

## About Biwater:

Biwater provides water and wastewater treatment solutions for clients across the World. Since its inception in 1968, Biwater has gained recognition for innovative approaches aimed at overcoming the World's most pressing water-related challenges. Throughout its history, the company has grown to meet the demands of many water-stressed countries and their burgeoning populations. It has a successful record of accomplishment, having completed over 25,000 projects in over 90 countries – financing, consulting, process engineering, designing, constructing, operating, maintaining and owning water and wastewater facilities – in both rural and urban environments.

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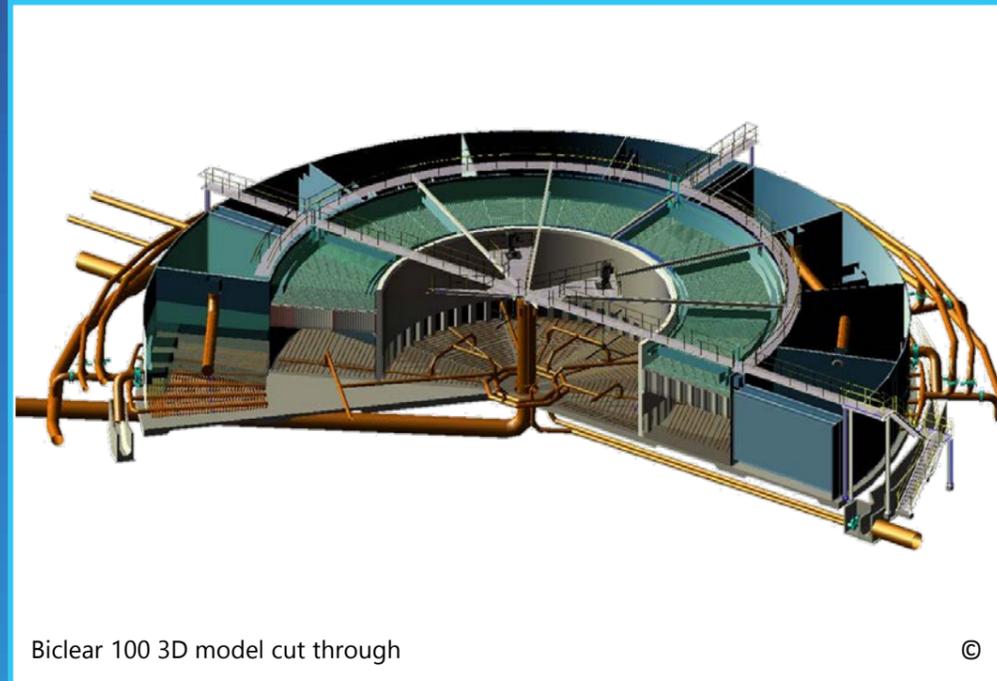
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Biwater panel tank



Bicular 100 3D model cut through

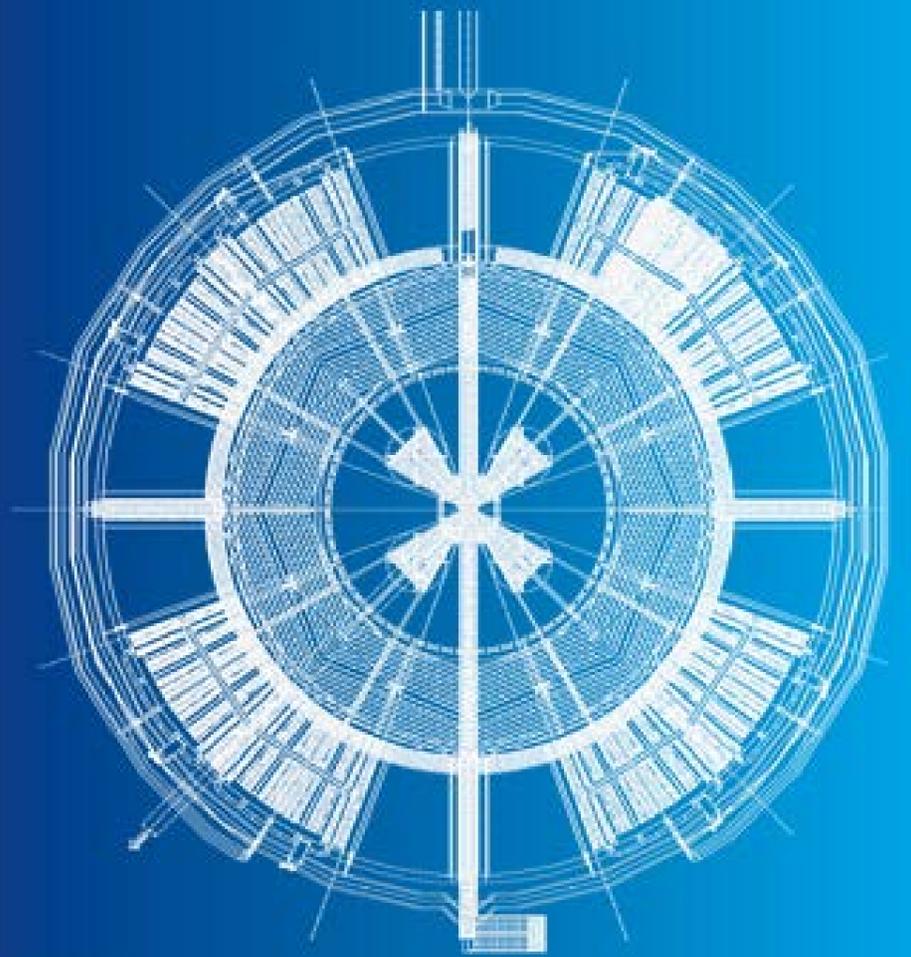


Biwater panel tanks



Bicular ©

Biwater Modular Treatment Plant



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# Biclear © – Bewater Modular Treatment Plant

## Introduction:

The Bewater Modular Treatment Plant (Biclear) has been developed to provide an economic, simple and reliable method of treatment for drinking water. The treatment is based on conventional treatment processes.

The design is modularised with a range of standard components to enable fast installation on site. The treatment plant produces potable water quality or can be used as a cost effective alternative pre-treatment modular solution for seawater desalination.

There are **five standard model sizes** catering for populations from 100,000 to 1 million. Populations for larger communities are catered for with multiple models.

## General features:

The Biclear modular treatment plant provides:

- Reliable and simple operation with minimum maintenance requirements
- Robust, efficient process maintaining treated water quality and throughput across a broad range of raw water characteristics
- Steel, ductile iron, concrete or other suitable construction material
- Rapid installation – delivery of sub-assemblies to any location
- Scalable and multiple modules permit limitless plant size
- Lamella tube clarifiers to reduce footprint
- Dissolved air flotation chambers for finer settlement and algal removal
- Meets World Health Organisation water quality standards from surface water sources

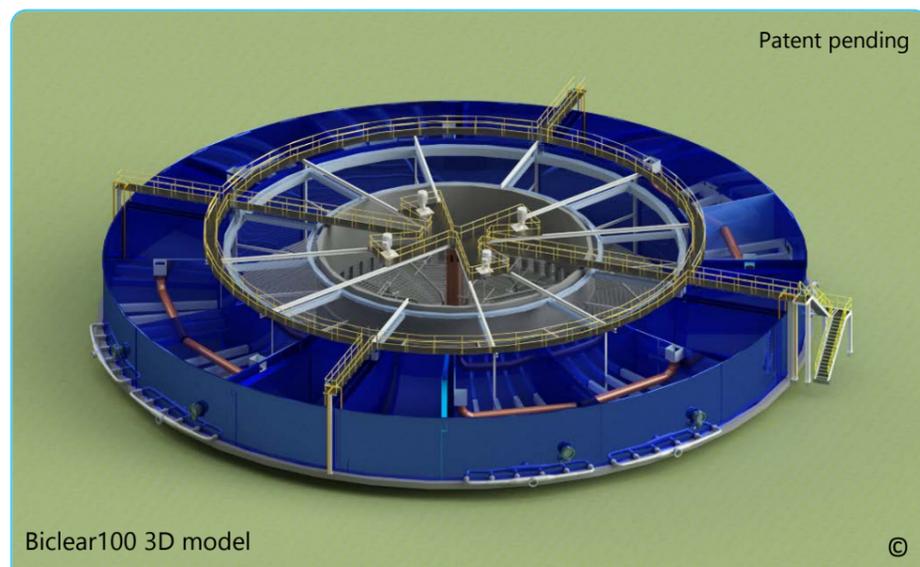
## Biclear\*\*\*

Model range	Model No	Treated water flow	Population equivalent**	Raw Water	Installed power requirement*	Power consumption	Nominal site area
		m <sup>3</sup> /hour	up to	NTU	kW	kWh/m <sup>3</sup>	m <sup>2</sup>
1	Biclear10	417	100,000	1,000	57.7	0.05	1,650
2	Biclear20	833	200,000	1,000	100.5	0.04	2,045
3	Biclear30	1,250	300,000	1,000	145.3	0.04	2,350
4	Biclear50	2,083	500,000	1,000	180.9	0.04	3,640
5	Biclear100	4,167	1,000,000	1,000	288.3	0.04	5,320

\* Sizing requirement of the incoming power system

\*\* Based on 100 liters per person daily consumption

\*\*\* Based on standard Biclear system



## Process description:

The Biclear is a modular water treatment plant incorporating four conventional treatment zones. Within each zone, pre-fabricated components are installed within a number of coated steel panel tanks.

Other ancillary elements not described below, such as intake, chlorine contact/balance tank and treated water pumps can form part of the supply scope for a full turnkey project and are available as bespoke designs with multiple modular configuration.

### 1. Flocculation zone

Chemically coagulated raw water enters the centre of the Biclear module through a diffuser drum to provide even distribution across a flocculation zone which is sized for 25 minutes retention. Optional polyelectrolyte can be dosed at this point.

The flocculation zone is equipped with Variable Frequency Drive (VFD) driven picket fence type mixers with speed proportional to energy input, allowing controlled floc growth depending on changes in quality of the raw water and seasonal variations.

### 2. Lamella clarification zone

The water from the flocculation zone flows through submerged orifices and directly to a clarifier equipped with inclined settling tubes. As the water rises up through the tubes, flocculated particles settle to the bottom face of the tube. Settled sludge consolidates and slides down the tube to the base where it consolidates further.



The base of the clarifier is equipped with a hydrostatic sludge withdrawal arrangement utilising perforated pipes. This covers the floor area of the clarification and flocculation zone and incorporates a set of automatic valves to provide control. The sludge is ejected from the piped system under the hydrostatic head of the water.

Clarified water is then routed to the DAF/RGF units via lateral and radial launders. Inlet penstocks control the discharge of the clarified water to the hydrostatically connected DAF/RGF unit, allowing for a single DAF/RGF unit to be isolated when performing a backwashing sequence.

### 3. Dissolved Air Flotation (DAF) zone

The Biclear benefits from the provision of a Dissolved Air Flotation process, which provides the ability to further reduce the turbidity of the clarified water entering the RGF and thereby increase the filter run time.

The DAF/RGF units are located in the annular ring around the central tank and are segmented into a number of discrete units.



Water enters the DAF zone via a drop box that directs flow to a riser channel, where it contacts with an air saturated recycle stream. When released, at reduced pressure, this air saturated stream results in the formation of microbubbles that “sweep” up fine neutrally buoyant and colloidal material to the surface of the flotation zone for subsequent hydraulic descumming.

The water leaves the DAF zone via an under baffle and into the RGF distribution pipe.

### 4. Rapid Gravity Filtration (RGF) zone

The final zones of the module comprises a single media Rapid Gravity Filter (RGF) with a bed of silica sand on a gravel support layer. The low profile lateral underdrain system is equipped to facilitate combined air and water backwashes.

The filters operate on the constant flow, constant level principle with the head manipulated by an outlet control valve in order to operate the unit at a fixed water level up until the point where the media requires backwashing.

## Optional modules

There are various modules that can be incorporated into the standard Biclear system in order to tailor the treatment plant for specific raw water conditions or customer requirements.

Process components	Optional modules	
	Chemical system	General system
pH Correction dosing (alkaline or acid)	▲	
Disinfection dosing (pre-dose only)	▲	
Polyelectrolyte dosing	✓	
Filter backwash elevated storage tank		✓
Prefab. operation building		▲
Supervisory Control and Data Acquisition (SCADA)		✓
Standby power generation and fuel tank		✓

Recommended optional modules ▲

Other optional modules ✓

