

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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Bicom

Biwater Compact Wastewater Treatment Plant



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Bicom - Biwater Compact Wastewater Treatment Plant

Introduction:

Biwater's Compact Wastewater Treatment Plant (Bicom) has been developed to provide an economical, simple and reliable method of treatment for wastewater. The sewage treatment is based on the activated sludge process using extended aeration and optional denitrification.

The design is standardised on a range of prefabricated factory built modules to enable rapid onsite installation.

There are **seven standard model sizes** catering for a population equivalent range of 5,000 to 80,000. Populations for larger communities are catered for with a combination of standard models.

Specific benefits:

- Total wastewater solution
- Consistent high quality effluent that fulfils EU discharge consents
- Designed and built to British / EU / AWWA Standards
- Compact plant reducing footprint
- Rapid installation with prefabricated factory built and tested modules

General features:

- Modular approach allows flexibility to achieve the client specific requirements
- Process selection capable of dealing with varying hydraulic and pollution loads
- Proven, simple and reliable process elements
- No primary settlement required
- Reduced quantity of stable sludge produced with optional sludge treatment units

Bicom is offered across two ranges, Carbonaceous or Nutrient removal models. The selection of the model required is based on the sewage characteristics and the required effluent standard with both capable of removing TSS. The Carbonaceous model is primarily designed to biologically reduce BOD and COD, while the Nutrient removal model is designed to also reduce Nitrogen and Phosphorous in the effluent.

Bicom CARBONACEOUS ****

Model range	Model number*	Influent flow m ³ /day	Population equivalent***	BOD kg/day	Installed power requirement** kW	Power consumption kWh/m ³	Nominal site area m ²
1	Bicom500C	500	5,000	150	48	1.17	750
2	Bicom1000C	1,000	10,000	300	65	0.85	1,000
3	Bicom2000C	2,000	20,000	600	84	0.57	1,700
4	Bicom3000C	3,000	30,000	900	105	0.48	2,500
5	Bicom4000C	4,000	40,000	1,200	136	0.48	3,300
6	Bicom6000C	6,000	60,000	1,800	198	0.46	4,200
7	Bicom8000C	8,000	80,000	2,400	243	0.43	5,000

Bicom NUTRIENT ****

Model range	Model number*	Influent flow m ³ /day	Population Equivalent***	BOD kg/day	Installed power requirement** kW	Power consumption kWh/m ³	Nominal site area m ²
1	Bicom500N	500	5,000	150	63	1.73	750
2	Bicom1000N	1,000	10,000	300	89	1.29	1,000
3	Bicom2000N	2,000	20,000	600	136	1.01	1,700
4	Bicom3000N	3,000	30,000	900	175	0.87	2,500
5	Bicom4000N	4,000	40,000	1,200	221	0.84	3,300
6	Bicom6000N	6,000	60,000	1,800	340	0.85	4,200
7	Bicom8000N	8,000	80,000	2,400	414	0.79	5,000

* Model numbers are based on average flow rates.
 ** Sizing requirement of the incoming power system
 *** Based on 30 g/h/d BOD and 100 l/h/d influent flow
 **** Based on core Bicom system

Process Description:

The core Bicom system comprises three modular sections:

- Raw wastewater pumping system
- Preliminary treatment system
- Biological oxidation system

1. Raw wastewater pumping system

A pump station is constructed to receive influent from the incoming sewer. A fixed bar coarse screen is installed at the sewer discharge.

The sewage is lifted to the inlet of an elevated fine screening channel by duty/standby submersible sewage pumps, operating automatically by level control.

2. Preliminary treatment system

Preliminary treatment consists of fine screening and grit removal. A rotating mechanically cleaned fine screen is installed in an elevated steel channel. The screen operates on level sensors, and a compacting screw conveyor transfers the screenings to skips for offsite disposal.

Grit removal is conducted in a conical stainless steel tank, with a central turbine mixer. Settled grit is air lifted and conveyed into the grit classifier before being discharged into skips for offsite disposal. Return liquids are directed to the inlet works via pre-treated effluent weirs into the Biological Treatment.

3. Biological oxidation system

Biological treatment is conducted by the activated sludge process utilising extended aeration within combined concentric circular tanks, divided into a number of zones.

The **aeration** zone is located in the outer ring and provides oxidation of carbonaceous material and nitrogen containing compounds. Air is supplied by a duty/standby blower. Fine bubble membrane diffusers are used for dispersion and efficient transfer of oxygen into the liquid controlled by dissolved oxygen sensors. An optional concentrated Ferric Chloride solution can be dosed in the inlet of the tank for phosphate precipitation.

The aerated liquid flows into the **settlement** zone located in the central tank. This is equipped with a sludge scraper mechanism which directs settled sludge into a central sludge discharge hopper. Duty/standby sludge pumps recycle settled sludge constantly into the outer ring. A timer operated motorised valve is provided in the sludge recycle line to facilitate periodic discharge of surplus sludge into the sludge holding tanks.

If nutrient removal models are selected, then the outer ring is split to include an **anoxic** zone, where the screened wastewater is mixed with returned liquid and kept constantly mixed without aeration. A denitrification process takes place whereby nitrates are reduced to nitrogen gas thus achieving nitrogen consent levels in the final effluent. The anoxic zone has the added advantage of preventing sludge floatation in the settlement zone.

Clarified effluent flows over a weir channel and is discharged to a receiving water course or, if required, is directed to effluent pumps or for tertiary treatment.

Optional modules

There are various optional modules which can be included to the core Bicom system in order to tailor the treatment plant to specific requirements.

Process components	Optional Modules					
	Pre-treatment system	Sludge treatment system	Tertiary treatment system	Effluent system	Disinfection system	General system
Oil & Grease removal	▲					
Sludge treatment		▲				
Prefab. sludge building		X				
Disc filtration			▲			
Effluent storage tank				X		
Effluent pumping station				X		
Sodium hypochlorite dosing					▲	
Ultra-violet disinfection					X	
Prefab. admin building						X
Prefab. operations building						▲
Laboratory equipment						▲
Odour control & treatment						▲
Lifting equipment						▲
Standby power generation & fuel tank						▲
Supervisory control & data acquisition						▲

Recommended optional modules ▲

Other optional modules X

