECTS

- Jet Stream Pumps.
- Water Filters.
- Water Sanitation (UV and Ozone).
- Electronic Control of Chlorine and pH.
- Heat Exchangers.
- Pool Ladders.
- Pool Lighting.
- Pool Accessories.



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CHEMICALS

Our qualified team of chemists develop, prepare and analyze all chemical mixtures to ensure quality and performance.

Our team of customer service chemists visit the client, sample and analyze the water in order to recommend the appropriate treatment.

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CHEMICALS

- R.O. – used for scale prevention.
    1. Antiscalant – With/without Acid.
    2. RO cleaning chemicals – there is a wide spectrum of cleaning chemicals for the removal of sulfate, silica and carbonate scales, as well as iron fouling, biofilms and organics.
- STP – used to control odor.
- Filtration – used for Coagulation / Flocculation.
- Heating & Cooling:
    1. Scale and Corrosion Inhibitor.
    2. Prevent Bio-fouling in cooling.
    3. Biocide for legionella bacteria for cooling towers.
- Swimming Pool:
    1. To prevent Algae growth.
    2. To adjust pH and pool clarity.
    3. To prevent germs and bacteria.

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BOILER CHEMICALS

- The Boiler system includes feed lines, pumps, and the boiler itself as well as the steam and condensate system. For maximum efficiency and working life we need:

1. No Scale – heat transfer surfaces free from scale or sludge deposits which act as a heat barrier.
2. No Corrosion – The surfaces covered by an unbroken protective film of magnetite free from any pits or wasteage.
3. Pure Steam – Elimination as far as possible of boiler water carried over into the steam.
4. Safe Operation – Prevention of sludge build up in the water level and blow down controls which may interfere with their operation.

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CHEMICALS

- Potable Water – Our chemicals are non-toxic and designed for hardness scale, corrosion control, and red water control for domestic and commercial potable pipe work systems.
- Resins and Resin Cleaners:
    1. SAC,WAC, SBA, WBA.
    2. Cleaners are designed to prevent the build-up of silt, metallic oxide, and other suspended solids.
    1. Braw Salt is used for resin regeneration.

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CHEMICALS

- Consumable Chemicals – includes but not limited to the following:
    1. Sulfuric Acid.
    2. Sodium Hydroxide (Caustic Soda).
    3. Sodium Hypochlorite.
    4. Calcium Hypochlorite.
    5. Hydrochloric Acid.
    6. Sodium Metabisulfite.
- Laundry Chemicals:

1. White oxygen bleach powder – safe and effective in cleaning of all colors.
2. Dry chlorine bleach – where extra stain removal power is required.
3. Wrinkle Reducer – shorten drying time and make fabric feel soft and fluffy.
4. Special blood removal chemical available for hospitals.
5. Rinsing cycle – pH neutralizing and chlorine bleach removal.
6. Starching for wrinkle free appearance after ironing.
7. Special cleaner for synthetics and cotton.

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PRECOMMISSIONING CLEANING CHEMICALS

1. To remove atmospheric rusting and oil from systems after commissioning as a preliminary treatment.
2. Acid descalant for the removal of hardness deposits and iron oxides.
3. Metal passivators and neutralizers used after cleaning to passivate bare metal surfaces following metal cleaning.
4. Non-acid cleaner for Diesel cooling systems.

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WTP PROJECTS

WATER TREATMENT PLANTS

- SHAS – 12,000 m^3/day
- Saudi Aramco RT utilities 2X500 m3/d BWRO
- Jeddah Industrial City Water Reclamation RO – 8000 12,000 m^3/day
- Al-Marai Super Farm 6 – 1600m^3/d X 2 R.O.
- Al-Marai CPP2 – 2 X 1500m^3/d R.O. with 1824m^3/hr Polishing Station.
- Gulf Union Juice Factory 1000m^3/d Polishing Station.
- ARASCO 1500 m^3/day RO.
- FEMCO 600 m^3/d RO.\
- Riyadh Medical Complex – 150 bed Hemodialysis (biggest in the Middle East).
- Saudi Center for Organ Transplantation –70 bed Hemodialysis.

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CURRENT PROJECTS

WASTEWATER TREATMENT PLANTS

- Riyadh Municipal STP – 200,000 m^3/day
- Jeddah Industrial City WWTP – 25,000 m^3/day
- Al-Ayoun City STP- 30,750 m3/d
- Al-Oumran City STP- 30,750 m3/d
- Saudi Paper Mfg IWWTP reuse-5,300 m3/d
- HAIL Municipal STP – 12,000 m^3/day
- Arar Municipal STP – 12,000 m^3/day
- Majmaa Municipal STP – 3,500 m^3/day
- Shaqra Municipal STP – 3,500 m^3/day
- Obeikan Paper Mill WWTP – 6,000 m^3/day
- Al-Marai WWTP 3200 m^3/d & STP 510m^3/d - MBR
- Arab Paper WWTP – 2,400 m^3/day
- HADCO slaughter house WWTP –1,900m^3/day
- MODA, GID – 1000m^3/day STP
- Yamama Saudi Cement – 750m^3/day STP
- Arabian Cement Factory – 700m^3/day STP
- ACOLD Dubai – 600 m^3/day Ind. WWTP.

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CURRENT PROJECTS

OPERATION & MAINTENANCE

- Ministry of Water & Electricity - Assir
- Ministry of Finance - Haditha
- Al-Qassim Industrial City
- Nayyaria Municipality - Dammam
- Riyadh Medical Complex - Riyadh
- Arabian Cement Factory - Jeddah
- Annakheel Village - Jeddah
- Intercon Hotel - Riyadh
- Prince Sulman Dialysis Hospital - Riyadh
- Ita Agri Co. – Riyadh
- Arab Medical Dar Hospital – Riyadh
- AFG Water Treatment Plant
- Kingdom Resort – Wadi Laban

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THANK YOU

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