Wastewater Treatment Systems
Miranda is an engineering, consultancy, manufacturing and R&D company focused in the treatment of water, wastewater and reuse of treated water. We are established to offer solutions to the growing water management needs of our country and the world struggling with the management of depleting water resources caused by global warming.

Miranda is focused to address the needs within its area of activity accurately and expediently with its experienced technical staff who are ready to serve with the principle of total customer satisfaction.

Miranda, Latin meaning of which means “worthy of admiration”, was chosen deliberately by the founders of the company to address the neglect exhibited by society with respect to the environment and the desire of the founders of the company to reverse the effects of this negligence by producing exceptionally well designed equipment which would best address this requirement.

Additionally, “Miranda Rights” as defined in legal terms addresses every individual’s most basic civil rights to live in a society which, in our opinion, should also include our right to live in a clean environment in harmony with nature.

It is for this reason Miranda and its employees take pride in being part of an organization that services this most fundamental need of human beings.

You have a right to a clean environment.
MIRACELL®

you gain when you purchase...

The system most preferred by customers who clearly understand the economic value in purchasing a well-built and well-designed system

Miranda has developed a wastewater treatment system named Miracell® which utilizes leading technologies in the wastewater treatment and reuse sector. Our customers, by using Miracell, reclaim their domestic wastewater in obtaining odorless and clean treated water which is used for many purposes such as irrigating green areas, washing roads and utilization in various construction site services. The wastewater which would have been discharged is not only put to use by our customers as a valuable conserved resource but also is a proof of their individual contributions to the cleanliness of the environment. Those customers who are active in industrial fields are able to source their treated water for various applications such as process cooling water, concrete mixing and curing.

If one asks why Miranda is preferred over many other firms who appear to provide similar mentioned benefits, the response is hidden in Miracell™’s advanced technology. Aesthetic appearance is highly important and manufacturers should observe this significant factor in their designs in an effort to be environmentally sensitive, but many of our competitors do not address this key point. In addition, Miracell® due to the corrosion free and easily formed composite materials used in its manufacturing is offered in many desired colors, textures and forms.

Process Description

Before the wastewater is supplied to the Miracell®, it will need to be treated mechanically and physically. To be able to prevent coarse materials to pass on through to the biological treatment unit, wastewater is first passed through a rough screen. Wastewater that is cleared of the coarse material is then channeled directly into the pre-sedimentation basin before the equalization basin which serves the purpose of equalizing the fluctuations in the daily flow of wastewater.

Wastewater that is equalized then is pumped from the equalization basin to Miracell® system by the help of a sewage pump with macerator (including spare sewage pump system) having level control. Sewage pump and its spare will be located at a proper depth in the equalization basin. If the wastewater plant is situated such that gravity flow serves the purpose of supplying the wastewater to the plant then the vortex pump will not be utilized.

Once the wastewater is cleared also of fine sediments then it is passed on to the Miracell® Reactor Sections which remove nearly all of the BOD and COD in the water as well as the remainder of the extra fine sediments in the system. Once wastewater is supplied to the plant the flow is directed over a group of Lamella Separators which serve as a final settlement tank to remove fine sediments. pH is also neutralized by the biological treatment process and the water discharged from the system meets and exceeds the parameters for discharge of effluents into streams imposed by the Turkish and European Union Standards for Discharge.

In order to provide irrigation and reuse water, Miracell® can be equipped with a sand filter and ultrafiltration system, thus providing a 99% hygienic water that can be used for various purposes.

The sludge that is periodically removed can also be utilized as a stabilized fertilizer. For areas of high sensitivity, mild chlorination may be utilized by use of an automatic chlorination unit attached to the system as an option, although by usage of Microbe-Lift bacteria, most of the reasons for chlorination such as Hydrogen Sulfide odors, Coli Bacillus and Mosquitoes are removed over 90% from the system naturally without harming the environment.

Features & Benefits

The Miracell® wastewater treatment system has a modular design, with units that can be configured to service small to mid-sized communities between 50 and 20,000 people or businesses with water treatment needs of 10 - 4000 m³/day (2.645 - 1.058.200 GPD). It is one of the most flexible and expandable systems on the market today, where units can be easily added or moved to accommodate changes in demand. The system is certified to meet or exceed strict EU environmental discharge and irrigation standards.

High Efficiency
- Consumes much less power
- Occupies much less space
- Requires much less maintenance
- The Start-up period is much shorter

Modular & Compact Design
- Can be easily transported
- Its capacity can be easily increased
- Can also be operated at less than maximum capacity

Quiet & Odorless
- It operates silently
- Less sludge will have to be discharged
- Odor and mosquito problems will be negligible

Capacity increase or decrease when needed

Miranda Wastewater Treatment Systems
### Areas of Application

**Domestic Wastewater**
- Camps, Touristic Resorts, Municipalities, Mass Housing, Villas, Hotels, Restaurants, Construction Sites, Factories, Schools, Universities, Military Sites and Marinas.

### Miracell® Product Series

- **Miracell White**
  - Low energy consumption
  - Low maintenance cost
  - Modular
  - Composite (GRP)
  - Low cost
  - Standard water quality
  - BOD : 45  COD : 120  TSS : 45
  - Discharge purposes in emerging countries

- **Miracell Green**
  - Low energy consumption
  - Low maintenance cost
  - Modular
  - Composite (GRP)
  - High water quality
  - BOD : 25  COD : 125  TSS : 35
  - Discharge purposes in developed countries & irrigation purposes for emerging countries

- **Miracell Blue**
  - Low energy consumption
  - Low maintenance cost
  - Modular
  - Composite (GRP)
  - Superior water quality
  - BOD : 10  COD : 90 / 50  TSS : 1
  - Irrigation of landscape & vegetation, car washing, cooling towers & concrete mixing purposes in developed countries

### Technical Specifications

<table>
<thead>
<tr>
<th>MIRACELL®</th>
<th>250</th>
<th>500</th>
<th>750</th>
<th>1000</th>
<th>1250</th>
<th>1500</th>
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<tbody>
<tr>
<td>Equivalent Population (person)</td>
<td>250</td>
<td>500</td>
<td>750</td>
<td>1000</td>
<td>1250</td>
<td>1500</td>
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<td>Treatment Capacity (m³/day)</td>
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</table>

Pump excluded in energy consumption.

### Energy Comparison Table - 1000 People Capacity / 10 Year Energy Consumption

Note: Energy cost totals are provided for comparison purposes only. Increases in energy costs and energy consumption variations due to operation - maintenance activity has been disregarded. Our firm can not be held responsible for energy consumption calculations due to energy unit price escalations or other changes.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost of Energy</th>
<th>Cumulative Total</th>
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<td>120,000 €</td>
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<td>2</td>
<td>100,000 €</td>
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<td>3</td>
<td>80,000 €</td>
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<td>4</td>
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<td>420,000 €</td>
</tr>
<tr>
<td>10</td>
<td>3 €</td>
<td>420,000 €</td>
</tr>
</tbody>
</table>

- MIRACELL WASTEWATER TREATMENT PLANT & ACTIVATED SLUDGE SYSTEM
- Discharge purposes in emerging countries
- BOD : 45  COD : 120  TSS : 45
- Superior water quality
- Discharge purposes in developed countries & irrigation purposes for emerging countries
- BOD : 25  COD : 125  TSS : 35
- Irrigation of landscape & vegetation, car washing, cooling towers & concrete mixing purposes in developed countries
- BOD : 10  COD : 90 / 50  TSS : 1
The system most preferred by customers who clearly understand the economic value in purchasing a well-built and well-designed system.

The operating principle of Miranda Environmental and Wastewater Treatment Technologies Inc.’s Dropbox® Wastewater Treatment Unit is based on the Rotating Biological Contactor (RBC) technology. By employing RBC technology, specific quantity of disks are centered and connected around a horizontal shaft. The quantity of the disks is a function of the bacterial growth needed to treat the waste within the wastewater and other pertinent parameters. The shaft where the disks are connected is driven by an electric motor and reduction gear. The media made up in this manner is slowly rotated (3-5 rpm) by the mechanical drive.

In this system, 40% of the media surface is in the wastewater at any given time during the rotation. The organisms in the wastewater attach and multiply on the rotating media until they form a thin layer of biomass over the disc surface. The elevation of the water occurs without the use of pumps by utilizing several buckets connected to the shaft and rotating with the RBC drum. While the buckets move to their highest position they will pass over the discharge drain into the chamber where polyethylene discs are located. The wastewater is then cleared of fine sediments and equalized before moved on to the Rotating Disc where nearly all of the BOD and COD will be removed along with the remainder of the extra fine sediments.

The process description:

**Rough Screen:** Before the wastewater is supplied to the Dropbox® system, it needs to be treated mechanically and physically. In this regard, wastewater is first passed through a rough screen.

**Equalization Basin and Pre-settlement:** Wastewater which is cleared of the coarse materials is then channeled into the equalization basin, which serves the purpose of equalizing the fluctuations in the daily flow of wastewater but also as a pre-sedimentation area where fine sediments are settled and removed from the water.

**RBC Reactor:** The elevation of the water occurs without the use of pumps by utilizing several buckets connected to the shaft and rotating with the RBC drum. While the buckets move to their highest position they will pass over the discharge area and empty their load of water over the area of discharge draining into the second chamber where polyethylene discs are located. The wastewater is then cleared of fine sediments and equalized before moved on to the Rotating Disc where nearly all of the BOD and COD will be removed along with the remainder of the extra fine sediments.

**Final Settlement:** Following the RBC process, treated water is moved onto the third section by utilizing a second set of buckets mounted on the rotating drum. In the third section which serves as the final settlement, water is directed over a group of Lamella Separators to remove fine sediments. pH is also neutralized by the biological treatment process and the discharged water from the system exceeds the parameters of discharge imposed by the European Union. In addition, for areas of high sensitivity, mild chlorination may be utilized by the use of an optional automatic chlorination unit. By utilizing a laboratory generated specialized bacteria culture, odors caused by Hydrogen Sulphide, Coll Bacillus and Mosquito larva are removed over 90% from the system naturally without harming the environment.

**Sand and Ultrafiltration Option:** If further treatment is required for any specific purpose, Sand Filter (0.1 micrometer) and an Ultrafiltration (0.01 micrometer) can be used. Sand filter collects the suspended solids remained after sedimentation and sends effluent to Ultrafiltration. Ultrafiltration is a membrane filtration method that prevents bacteria and viruses and creates 100% hygienic effluent for irrigation.

The Dropbox® wastewater treatment system has a plug & play design, with units that can be configured to service small to mid-sized communities between 50 and 20,000 people or businesses with water treatment needs of 10 – 4,000 m³/day (2.645 – 1,058,200 GPD). It is one of the most flexible and expandable systems on the market today, where units can be easily added or moved to accommodate changes in demand. They can also be buried in the ground. The system is certified to meet or exceed strict EU environmental discharge and irrigation standards.

**Features & Benefits**

- **High Efficiency**:
  - Consumes much less power
  - Occupies much less space
  - Requires much less maintenance
  - The Start-up period is much shorter

- **Plug’n Play & Compact Design**:
  - Can be easily transported
  - Its capacity can be easily increased
  - Plug & Play Design
  - Can be buried in the ground

- **Quiet & Odorless**:
  - It operates silently
  - Less sludge will have to be discharged
  - Odor and mosquito problems will be negligible

- **Odorless**

- **Aesthetic**

- **Economical**

- **Plug’n Play**

- **Silent**

- **Economical**

- **Plug’n Play**

- **Silent**
## Areas of Application

**Domestic Wastewater**
- Camps, Touristic Resorts, Municipalities, Mass Housing, Villas, Hotels, Restaurants, Construction Sites, Factories, Schools, Universities, Military Sites and Marinas.

## Dropbox® Product Series

<table>
<thead>
<tr>
<th>Dropbox Series</th>
<th>Energy Consumption</th>
<th>Water Quality</th>
<th>Discharge Purposes</th>
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<tbody>
<tr>
<td><strong>White</strong></td>
<td>BOD: 45 COD: 120 TSS: 45</td>
<td>Discharge purposes in emerging countries</td>
<td></td>
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<tr>
<td><strong>Green</strong></td>
<td>BOD: 25 COD: 125 TSS: 35</td>
<td>Discharge purposes in developed countries &amp; irrigation purposes for emerging countries</td>
<td></td>
</tr>
<tr>
<td><strong>Blue</strong></td>
<td>BOD: 10 COD: 90 / 50 TSS: 1</td>
<td>Irrigation of landscape &amp; vegetation, car washing, cooling towers &amp; concrete mixing purposes in developed countries</td>
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</tr>
</tbody>
</table>

### Technical Specifications

**DROPBOX WASTEWATER TREATMENT PLANT & MBR SYSTEM**

**Energy Consumption Comparison Table**

<table>
<thead>
<tr>
<th>Equivalent Population (person)</th>
<th>Treatment Capacity (m³/day)</th>
<th>Energy Consumption</th>
<th>Width (cm)</th>
<th>Length (cm)</th>
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<tr>
<td>50</td>
<td>10</td>
<td>0.37 kW</td>
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<td>100</td>
<td>20</td>
<td>0.37 kW</td>
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<td>218</td>
<td>970</td>
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</table>

Pump excluded in energy consumption

**Areas of Application**

- Discharge purposes in emerging countries
- Discharge purposes in developed countries & irrigation purposes for emerging countries
- Irrigation of landscape & vegetation, car washing, cooling towers & concrete mixing purposes in developed countries

**Discharge Purposes**

- Domestic Wastewater
- Camps, Touristic Resorts, Municipalities, Mass Housing, Villas, Hotels, Restaurants, Construction Sites, Factories, Schools, Universities, Military Sites and Marinas.
R/OCELL®

you earn while it filtrates...

It allows the customer to obtain clean drinking water by desalinating sea water and brackish water most economically

R/OCELL® Reverse Osmosis Systems

Miranda provides drinking and utility water solutions for all needs and capacities through its R/OCELL line of Reverse Osmosis Systems which apply leading edge technologies.

Miranda is your solution partner in reverse osmosis systems for applications in sea water (desalination). Brackish and well water filtration by offering custom design, manufacturing and customer satisfaction guarantees.

Areas of Application

- Drinking Water Supply Facilities,
- Fruit Juice and Soft Drink Industry,
- Milk and Dairy Products Industry,
- Health Industry,
- Glass Industry,
- Textile Industry,
- Cosmetics Industry,
- Electronics and Appliance Industry,
- Cooling and Humidifier Systems,
- Medium to High Pressure Steam Vessels,
- Fisheries,
- Yachts and Ships,
- Pure Water and Ice Production,
- Well and Sea Water Filtration.

www.miranda-tr.com
MBR Systems are considered as advanced active sludge treatment systems. They utilize micro pores within the membranes to separate liquid and solid particles in the water by pressure. As a result of this process, secondary treatment is not needed. Besides treatment of wastewater, MBR systems also offer attractive solutions in regaining greywater. By providing filtration at a 0.01 micron level, Membrane Bioreactors are:

- An advanced form of activated sludge treatment
- Separate solid and liquid particles
- Remove pathogens, bacteria and block viruses
- Provide highest quality treated water
- Require smaller spaces

**GREYWATER RECYCLING**

Greywater is the wastewater collected from laundry, dishwashing, bathing type of domestic activities and does not contain wastewater from toilets. Greywater amounts to about 80% of all the water used domestically. By utilizing membrane bioreactors and ultrafiltration type of equipment greywater can be processed and recycled to save up to 50% of the utility water used.

**Areas of Application**

- Filling toilet reservoirs, laundry, irrigation
- Fountains / decorative pools, car washing
- Filling of fire extinguishers or tanks
- Cooling towers for industrial uses

**UF Ultrafiltration System**

Ultrafiltration is a process, which separates particles by preventing them from passing at a molecular level (40 Angstrom) filtration by application of pressure. By Ultrafiltration, suspended solids, turbidity, color pigments up to 99% and most importantly all bacteria and viruses can be removed from the wastewater.

As a consequence, Ultrafiltration is a key process in treating spring water and potable water.

**Areas of Application**

- Precise and Advanced water treatments
- Pre-treatment before reverse osmosis
- Open-Closed water circuits
- Industrial solid-liquid separation distillation process
- Purifying microorganisms
SF & ACF
Sand Filter & Active Carbon Filter

Blurriness which is the most notable contamination parameter showing suspended solids, silica, residues etc. in the water. These factors are removed by sand filtration which helps protect the equipment in the process line after sand filter.

Active Carbon Filter is used to remove odors, taste, color and organic contaminants. The system operates automatically by control valves without requiring human intervention.

Areas of Application
- Treating of brackish water to be used in communities, municipal facilities or residences
- Treating pool water or potable water for Hotels and Resorts
- Producing processed water for Industrial facilities

Design Turkey
Industrial Design Awards 2010 Winner
MIRACELL®
You have a right to a clean environment
You have a right to a clean environment