CATALOGUE of PRODUCTS and SERVICES

Wastewater Treatment Systems

KWT bioreactores

2023

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CONTENT

INTRODUCTION

CHARACTERISTICS OF WASTEWATER TREATMENT PLANTS (WWTP)

KWT treatment plants have been designed to process wastewater for use in the irrigation of parks and green areas.

Our treatment plants can be designed to adapt to each type of water with the support of our engineering team.

System
MBBR with BIOFILM

The main function of our WWTPs is compliance with NOM-003-SEMARNAT-1997 and NOM-001-SEMARNAT-2022.

They are manufactured with high density polyethylene and have a continuous flow system; with a manufacturing time of 4 to 5 weeks.

KWT plants are ideal for treating water with flows of 3.1, 7.9, 15.8, 23.7 and 31.7 Gallons per minute (GPM).

They remove up to 95% of the organic load (TSS and BOD), have a MBBR removal system, with a Hydraulic Retention time of 5 Hours.

ODORLESS System

Our applied engineering allows the use of an OZONE disinfection system, in addition to an automated operation.

INTRODUCCIÓN

CONSTRUCTION OF WWTP

Our plants are built with KRAH pipes. The tank wall structure is designed with the same performance criteria that characterize our pipes.

Being manufactured entirely in KRAH pipe, WWTPs with KWT MBBR systems have the following advantages:

- Lifespan of 100 years.
- Exceptional chemical resistance.
- Under weight.
- Impact resistence.
- Interior with co-extruded color.
- It does not generate deposits or incrustations over time.
- Seismic resistance.
- KRAH's proven experience in manufacturing parts and structures.
- Possibility of relocating the WWTP since its structure allows it.

FLOW DIAGRAM FOR TREATMENT SYSTEM

Residual Water → **Flow m3/day** → **WWTP** → **TREATED WATER** → **STORAGE**

BOD: 300 mg/l
SST: 250 mg/l
Fats and oils: 80 mg/l

→ WWTP Removal efficiency 95% →

BOD: <20 mg/l
SST: <20 mg/l
Fats and oils: <15 mg/l

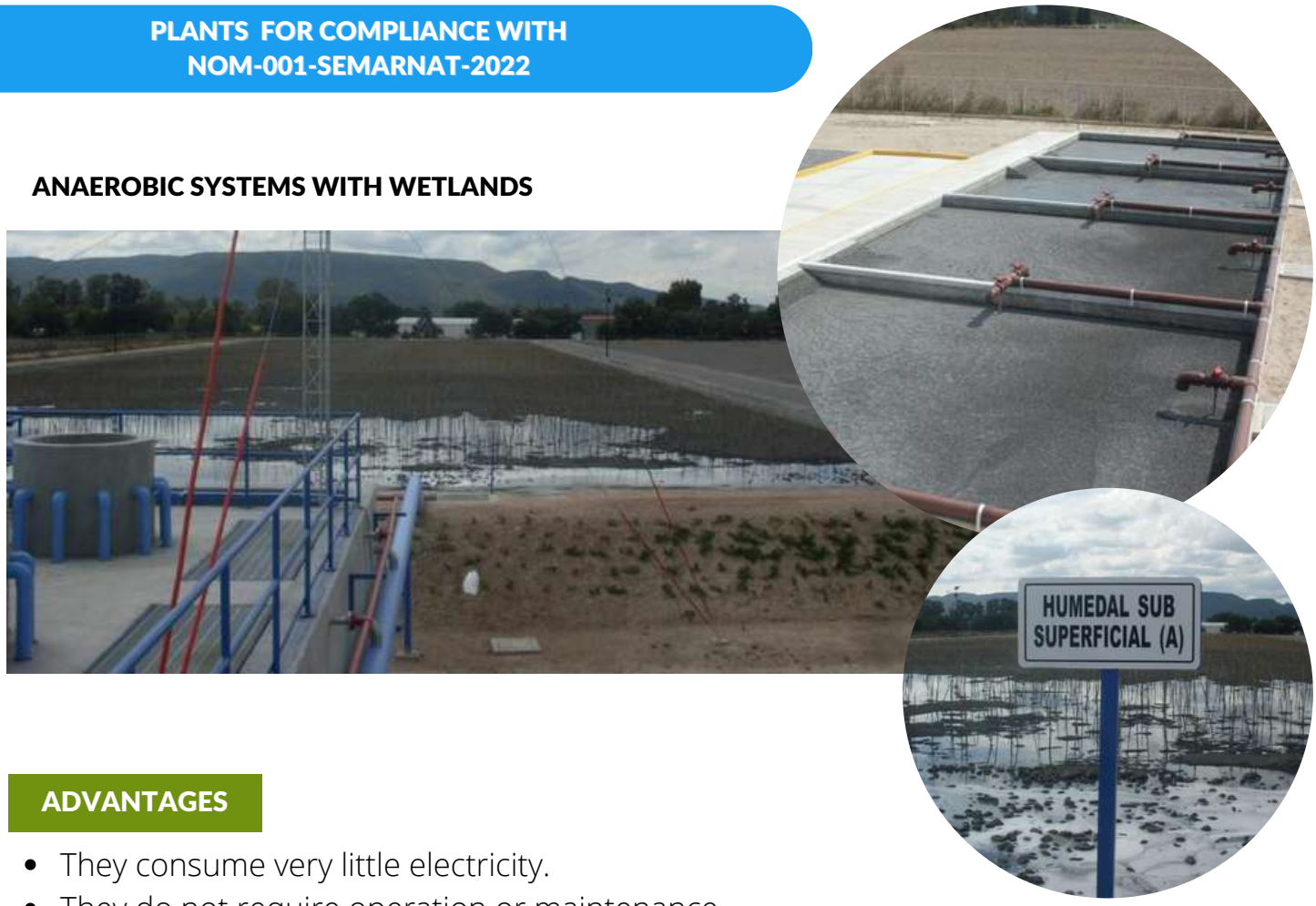
Advantages and benefits of WWTPs

WWTP

Compliance of normative

PLANTS FOR COMPLIANCE WITH NOM-001-SEMARNAT-2022

ANAEROBIC SYSTEMS WITH WETLANDS



ADVANTAGES

- They consume very little electricity.
- They do not require operation or maintenance.

FIELDS OF APPLICATION

- Wastewater of domestic or municipal origin (urban and rural municipalities, health centers, camps, hotel facilities, sports clubs, schools, homes, farms, etc.).
- Wastewater of industrial origin (refineries, chemical factories, paper mills, tanneries and textiles, distilleries, slaughterhouses, etc.).
- Waste water of food origin (production and processing of milk, cheese, potatoes or sugar, canning, etc.).
- Wastewater from fish farms.
- Leachates from different origins (from agriculture, airports, highways, greenhouses, nurseries, garbage dumps, etc.).

PLANTS FOR COMPLIANCE WITH NOM-001-SEMARNAT-2022

Specifications
NOM-001-SEMARNAT-2022

OFFICIAL MEXICAN STANDARD NOM-001-SEMARNAT-2022, which establishes the maximum permissible limits of contaminants in wastewater discharges into national waters and assets.

TRICKLING FILTER SYSTEMS

Upflow anaerobic reactor system.

- It does not require external energy (electricity) for its operation, therefore its operation is low cost.
- Its maintenance is less than an activated sludge reactor since it does not have diffusers.
- Useful for reducing high organic loads to later use an activated sludge process.
- Low sludge production (10% of what is produced by activated sludge).
- Biogas is generated and can be used for the production of electricity or a source of heat for Steam Generators.

ADVANCED OXIDATION SYSTEMS

With KWT's Advanced Oxidation System, it is possible to eliminate difficult biodegradable compounds and even reduce microbiological contamination.

This system is highly effective for the oxidation of organic matter under mild conditions of pressure and temperature, until the complete mineralization of these contaminants.
Due to the very high reactivity of these species, it is possible to eliminate both organic and inorganic compounds, thus achieving a reduction in COD and toxicity in treated wastewater.

WWTP

Compliance of normative

PLANTS FOR COMPLIANCE OF NOM-003-SEMARNAT-1997

Specifications
NOM-003-SEMARNAT-1997

Official Mexican standard NOM-003-SEMARNAT-1997, which establishes the maximum permissible limits of pollutants for treated wastewater that is reused in public services.

Parameters of desing	Entry	Exit	Unit
DBO	300	<20	mg/l
SST	250	<20	mg/l
Fats and Oils	80	<15	mg/l
TRH	5		Hr

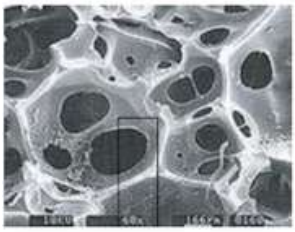
MBBR OR BIOFILM SYSTEMS (Package type)

What're they? Plants designed with MBBR (Moving Bed Bioreactor) technology, state-of-the-art Japanese technology that reduces retention time and energy costs.

Example of technology implemented by KWT (NISSHINBO)

Before use

After of use



Wall structure

Improves adherence and retention of bacteria

DISTRIBUTION LINEAR SYSTEM

Designed to process residential wastewater, cleaning it so it can be safely returned to our environment.

System with MBBR (Moving Bed Bio Reactor) technology and an aeration process, which by means of useful bacteria and other natural microorganisms form a biomass.
This biomass consumes the organic matter in the wastewater and after this process is separated from the water to be sent to a biodigestion process.

The clarified water is passed to disinfection through an ozone system.

Internal Operation of Linear Distribution System

Primary Treatment.

Anoxic System. Reactor for pre-destroying.

Reactor 1 MBBR. Organic matter removal reactor.

Reactor 2 MBRR. Reactor for Nitrification.

Lamellar settler solid separation.

Disinfection system. Reactor to disinfect by ozone.

DISTRIBUTION MODULAR SYSTEM

KWT Bioreactors' modular layout scheme systems can be designed to be modularly connected and phased in as demand grows, saving operating costs in the process.

BENEFITS

- Staged treatment systems.
- The initial investment can be adjusted according to the stages of the project without decapitalization.
- Additional modules can be installed without extra work or additional costs.

APLICATIONS

INSTALLATION OF WWTP FOR RESIDENTIALS

BENEFITS

- Allows on-site treatment of wastewater avoiding the connection to the existing WWTP.
- The water is used to irrigate gardens.
- Compact WWTP; They can be installed on some donated or garden land without losing residential land.
- When buried, it does not generate noise or odors, and its visual impact is zero.
- They are ideal for their low cost of operation.
- They can grow along with the urbanization thanks to their modular system.

Data sheet

APLICATIONS

WWTP FOR PARKS AND GARDENS

BENEFITS

- Residual water from the existing sewerage network is used.
- Being totally buried they do not have a visual impact.
- They are safe, without noise or odors.
- They optimize the treatment to obtain irrigation water without removing all the nitrogen from the water and without the use of chlorine.
- They return the sludge to the sewage network, reducing maintenance to a minimum.

Data sheet

APLICATIONS

WWTP INSTALLATION FOR OTHER SECTORS

Housing development.

Shopping center.

Restaurants

Hotels

Agroindustry

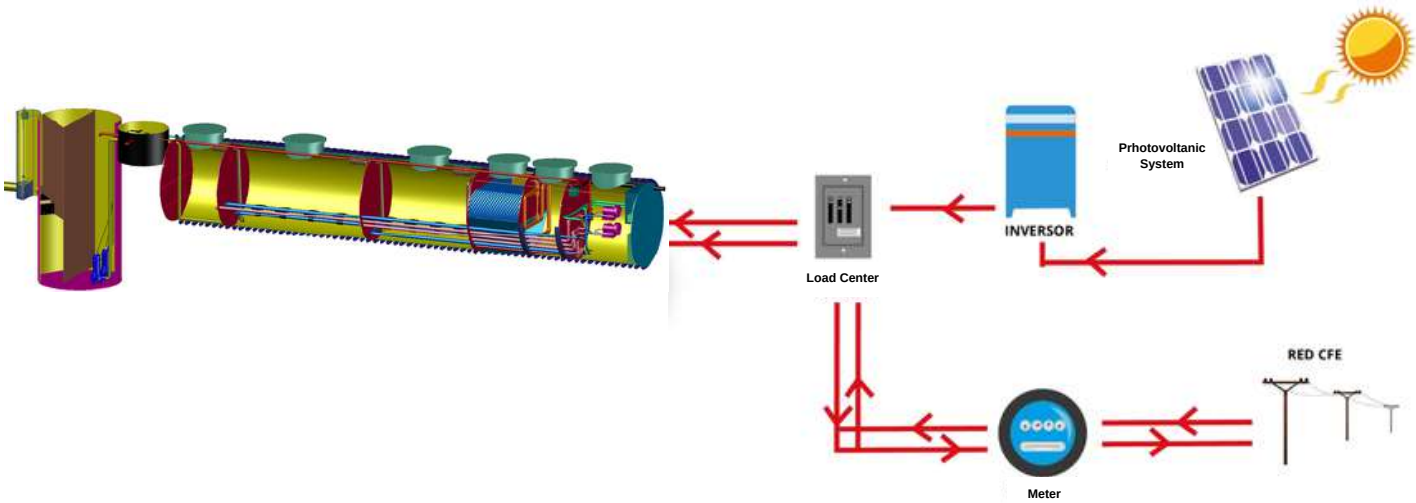
Rural Zone

Adaptation of improvement in other systems (biodigesters)

OPTIONAL

WWTP WITH PHOTOVOLTAIC SYSTEM

The operating costs of our plants are significantly reduced with the installation of a photovoltaic system, which produces 100% of the energy consumed in the WWTP, either in interconnection mode or in island mode.



SERVICES

REENGINEERING OF WASTEWATER TREATMENT PLANTS

KWT has the best technology and knowledge for the reengineering of any type of wastewater treatment plant, making the most of existing equipment and civil works.

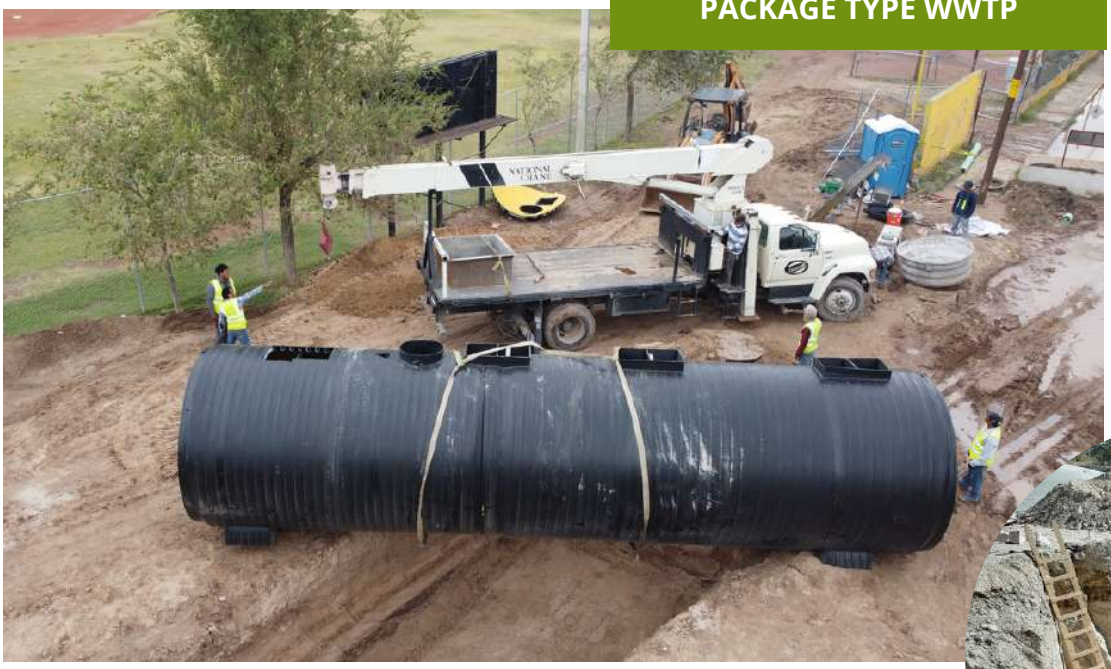
OPERATION AND MAINTENANCE OF WWTPs

- Increase in capacity in biological reactors.
- Conversion of activated sludge systems to MBBR.
- Reengineering to reduce operating costs through process redesign.
- Analysis and solution of problems caused by obsolete technology equipment.

SERVICES

CIVIL WORK

KWT accompanies you in all stages of construction of your WWTP and offers you the Civil Works service specially adapted for your project.



PACKAGE TYPE WWTP

EXCAVATIONS

CONSTRUCTION PLANT CONCRETE

BIODIGESTERS

LAGOON AND CONCRETE TYPE

DESIGN AND CONSTRUCTION OF BIODIGESTERS FOR THE INDUSTRY

KWT BIOREACTORES offers the Biodigesters construction service for all types of livestock industry, slaughterhouses, cheese and dairy.

It consists of a hermetically closed biodigester, which is loaded with organic waste, producing a decomposition of organic matter inside, producing biogas, which is used to produce electricity or be the main source of biofuel production for vehicle use. Thus contributing to the care of the environment.

PRODUCTIVE BENEFITS

- Electric power generation.
- Thermal use in different production processes.

ECONOMICS BENEFITS

- Savings due to displacement of electrical energy produced by the network.
- Economic benefits from the reduction of greenhouse gas (GHG) emissions.
- Decrease in the payment of fees for wastewater discharge.
- Use of biofertilizer for sale or consumption.
- Use of wastewater for irrigation.

PRODUCTS

EQUIPMENT FOR THE USE OF BIOGAS

ELECTRIC POWER GENERATION EQUIPMENT

INFRARED HEATER FOR FARM ANIMALS

BIOGAS COMPRESSION AND PURIFICATION SYSTEM FOR VEHICULAR USE

STEAM GENERATORS

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PRODUCTS

SOLIDS SEPARATORS

The solids separators are designed for the handling and use of pig and cattle manure and any type of effluent or affluent residue with a percentage of solids admissible for separation. Solids separators can be used before or after a biodigester. With this method, the waste is separated into a solid part and a liquid part, which can be used for compost and irrigation, respectively.

BENEFITS

- Reduction of the volume of waste to be treated.
- Liquid and solid biofertilizer with a suitable chemical composition to use as a soil restorer for cultivation.
- The solid part is used for compost and the liquid part can be used to irrigate green areas.
- Avoid desilting lagoons with heavy machinery.
- Minimize unpleasant odors.
- Manure handling facility.

KWT Bioreactors, within its activities, designs and manufactures solid separators, according to customer needs.

PRODUCTS

SOLIDS SEPARATORS

DENOMINATION	SPECIFICATIONS
Process flow	Bovine manure: 1m3/h; pig manure 1-2 m3/h
Operation time	3-4 hours per day.
Maintenance	Exterior cleaning daily; adjustments every 6-12 months *(change screen or auger adjustment) *Depends on the hours of use given to the separator*
Percent moisture in solids	25 - 35%

DENOMINATION	SPECIFICATIONS
Engine	0.75 kW 110 V; 60 Hz 1750 rpm.
Reducer	Reducer 50 rpm a 60 HZ
Sieve Frame	T304 stainless steel
Base	PTR 1.5” x 1.5”
outlet accessories	2” in stainless steel
Sieve	Stainless steel perforated sheet 1 mm opening in 304 stainless steel
Compression system using counterweights	304 stainless steel plate, Nylamid bearings and gears

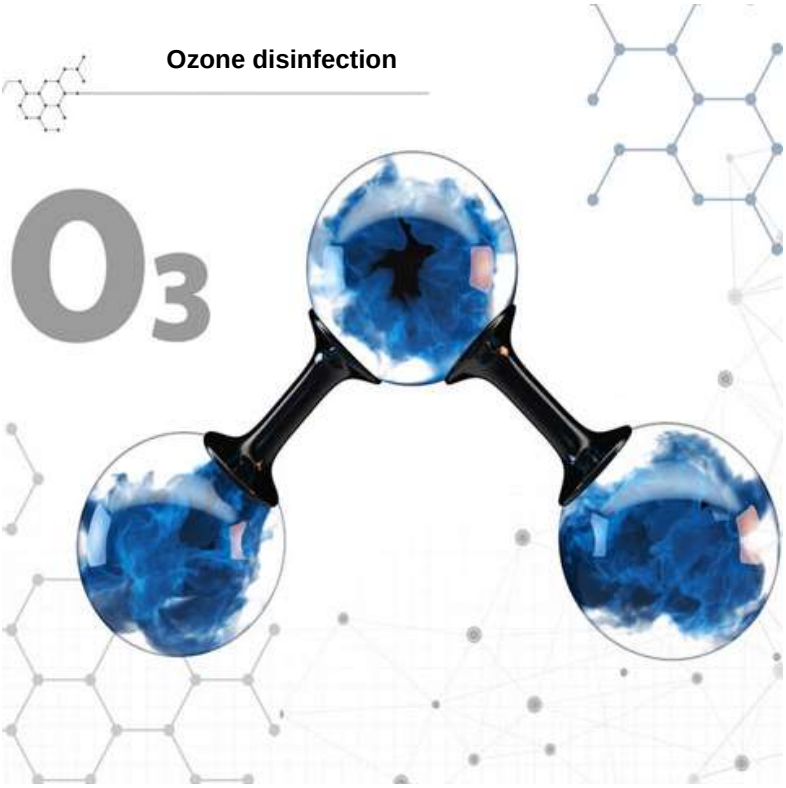
PRODUCTS

SIEVE

Mesh filter ideal for separating solids greater than 2mm from wastewater, leaving a solid and a liquid part, which goes directly to the wastewater treatment process.

PRODUCTS

OZONE REMOVAL AND DISINFECTION SYSTEMS



Eliminates pathogens by oxidizing the covering of viruses, bacteria and fungi and a wide spectrum of microorganisms, which are deactivated.

Thanks to KWT's applied technology, ozone decomposes in the same way that it naturally occurs in the atmosphere and returns to oxygen, so it does not leave any type of chemical residue and at the same time acts as a powerful deodorizer, eliminating source of unpleasant odors.

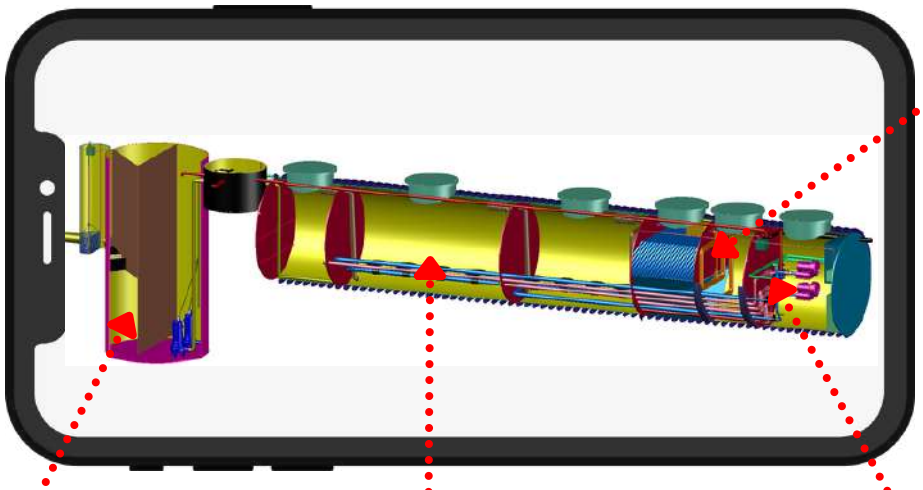
BENEFITS

- It is generated on site.
- No consumables required.
- After performing its function it becomes oxygen.
- It is 3000 times faster than Chlorine to act and has 100 times more strength.
- Does not leave residues in the water.

PRODUCTS

REMOTE CONTROL AND MONITORING SYSTEM

KWT has the appropriate technology for the control, monitoring and measurement of the parameters of wastewater treatment systems.
This technology is represented by a Software, which is operated remotely from your cell phone, giving access to all the components of your system.



- Caudal
- DBO
- SST
- PH

- Caudal
- DBO
- SST
- PH

- OD
- PH
- Temperature

- Control System
- Blowers
- Valves
- Ozone
- Sludge recirculation

Control and monitoring

PRODUCTS

WATER QUALITY MEASUREMENT

This instrument adopts pulse xenon lamp as the light source and ultraviolet fiber optic spectrometer as the detector: it is capable of real-time collecting the absorption spectrum of water pollutants ranging from 200nm to 800nm and analysis in real time of the content of water contaminants through chemometric algorithm technology.

- Real-time absorption capacity of water contaminants ranging from 200nm to 800nm.
- It does not require reagents, so you can save operating costs.
- Free from chloride ion interference.
- It adopts full spectrum measurements and chemometric algorithm analysis.

PRODUCTS

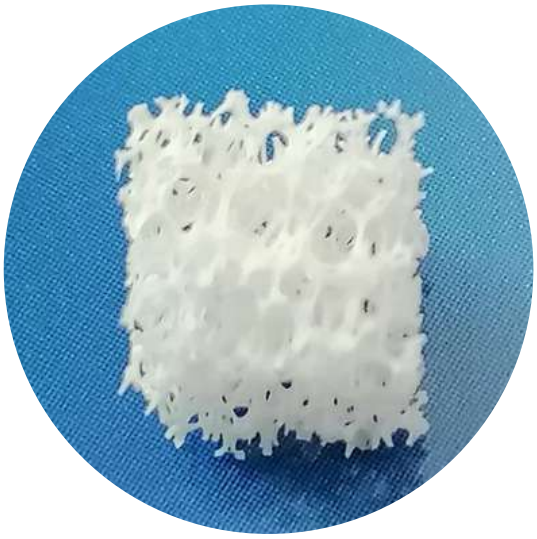
WATER QUALITY MEASUREMENT

Description	Measurements
Measurement Parameters	DQO, DBO, UV254, nitrate, COT, turbidity, and more.
Measurement Ranges	What the client requires
Method	UV/visible, Absorption spectrum differential Optics, wavelength range
Energy	230V AC, 30W
Linearity	2% F.S
DQO Range	200mg/l Range adjusts
Interval	60 seconds Adjusts Interval
Depth Sounders	<10m
Optical	Adjusts according to the condition of the site
Work Temperature	sc- 4sc
Degree of protection	Ip65
Interfaz	RS232/RS485 (to be configured), 2x4 -20m one exit
System compatibility	Modbus RTU
Calibration	24 months
Warranty	1 year

PRODUCTS
BIOCARRIER

NISSHINBO

KWT Bioreactors implements innovative technology for wastewater treatment.
MBBR (Moving Bed Bioreactor) technology absorbs water and provides a hydrophilic surface for chemically degrading bacteria to attach and colonize, reducing retention time and energy costs for wastewater treatment plants.



Description	Sewage water
Material	Polyurethane
Volume	0.7 cm x 0.7 cm
Total fluidization with flow of air	12 % - 30%
Total Area	1,200 m2/m3
Effective surface area	1,000 m2/m3
Useful life	15 years
Country of origin	Japan
Quality tests	Visual inspection, certificate of Compliance

The technology to be implemented is in accordance with the choice and needs of the Client.

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