

## Colon Bacillus Trials on Lake Biwa—Japan Project Overview

Lake Biwa is the largest fresh water lake in Japan, located almost in the centre of country, it is 70 miles east of the ancient capital of Kyoto. The area is approx. 5.5 times that of the heavily polluted Lake Apopka in Florida. At a length of 40 miles, the lake is a popular recreation spot for swimmers, water skiers, campers and fishermen.



**Coordinates:** 35° 20' N 136° 10' E

**Primary inflows:** 118 rivers

**Primary outflows:** Seta River

**Catchment area:** 3,174 km<sup>2</sup> (1,225 sq mi)

**Max. length:** 63.49 km (39.45 mi)

**Max. width:** 22.8 km (14.2 mi)

**Surface area:** 670.3 km<sup>2</sup> (258.8 sq mi)

**Max. depth:** 104 m (341 ft)

**Water volume:** 27.5 km<sup>3</sup> (6.6 cu mi)[1]

**Shore length:** 1:235.2 km (146.1 mi)

**Surface elevation:** 85.6 m (281 ft)

**Islands:** 33

**Ramsar:** Wetland

Lake Biwa is the main water supply for four prefectures in the area, but has recently had many environmental issues, such as heavy bacteria growth, which can harm human health.

Recent contamination has affected the quality of the water, so the local environmental agency asked its testing agent, Toyobo Engineering Co., Ltd. (who is a specialist of R.O. membrane filter engineering and a Government contractor), to initiate an Ozone disinfection program at certain points around the lake, to disinfect against *Coliform*.

### What was required in this project?


All initial tests were carried out at the Lake Biwa Testing Station, using a sample of 110 litres of water, the focus was to establish which technology would be the most practical and effective to use in field tests. The initial laboratory test was carried out by injecting Ozone gas directly into the lake's raw water to see how much the *Coliform* decreased within 1/2 an hour.

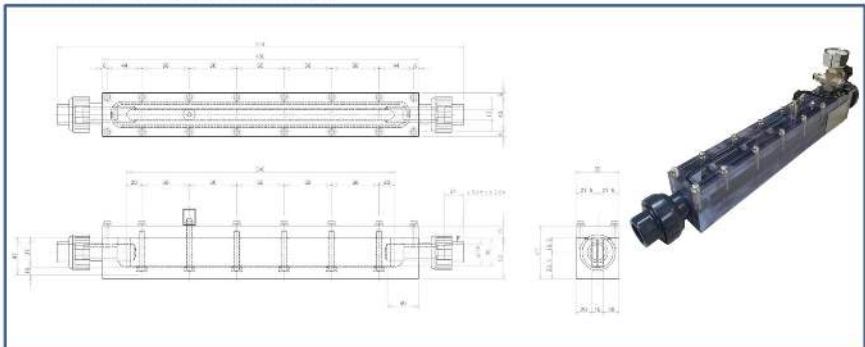
After trialling several different methods of injecting Ozone into the water, the research department of Toyobo Engineering engaged Anzai Kantetsu to employ its Ozone Nanobubble technology for this work, considering it the only practical option to carry out the programme effectively.

### What Anzai equipment was used in the trial?

Anzai used its own (29psi) Ozone generator of 5ppm capacity with the 20 A/LOZ Nanobubble unit and 110 litres of water to be recycled @ 46.6 litres/min.

## 『20A/L Specifications』



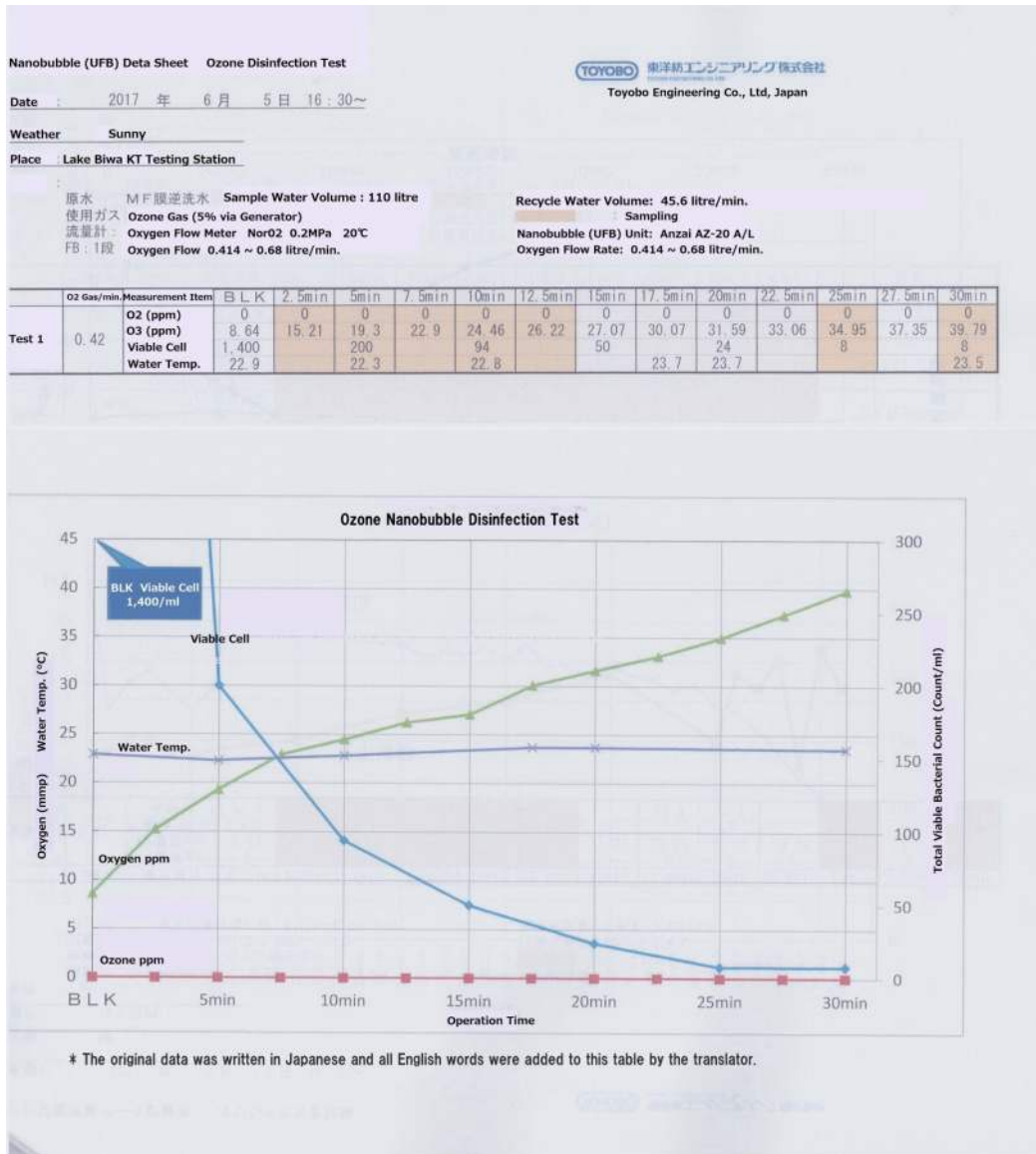


Distribution Gas Volume :	1.9L/min(max) 0.2Mpa=29psig
Recommended Pump :	0.06kw~0.1kw
Water Flow :	0.015m <sup>3</sup> ~0.05m <sup>3</sup> /min
Carbon Ceramic Dimension :	220mm × 35mm × 13mm
Material :	Transparent PVC, ( union used grey PVC)
O-ring packing :	Viton GS250
Connection method :	Adhesion or R3/4
Piping outer diameter :	φ20mm

Standard specifications for the 20 A/L unit

## What were the laboratory test results?

Anzai's system reduced the number of Colon Bacillus from 1,400/ml down to 200/ml within 5 minutes and within 25 minutes there was almost total elimination. This shows that Anzai's technology can create Ozone Nanobubbles in raw water, where they can be used effectively before/without evaporation.



The above chart shows the number/speed of kill of the live bacteria

## What added benefits does Anzai's technology bring?

Generally speaking, Ozone technology used on this scale of field-testing (a lake location) requires large-scale facilities and equipment, such as a sealed tank. In addition, Ozone water can only be produced from pure water.

Anzai Kantetsu's Nanobubble technology can inject Ozonedirectly into the lake's raw water in Nanobubble form and has the flexibility of being able to scale up and down in size and volume depending on requirement and location.

Anzai's standard in-line Nanobubble generators, such as the model used in this test, have no mechanical parts and does not need high pressure to feed either the gas or the water through the unit which makes this system very energy efficient to operate.

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