



*You have a right to a
clean environment*

COMPANY & RBC OVERVIEW



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ABOUT US

Miranda Water Technologies, operating in Türkiye and Canada with over 1,200 units deployed across more than 40 countries, leads the way in pioneering sustainable environmental solutions. Our integrated approach covers engineering, consultancy, manufacturing, and advanced research and development, all aimed at advancing water treatment, wastewater management, and innovative treated water reuse.

Going beyond mere functionality, our goal is to engineer solutions that are environmentally friendly, economically viable, and efficiently operated, while maintaining a compact design. Through our state-of-the-art technology, we ensure that our water and wastewater treatment systems not only meet but exceed the strict discharge standards mandated globally.

An exemplary testament to our dedication is the Miracell® wastewater treatment system. Its lightweight yet durable design, minimal maintenance needs, and remote management capabilities set new standards for both aesthetics and functionality in wastewater treatment.



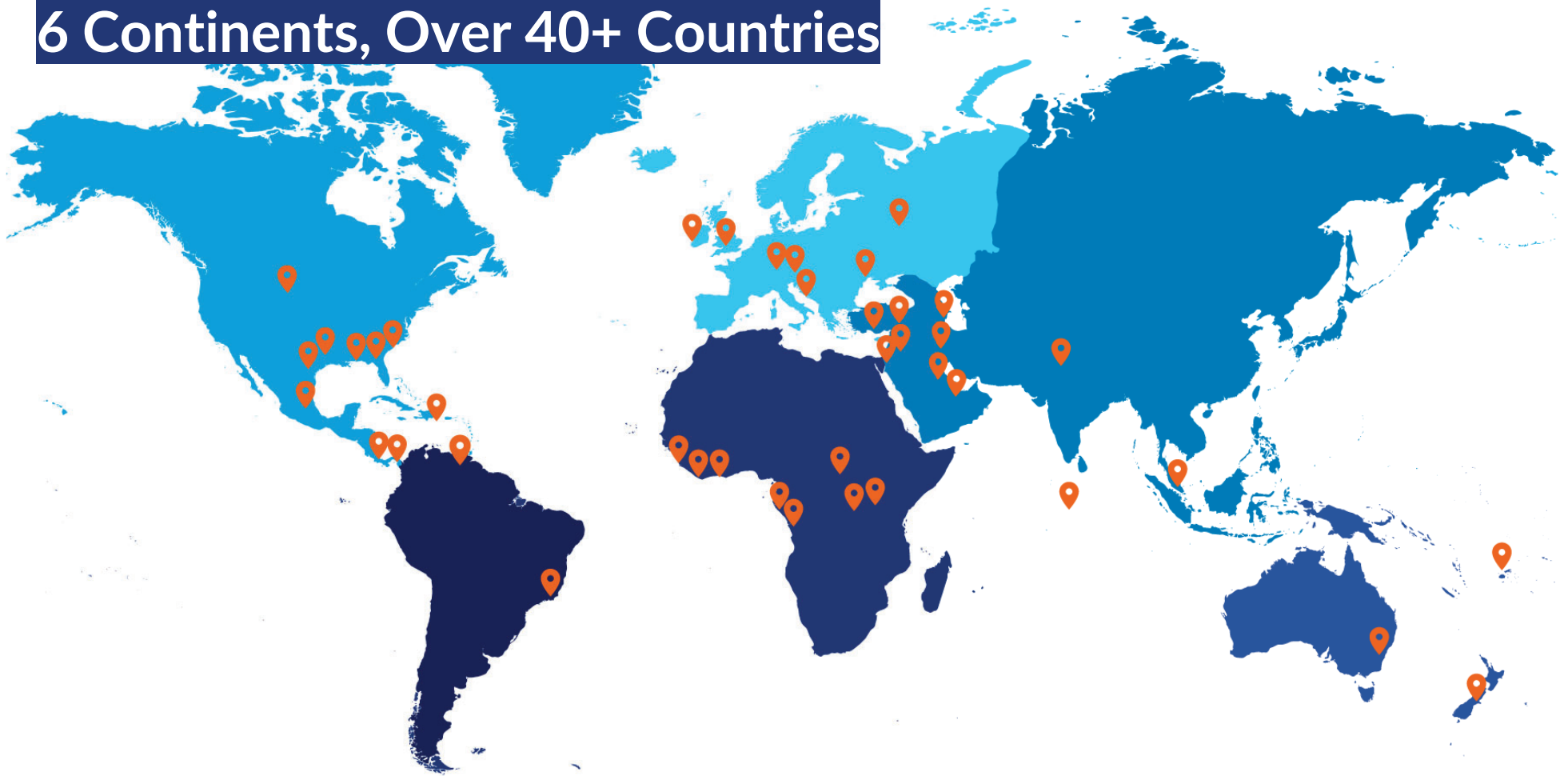
SENIOR MANAGEMENT TEAM



Turnkey Wastewater Treatment Solutions

Miranda Systems Are Installed In:

6 Continents, Over 40+ Countries



SAMPLE OF OUR WORLDWIDE CLIENTS



TYPES OF WASTEWATER



There are several types of wastewater, each with its own characteristics and sources:

- Domestic Wastewater: Wastewater originating from households, including kitchen, bathroom, and laundry activities.
- Commercial Wastewater: Wastewater generated from commercial establishments such as restaurants, hotels, and offices, similar to domestic wastewater but often with higher volumes and different pollutants.
- Industrial Wastewater: Wastewater generated from industrial processes, often containing various chemicals, heavy metals, and pollutants specific to the industry.
- Agricultural Wastewater: Wastewater produced from agricultural activities such as irrigation, livestock operations, and crop processing, containing fertilizers, pesticides, and organic matter.
- Stormwater Runoff: Wastewater resulting from rainwater and melting snow that flows over surfaces and can pick up pollutants such as oil, chemicals, and debris as it travels.



MIRANDA WASTEWATER FOCUS: DOMESTIC & COMMERCIAL

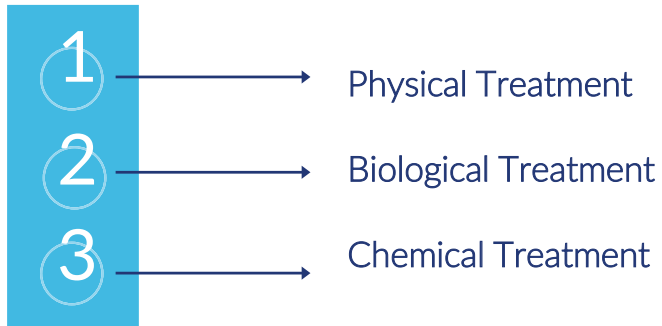


Domestic/commercial wastewater, stemming from human activities in homes and businesses, is commonly collected from sinks, toilets, showers, and drains.

The treatment methods for domestic/commercial wastewater environments vary, ranging from individual septic systems to centralized municipal plants. The choice depends on factors such as the volume and nature of the wastewater. Population density, wastewater flow rates (both average and peak), pollution load (measured as BOD - Biological Oxygen Demand), and the available capital expenditure (CAPEX) budget are important considerations in determining the most suitable treatment approach.

HOW TO PURIFY AND TREAT DOMESTIC WASTEWATER

Domestic Wastewater Treatment methods are basically divided into three methods:



Different treatment methods can be used for wastewater with different characteristics.

While physical and biological treatment methods are generally preferred for the treatment of domestic wastewater along with a disinfectant such as chlorine. Chemical methods are also used in addition to physical and biological treatment for the treatment of industrial wastewater.



TREATMENT METHODS WE FOCUS ON



PHYSICAL TREATMENT METHODS

- Treatment methods are chosen based on the physical characteristics of pollutants, tailoring the approach to the specific properties of the contaminants.
- Essentially, these methods act to prevent large solids like toilet paper, disposable wipes, feminine products, stones, and soil from entering the system. This enhances purification efficiency and minimizes the potential for mechanical equipment damage.
- By screening out such solid debris, these methods optimize the overall performance of wastewater treatment systems, ensuring smoother operation and improved effectiveness in pollutant removal. For example:
 - Grills
 - Sand catchers
 - Preliminary Sedimentation Tanks
 - Filtration Pools

BIOLOGICAL TREATMENT METHODS

- Biological pollutants in wastewater are eliminated through biochemical reactions, where bacteria play a key role in breaking down organic substances.
- Wastewater treatment plants foster bacteria growth by employing various technologies to enhance the process, ultimately purifying water by accelerating bacterial survival and reproduction.
- One notable method, the Miracell System, relies on bacteria consuming impurities in wastewater, with oxygen from the air being essential for their survival.
- The primary methods employed by domestic wastewater treatment plants include:
 - Biological Filters
 - Activated Sludge Method and Modifications
 - Stabilization and Modifications
 - Anaerobic Systems

NEXT GENERATION RBC SYSTEMS

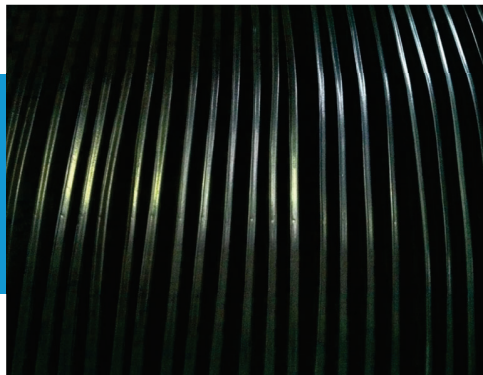
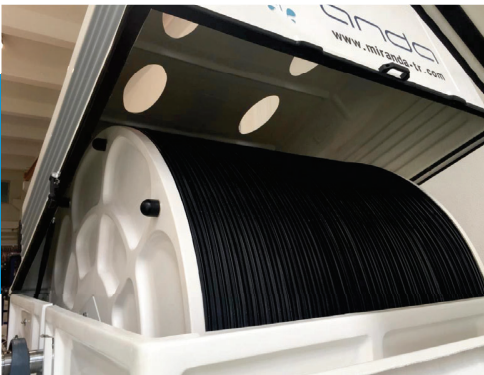


OVERVIEW OF AN RBC

(ROTATING BIOLOGICAL CONTACTOR SYSTEMS)

A rotating biological contactor or RBC is a biological treatment process used in the treatment of wastewater following primary treatment.

RBC is a type of secondary treatment process. It consists of a series of closely spaced, parallel discs mounted on a rotating shaft which is supported just above the surface of the wastewater.



MIRANDA'S MODULAR RBC SYSTEM

OVERVIEW OF AN RBC

(ROTATING BIOLOGICAL CONTACTOR SYSTEMS)

Our Miracell® RBC uses a solid shaft (C1050). The RBC shaft is aligned with the flow of wastewater so that the discs rotate at right angles to the flow with several packs usually combined to make up a treatment train.

The rotating packs of disks (known as the media) are contained in a tank and rotate at between 2 and 5 revolutions per minute.

Our Miracell® uses polyethylene for the disks.



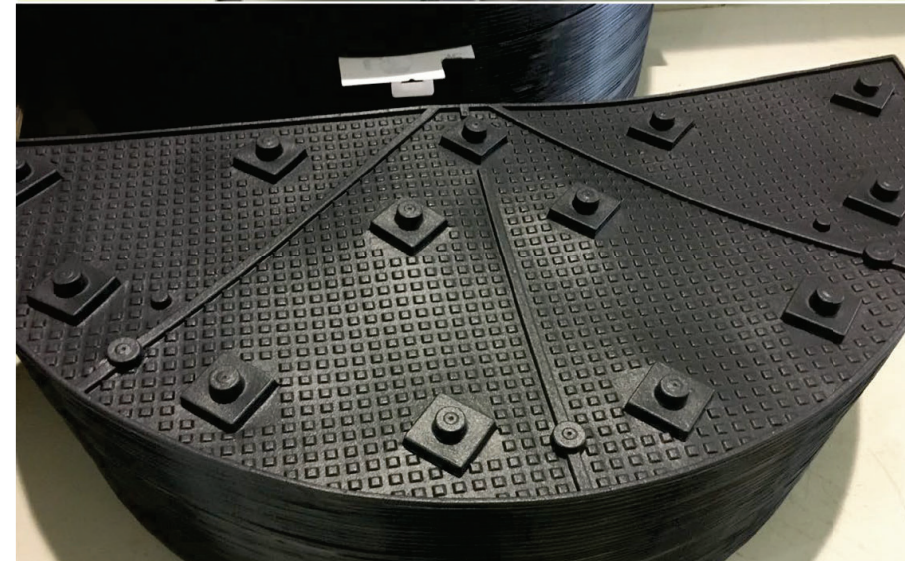
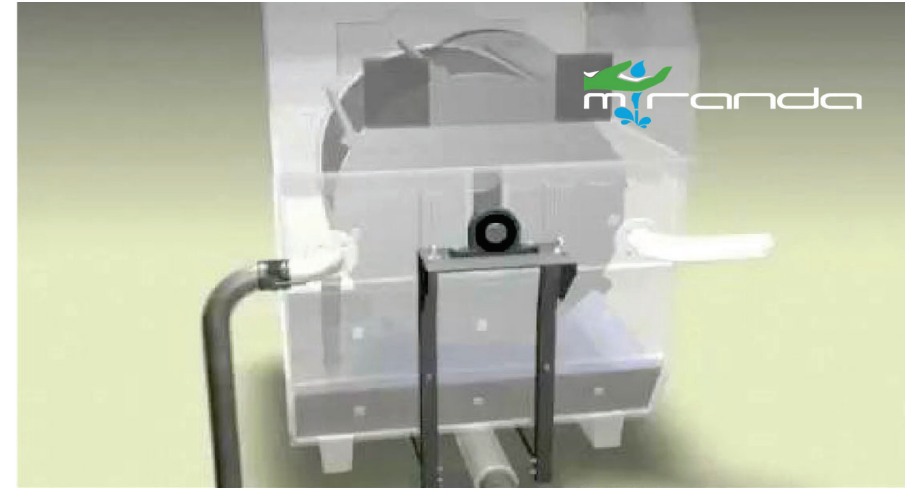
MIRACELL® GEARBOX WITH REDUCER

OVERVIEW OF AN RBC

(ROTATING BIOLOGICAL CONTACTOR SYSTEMS)

The discs are submerged in wastewater to about 40% of their diameter. Approximately 95% of the surface area is thus alternately submerged in wastewater and then exposed to the atmosphere above the liquid. The Miracell® RBC features a substantial 466^{M2} of surface area spread across 66 rotating disks.

Aeration is provided by the rotating action, which exposes the media to the air after contacting them with the wastewater, facilitating the degradation of the pollutants being removed. The rotation helps to slough off excess solids.



BASIC WORKING PRINCIPLE

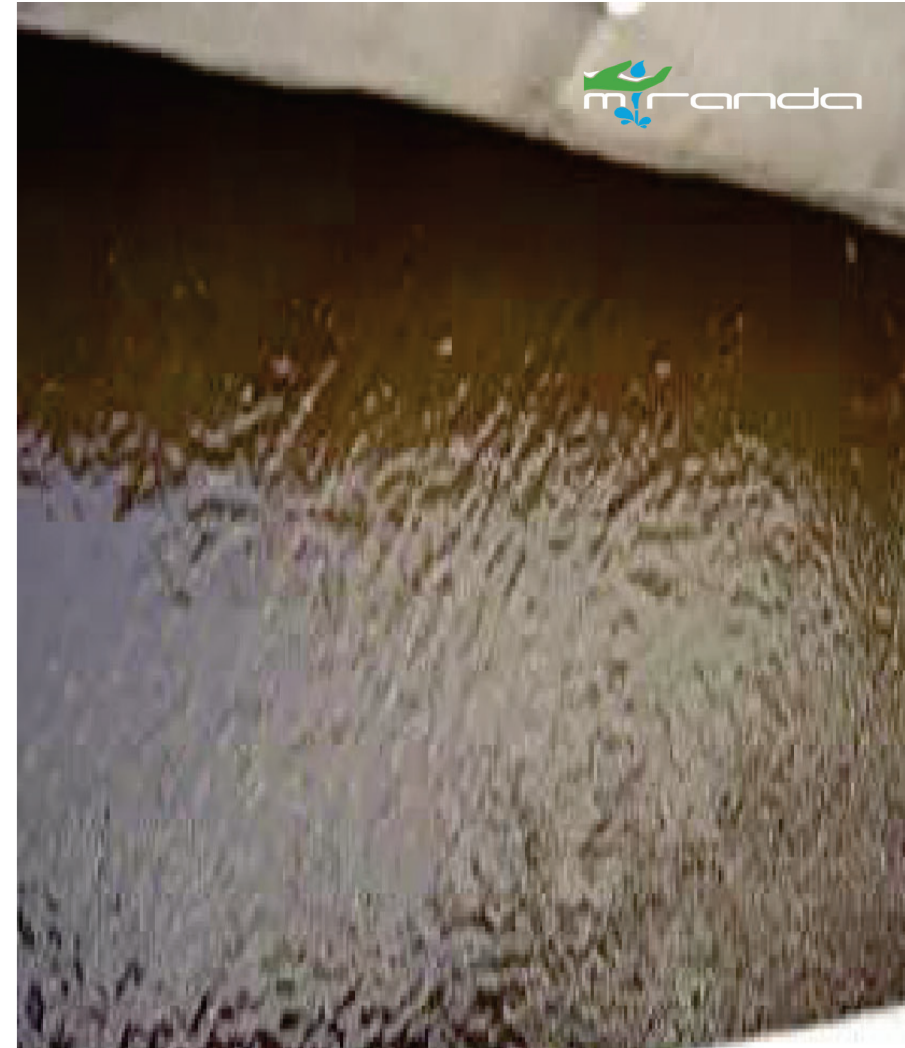
OVERVIEW OF AN RBC

(ROTATING BIOLOGICAL CONTACTOR SYSTEMS)

Microorganisms grow on the surface of the discs where biological degradation of the wastewater pollutants takes place.

Biofilms, which are biological growths that become attached to the discs, assimilate the organic materials in the wastewater.

Carbonaceous substrate is removed in the initial stage of RBC. Carbon conversion may be completed in the first stage of a series of modules, with nitrification being completed after the initial stage.



BACTERIAL GROWTH

OVERVIEW OF AN RBC

(ROTATING BIOLOGICAL CONTACTOR SYSTEMS)

Types of Microorganisms:

1. Aerobic bacteria
2. Biofilm-forming bacteria
3. Nitrifying bacteria
4. Denitrifying bacteria
5. Phosphorus-accumulating bacteria
6. Protozoa and other microorganisms



TYPES OF BACTERIA

OVERVIEW OF AN RBC

(ROTATING BIOLOGICAL CONTACTOR SYSTEMS)

The disc system can be staged in parallel and/or series to obtain nearly any detention time or degree of removal required. Since the systems are staged, the culture of the later stages can be acclimated to the slowly degraded materials.

The degree of wastewater treatment is related to the amount of media surface area and the quality and volume of the inflowing wastewater.

The Miracell® patented media design maximizes the surface area available.



PARALLEL RBC LINES

MIRACELL® Versions

Miracell® White

Miracell Module + Sedimentation Tank

Miracell® White Systems aim to purify compounds primarily composed of carbon atoms, with minimal nutrient removal focusing on nitrogen and phosphorus.

- Low energy consumption
- Low maintenance cost
- Modular
- Composite (GRP)
- Low cost
- Standard water quality

Discharge purposes in emerging countries

BOD **45** COD **120** TSS **45**

Miracell® Green

Miracell White + Sand Filter

Miracell® Green Systems employ biological processes for carbon-based purification, mainly targeting TSS removal using a sand filter as a secondary filtration, capable of retaining some BOD, nitrogen, and phosphorus compounds within a 50-micron sensitivity.

- Low energy consumption
- Low maintenance cost
- Modular
- Composite (GRP)
- High water quality

Discharge purposes in developed countries & irrigation purposes for emerging countries

BOD **25** COD **110** TSS **35**

Miracell® Blue

Miracell Green + Ultrafiltration

Miracell® Blue Systems are designed to cover the entire bacteriological spectrum, particularly emphasizing nitrogen and phosphorus removal for high-quality effluent. Extra disk space is required for nitrification alongside carbon compound treatment, potentially doubling module numbers to ensure the contact time is longer. Denitrification occurs in a reinforced concrete tank under anaerobic conditions, converting nitrogenous compounds into N2 gas.

- Low energy consumption
- Low maintenance cost
- Modular
- Composite (GRP)
- Superior water quality

Irrigation of landscape and vegetation, car washing, cooling towers & concrete mixing purposes in developed countries

BOD $\leq$ **20** COD $\leq$ **90** TSS $\leq$ **10**

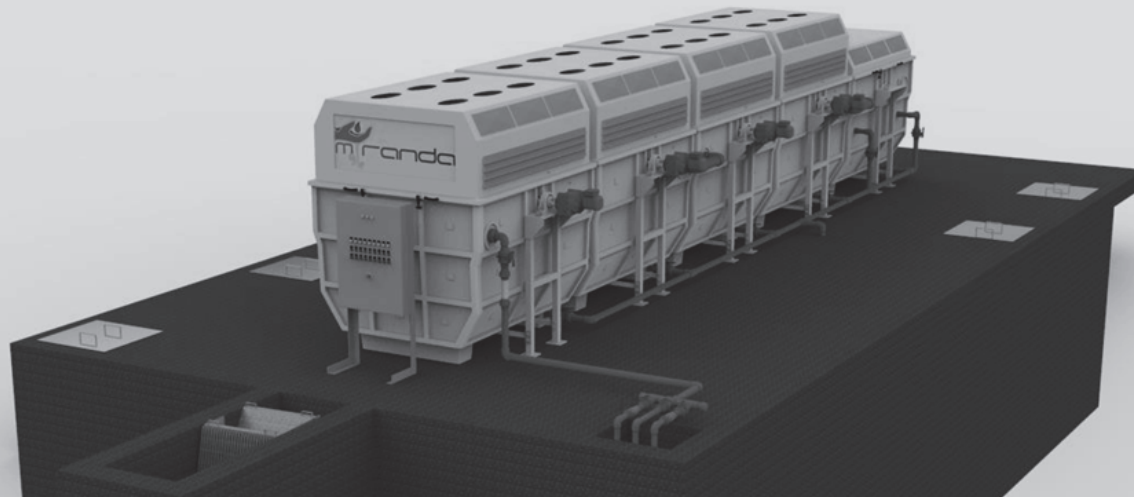
SF

UF

ACF

UV

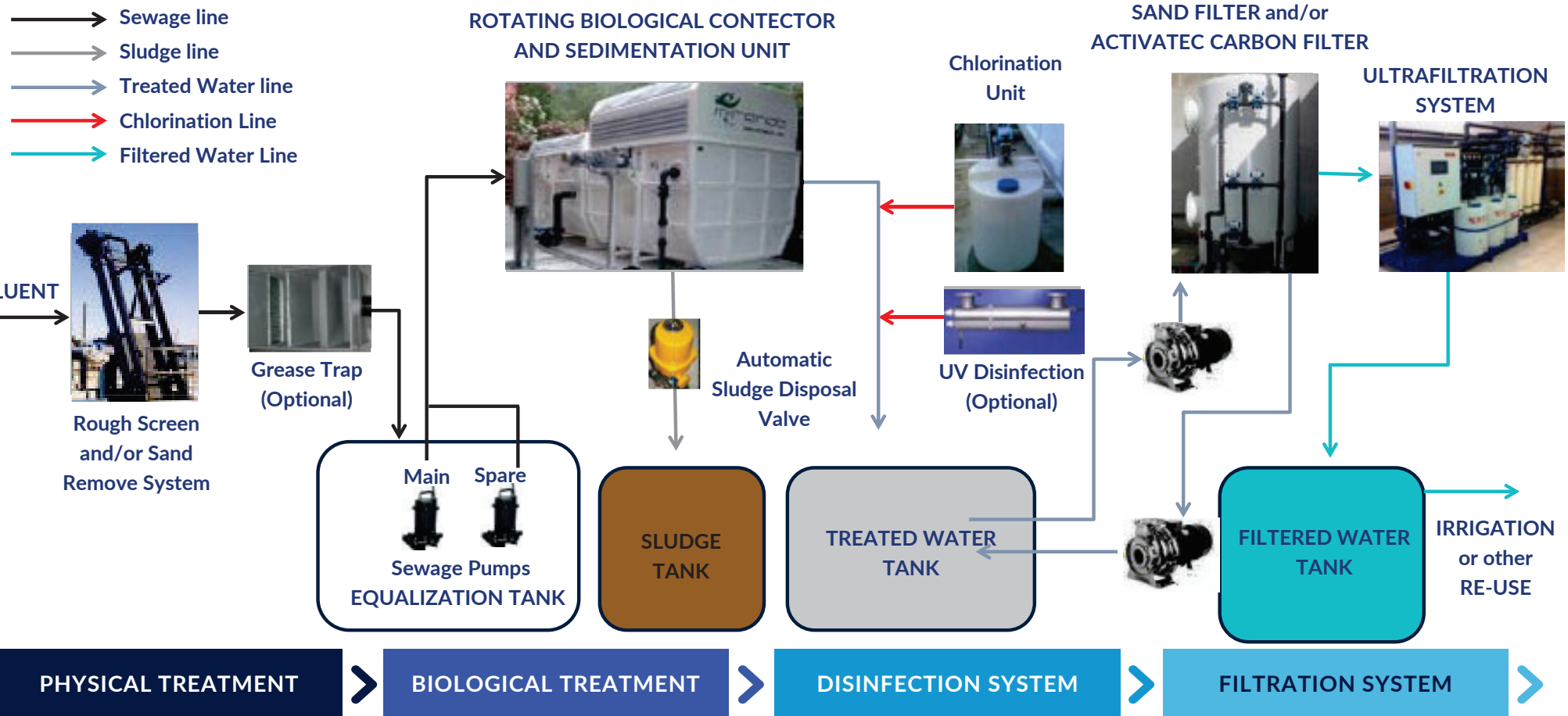
BASIC PROCESS FLOW



**How Does The Complete Miracell® RBC
Wastewater Solution Work?**

PROCESS FLOW

AN INDICATIVE PROCESS FLOW DIAGRAM MIRACELL® PROCESS FLOW DIAGRAM



SCALABILITY AND PERFORMANCE

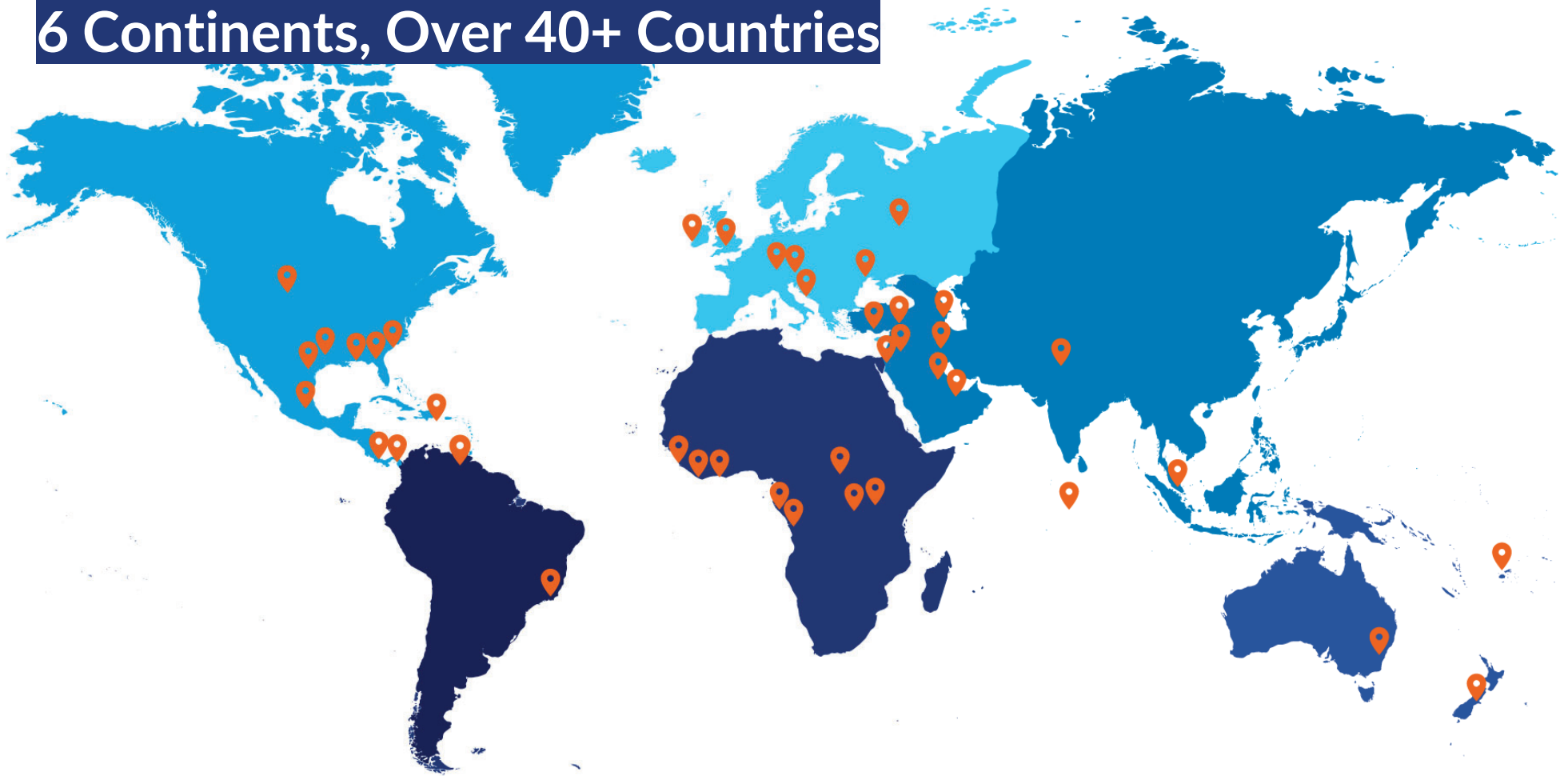


**Systems Can Easily Range From
50^{m³} To 3,000^{m³} Liters Per Day**

Turnkey Wastewater Treatment Solutions

Miranda Systems Are Installed In:

6 Continents, Over 40+ Countries



1,200 UNITS IN 40 COUNTRIES



Apple Springs South Dakota

South Dakota, USA

100 m³/day WWTP



1,200 UNITS IN 40 COUNTRIES



Robinson Club Maldives

Maldives, South Asia

400 m³/day WWTP



1,200 UNITS IN 40 COUNTRIES



Kendal South Africa

South Africa

200 m³/day WWTP



1,200 UNITS IN 40 COUNTRIES



Day Dream Island Resort

Queensland, Australia

400 m³/day WWTP



1,200 UNITS IN 40 COUNTRIES



Baku Trade Port

Baku, Azerbaijan

1,000 m³/day WWTP



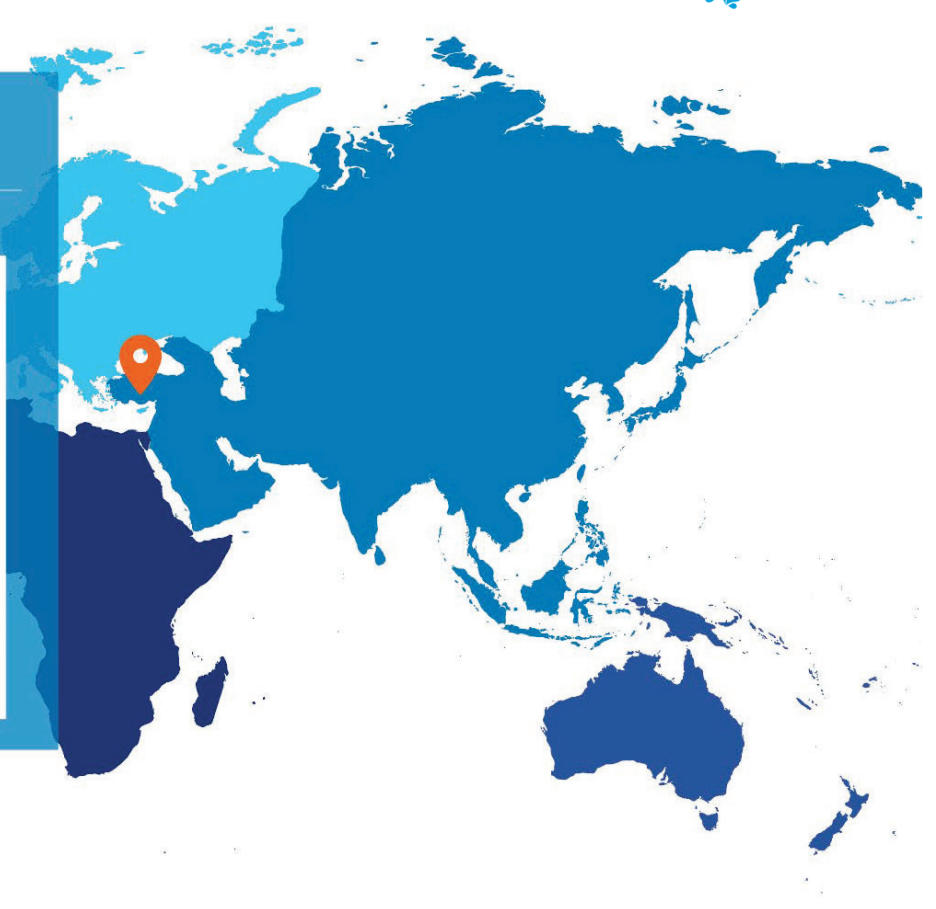
1,200 UNITS IN 40 COUNTRIES



Eczacıbaşı Ormanada

İstanbul, Türkiye

350 m³/day WWTP



1,200 UNITS IN 40 COUNTRIES



Miran City Project Suleymaniyah

Iraq

1,600 m³/day WWTP





KEY ADVANTAGES OF MIRACELL®

ADVANTAGES

ADVANTAGES OF MIRACELL® RBC SYSTEMS

1

Low Maintenance Requirement

The Miracell® brilliance is in its simplicity, having no mechanical part other than the gearbox (which is located outside of the module) this allows for a very easy and short maintenance as well as ease of repair and replacement.

2

Low Footprint

Because of the Miracell® modular and easily scalable nature, it has a significantly lower footprint adding up to 1/3 of the area demand of other competitors to an RBC.

3

Reduced Costs

Our Miracell® modular approach allows for waste processing at the point of origin, leading to significant cost reductions for communities and taxpayers. This minimizes the environmental and financial burdens associated with transporting wastewater over long distances.

4

Quiet Operation

The Miracell® operates quietly at less than 48 decibels (equivalent to the sound level of a standard dishwasher). This enables its placement in close proximity to living quarters where effluent is generated, such as hotel rooms, residences, and hospitals.



AN RBC INSTALLATION IN A LABOR CAMP IN SOUTH AFRICA

ADVANTAGES

ADVANTAGES OF MIRACELL® RBC SYSTEMS

5

Reduced Energy Consumption

Centralized treatment plants require significant energy inputs for pumping, aeration, and other treatment processes, including the energy required to transport wastewater over long distances.

6

Reduction on Excavating

Miracell® solutions reduce soil erosion impacts by avoiding extensive piping installations and associated earthworks, preserving topsoil for plant growth. Additionally, they mitigate habitat destruction caused by vegetation removal, minimizing adverse effects on local plant and animal life and curbing biodiversity loss.

7

Modular and Scalable

Miracell® is ingeniously designed as a modular system, offering easy customization and expansion tailored to site-specific needs. Our innovative interconnected modular design allows systems to be neatly housed within 50 M3 (50,000 liters per day) modules. This layout ensures operational redundancy and continuity. If a module experiences an unexpected issue, it can be swiftly detached for repairs while the remaining systems continue to purify wastewater without interruption.



A SKID MOUNTED RBC IN WORKSHOP

ADVANTAGES

ADVANTAGES OF MIRACELL® RBC SYSTEMS

8

Easy to Transport

The Miracell® can be manufactured and mounted on a skid, to allow for ease of transportation and installation.

9

Easily Scalable

Because of the Miracell® modular nature its capacity can be easily increased and can also be operated at less than maximum capacity (low season/high season operational costs are managed by the system) when required.

10

Aesthetic Look with a Purpose

The Miracell® is manufactured entirely from Glass Reinforced Fiber, which makes it not only one of the best-looking decentralized wastewater treatment plants out there but also thanks to the materials used, it has the strongest resistance against rust and corrosion amongst its competitors.



COAL MINING CAMP AUSTRALIA - 200 M3/DAY
WWTP

SMARTCELL CONTROL PACKAGE FEATURES

1. Wastewater temperature and pH monitoring
2. Gearbox vibration sensor and drum slip sensor
3. Unit weight sensor for precise measurements
4. Power and voltage draw monitoring
5. Wastewater input and output flow meters for accurate flow control
6. Drum rotation speed tracking for optimal performance
7. Float control positions with 10 inputs for versatile monitoring options
8. pH and temperature measurement of outlet water for quality assurance
9. Ambient temperature and humidity monitoring for environmental awareness
10. Preventative system maintenance monitoring with warning messages for lubrication needs
11. Monitoring of automatic sludge removal valves and status for efficient operation
12. Digital HMI display with WAN and cellular connectivity
13. SMS gateway and auto dialer for remote access and notifications
14. Optional Inputs for monitoring Pump Status, UF, Sand Filers, Chlorine Dossers
15. Optional external connectivity via PROFINET, PROFIBUS and MODBUS

MIRANDA SYNERGIES

Miranda and our partners have all the tools to create a decentralized circular water economy



NEXT STEPS



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