

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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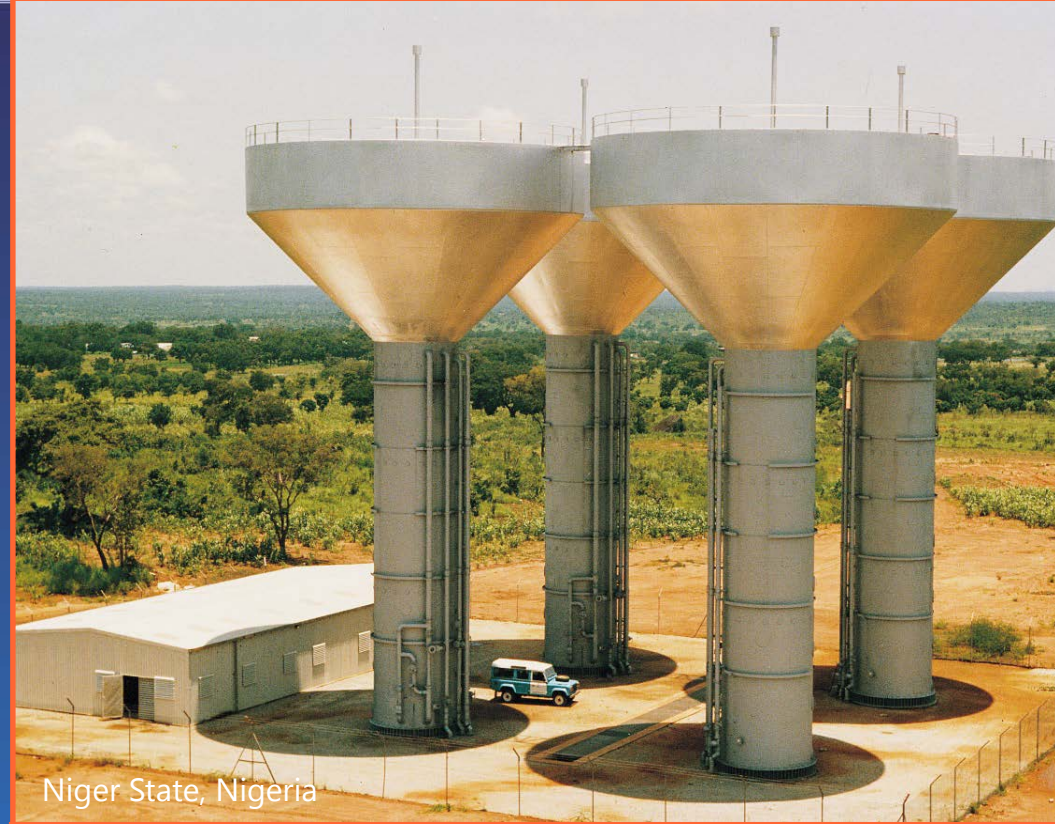
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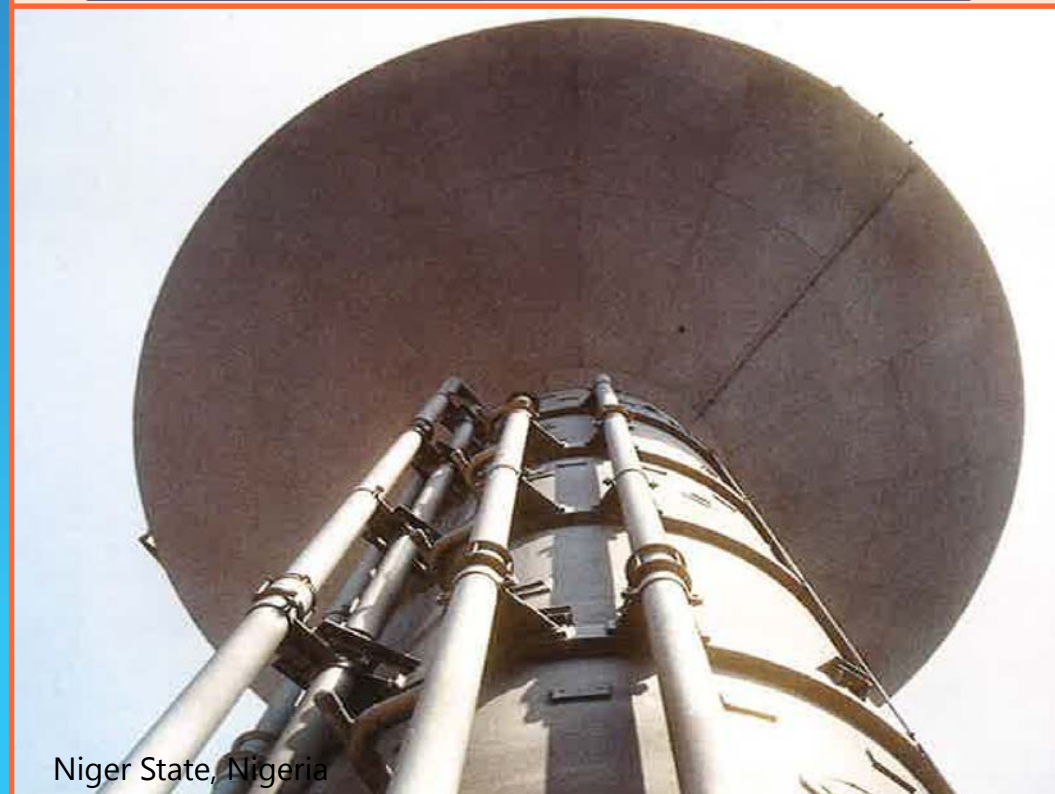
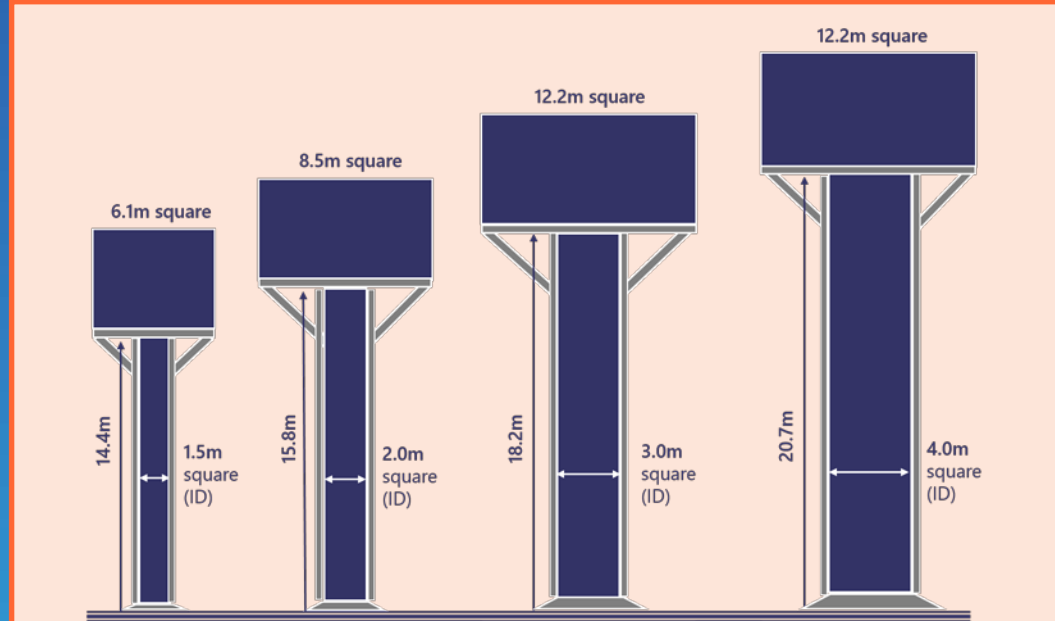
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Niger State, Nigeria

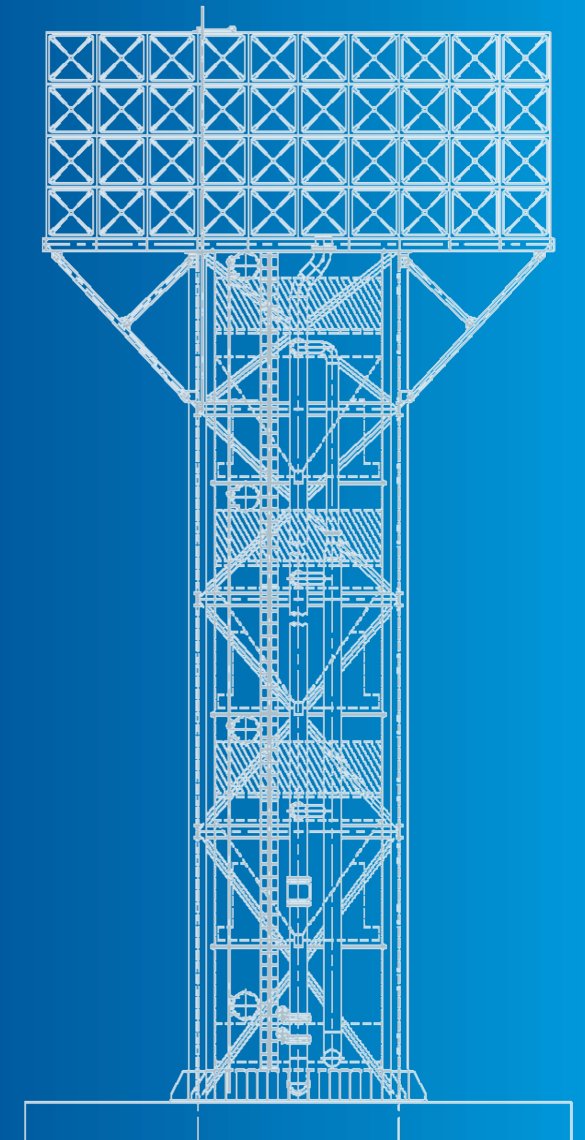


Niger State, Nigeria



Biwater Tower

Biwater Treatment Plant



biwater.com

Biwater Tower Treatment Plant

Introduction

The Biwater Tower is a unique treatment system, for either surface or ground raw water and designed to provide drinking water fully in compliance with World Health Organisation requirements.

The Biwater Tower combines elevated water storage with a modular water treatment plant. It uses conventional lamella sedimentation and filtration technology in an energy efficient system that requires the minimum of space allocation and with simple valve operation.

The Biwater Tower is suitable for both rural and urban environments, particularly in locations where efficient use of space and energy is required. Each Biwater Tower is prefabricated, often locally, in sections to allow for ease of transportation and rapid erection at the site.

The simple and comprehensive operating instructions, which follow general waterworks procedures, will enable the plant to produce a good quality disinfected water in a wide variety of circumstances.

With a **range of four unit sizes**, populations of between 3,450 – 27,600 can be served by one Biwater Tower. Larger communities can be served by multiple unit installations.

Specific benefits

- Total water treatment solution
- Meets World Health Organisation drinking water standards
- Simplicity of operation and maintenance
- Compact footprint ideal for small to medium sized communities
- Rapid installation with prefabricated factory built and tested modules

General features

- Modular approach allows flexibility to achieve client specific requirements
- Reliable and robust process treatment selection
- Ease of transportation
- Innovative, proven and versatile water treatment system
- Designed and built to British / EU / AWWA Standards

Biwater Tower types

The Biwater Tower is designed for both borehole and surface waters, with different types offered for each application.

Types*	Description
Type 1	Full treatment with treated water storage
Type 2	Without sedimentation with treated water storage

- Some waters may not require sedimentation. These sections can be used to provide additional chemical reaction time prior to filtration

Biwater Tower model range ***

Model range	Model number	Treated water flow	Population Equivalent**	Raw water	Installed power requirement*	Power consumption****	Storage Reservoir Capacity	Nominal site area
		m ³ /hr	up to	NTU	kW	kWh/m ³	Hours	m ²
1	Bitower15	15	3,450	120	2.7	0.151	8.0	300
2	Bitower30	30	6,900	120	5.6	0.146	8.0	350
3	Bitower65	65	14,950	120	10.8	0.151	8.0	400
4	Bitower120	120	27,600	120	20.0	0.156	4.0	400

** Sizing requirement of the incoming power system, including raw water pumps (Note – diesel driven raw water pumps reduce this)

** Based on 100 litres per person daily consumption and 23 hour run-time

*** Based on core Biwater Tower system

**** Based on Raw water pumps being located 120m from site

Process description:

The core Biwater Tower system comprises of three modular sections:

- Raw water pumping station
- Treatment tower
- Chemical system

1. Raw water pumping station

A pump station is constructed to provide raw water. The standard design provides for a Pontoon type intake or a borehole intake. Both types have upstream course screening facilities. The untreated raw water is pumped from source by an electrical, diesel or petrol engine driven pump.

The raw water is pumped through the treatment tower to the elevated storage reservoir, therefore requiring only the raw water pump lift for the entire treatment plant operation and to provide sufficient pressure for local treated water distribution.

2. Treatment tower

After chemical dosing is applied, the water travels up the tower under pressure into one of three upflow **lamella sedimentation** tanks, one above the other, in the body of the tower. These are connected in parallel and designed to allow the settled sludge to be removed from each section independently.

After the sedimentation stage, water flows down to the **pressure sand filter** at the base of the tower. The single grade filter media is supported on a lateral underdrain system which ensures even collection of the filtrate and even distribution of the backwash water.

After filtration the water passes up to the **storage reservoir**, ready for distribution to the Community.

3. Chemical system

The source water is chemically treated using electrical chemical metering pumps, powered by a solar panel and battery system, with alum to flocculate the fine particles before settlement and filtration and chlorine for disinfection.*

The standard chemicals for the plant are aluminium sulphate (alum), and sodium hypochlorite (chloros) or dissolved bleaching powder. Other chemicals and extra dosers are available as optional extras if required.

* Chemical systems are provided in a 40 foot container, fitted with solar panels and battery for local on-site power

Optional modules

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

Process components	Optional modules		
	Chemical system	Distribution system	General system
pH Correction dosing (alkaline or acid)	▲		
Prefab. operations building			✓
Distribution Kiosks / Stand pipes		✓	
Additional treated water storage capacity			✓
Standby power generation & fuel tank (containerised)			✓

Recommended optional modules ▲

Other optional modules ✓

Cleaning the plant

The only operational procedure required is the periodical draining of the sludge from the lamella sedimentation chambers and cleaning of the pressure filter by backwashing with clean water. Operation of a simple valving, at ground-level, reverses the flow of water and initiates this process. The period between backwashes depends on the quality of raw water, but is normally every few days.

The sedimentation tanks must also be desludged every few days, depending on the raw water quality. This is done by simply opening a valve at ground-level. Provision must be made to take all discharges to a suitable disposal point.

