Disinfection, Decontamination and Deodorization Solution
Ozone – the Earth's most powerful and natural sanitizing agent!

Biotek Ozone is the product of Biotek Environmental Science Ltd. (hereinafter called “BES”) which was established by a team of ozone engineers from Taiwan in 1988. Later on, BES established its company in the UK and teamed up with the professors in The University of Birmingham to develop electrolysis ozone generator.

BES is now the world's leading supplier of electrolytic ozone generators and integrated ozone systems in household, commercial, light industrial and medical applications. In the past 15 years, Biotek has obtained more than 40 patents in electrolytic ozone generator and its integrated ozone systems has also been approved by many international standard inspections and testings.

1988 – Biotek Environmental Science Ltd. was established and became the world’s No. 1 small-size-ozone-generator manufacturer.
1989 – Corona Discharged Ozone Generator was manufactured and generated ozone at 100 mg/hr.
1992 – The world’s smallest Corona Discharged Ozone Generator was launched and generated ozone at 250 mg/hr.
1995 – BES established its company in the UK and teamed up with the professors in The University of Birmingham to develop Electrolysis Ozone Generator.
1998 – Air-cool type Electrolysis Ozone Generator was developed and generated ozone up to 450 mg/hr.
1999 – The world’s first most compact Electrolysis Ozone Generator was launched, with consecutive ozone generation reaching 500 mg/hr and generator life span over 2,000 hrs. (for higher than 75% optimal generation levels).

In October 1999, Biotek started using the ultra-thin titanium alloy in making the ozone generator. The instant ozone generation reaches 500 mg/hr, and over 3,000 hrs. (for higher than 80% optimal generation levels).

2002 – Application, life span, durability and application integration of product was tested.
2004 – The technology development of Electrolysis Ozone Generation system completed.
2005 – BES’s manufacturing plant in China was in operation and Biotek ozone generation products obtained more than 40 patents.
2007 – Commercial grade Electrolysis Ozone Generator with 5,000 hrs’ life span was manufactured.
2009 – High efficiency Electrolysis Ozone Generator with 9,000+ hrs’ life span for use in light industries was manufactured.

Product – Product Intro

Biotek, Your Food Safety and Sanitation Partner

In the fast-paced catering industry, keeping a high level of sanitation standard is a challenging task. Biotek ozone disinfection system guarantees that every aspect of your food safety and sanitation is protected, including hand washing, surface disinfection, produce washing, water sanitation and ice safety. In Europe, catering and beverage industries are legally required to use ozonated water for disinfection, decontamination and deodorization.

Food safety in the food service industry is very important whether it is for food preparation, processing or serving. Ozone is certainly an ideal solution for disinfection, decontamination and deodorization because it is the most natural and strongest agent in the world, which is approved by FDA for direct food contact.

Ozone (O₃), derived from the Greek word “Ozein”, meaning “fresh air”. It exists naturally on Earth. Lightning empowers oxygen in the air and transforms it into ozone, forming the ozone layer that cleanses the Earth’s atmosphere, balancing the bacteria population and neutralizing harmful chemicals.

Ozone (O₃) is an unstable and highly reactive form of oxygen due to its extra oxygen molecule with strong oxidizing and self-decomposing properties. Thus, ozone (O₃) is the most powerful and effective disinfection, decontamination and deodorization agent in the world.

Ozone oxidizes bacteria cell wall and membrane causes lysis that inhibits and blocks the operation of its enzymatic control system so that it cannot recover, i.e. no cell wall can be built up again. After the oxidation process, ozone will naturally revert to its stable oxygen state, leaving no harmful by-products or residues.

Ozone (O₃) is nature’s best gift to us as the most powerful, effective and safest agent and has been used for disinfection since 1905 in many industries for eliminating pesticides, harmful chemicals, viruses and bacteria etc. Its effectiveness and sterilization speed are 50 and 3,000 times faster respectively than any other disinfection agents, like chlorine bleach!
**Product – Product Intro**

**Biotek Ozone Disinfection System**

### Application of Biotek Ozone Disinfection System

**Accessory - Spray Bottle**

The aluminum alloy spray bottle is designed for surface disinfection, e.g., kitchen worktop, food counter etc. Its inner layer was coated with epoxy resin, which is antioxidant material, and thus it can store 275 ml of high concentrated ozone water (2-4ppm) and can keep for approx. 20-40 mins.

**Biotek Ozone Disinfection System Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>C-7120</th>
<th>C-7120U</th>
<th>CDS</th>
<th>MDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Countertop</td>
<td>Under-sink</td>
<td>Floor</td>
<td>Mobile</td>
</tr>
<tr>
<td>Color</td>
<td>Dark grey</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>Flow rate</td>
<td>180±10% L/hr</td>
<td>100-3000 L/hr</td>
<td>400-3000 L/hr</td>
<td></td>
</tr>
<tr>
<td>O₃ concentration</td>
<td>4 ppm (0-20 sec.)</td>
<td>2 ppm (0-20 min.)</td>
<td>1 ppm (continuous)</td>
<td>0.2-6.0 ppm</td>
</tr>
<tr>
<td>Input Pressure</td>
<td>1.5-7.0 kg/cm²</td>
<td>2.0-4.0 kg/cm²</td>
<td>0.5-6.0 ppm</td>
<td></td>
</tr>
<tr>
<td>Output Pressure</td>
<td>0.1-0.3 kg/cm³</td>
<td>≤3.0 kg/cm³</td>
<td>1.5-3.0 kg/cm³</td>
<td></td>
</tr>
<tr>
<td>Ozone generator life</td>
<td>3,000 hrs</td>
<td>6,000 hrs</td>
<td>6,000 hrs</td>
<td></td>
</tr>
<tr>
<td>Elect. loading</td>
<td>220V /50h / 1ph; 800W</td>
<td>220V /50h / 1ph; 800W</td>
<td>220V /50h / 1ph; 950W</td>
<td></td>
</tr>
<tr>
<td>Dimension</td>
<td>330 x 190 x 410 mm (H)</td>
<td>400 x 700 x 709 mm (H)</td>
<td>420 x 1000 x 900 mm (H)</td>
<td></td>
</tr>
</tbody>
</table>

ppm (parts per million) is used to measure concentration. 1 ppm = 1 mg/liter, i.e. 1 milligram of dissolved ozone molecules in 1 liter of ozone water solution.
Biotek’s Ozone Generation Technology

In the past 15 years, Biotek has developed its Electrolytic Ozone Generator and its integrated ozone system has obtained more than 40 patents. Its technology is to create ozone from water into water for application, i.e. using normal tap water, going through the Biotek’s electrolytic ozone generator, generating 20% to 30% ozone to be dissolved in water via its injection system, thus providing instant high concentration ozonated water.

Step 1
Water molecules (H₂O)

Step 2
H₂O separated into O and H molecules by Biotek’s Electrolytic Ozone Generator.

Step 3
The separated O will combine into Ozone (O₃) and be dissolved in water via its injection system.

Step 4
Ozone (O₃), in forms of water kills bacteria, viruses and removes chemicals.

Step 5
Ozone (O₃) reverts to O₂ with no other by-products.

Biotek Ozone Water vs. Chlorine – Difference Testing on Disinfection Effectiveness
(Test conducted by SGS)

Biotek Ozone Water eliminates E-Coli
Time: 15 sec. @ 20°C

Chlorine not effective against E-Coli
Time: 3 minutes @ 20°C

Test Reports on Effectiveness of Biotek Ozone Water

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Antimicrobial Effectiveness Testing</th>
<th>SGS Test Report of Biotek Ozone Water Disinfection (2.0 ppm O₃)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 sec.</td>
<td>5 sec.</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>(CFU/ml)</td>
<td>5.4 × 10⁵</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>(CFU/ml)</td>
<td>2.5 × 10⁵</td>
</tr>
<tr>
<td>Salmonella</td>
<td>(CFU/ml)</td>
<td>1.7 × 10⁵</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>(CFU/ml)</td>
<td>4.5 × 10⁵</td>
</tr>
<tr>
<td>Candida albicans</td>
<td>(CFU/ml)</td>
<td>1.3 × 10³</td>
</tr>
<tr>
<td>MRSA</td>
<td>(CFU/ml)</td>
<td>1.3 × 10³</td>
</tr>
<tr>
<td>Decomposition of Residual Pesticide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mevinphos</td>
<td></td>
<td>0.642</td>
</tr>
<tr>
<td>Permethrin</td>
<td></td>
<td>0.559</td>
</tr>
</tbody>
</table>

SGS Test Report of Biotek Ozone Water Disinfection (2.0 ppm O₃)

Test Item | 0 sec. | 5 sec. | 15 sec. | Reduction
Staphylococcus aureus (CFU/ml) | 5.4 × 10⁵ | Not detected | Not detected | >99.999%
Escherichia coli (CFU/ml) | 2.5 × 10⁵ | 1.6 × 10² | <10 | 99.99%
Salmonella (CFU/ml) | 1.7 × 10⁵ | 1.9 × 10⁵ | Not detected | 99.9%
Pseudomonas aeruginosa (CFU/ml) | 4.5 × 10⁵ | Not detected | Not detected | >99.999%
Candida albicans (CFU/ml) | 1.3 × 10³ | Not detected | Not detected | >99.999%
MRSA (CFU/ml) | 1.3 × 10³ | Not detected | Not detected | >99.999%
Mevinphos | 0.642 | 0.0000 | 100%
Permethrin | 0.559 | 0.0337 | 94%
List of Micro-organisms Disinfected by Biotek Ozone Water

**BACTERIA**
- Escherichia coli
- Shigella dysenteriae
- Shigella flexneria
- Shigella paradysenteriae
- Spirillum rubrum
- Staphylococcus 'C'
- Staphylococcus lactis
- Streptococcus hemolyticus
- Streptococcus salivarius
- Vibrio cholerae
- Vibrio comma
- Vibrio anguillarum
- Vibrio alginolyticus
- Vibrio parahemolyticus
- Vibrio choleraesuis
- Vibrio parahaemolyticus
- Vibrio alginolyticus & anguillarum

**VIRUS**
- Adenovirus (type 7a)
- Encephalomyocarditis
- Polio virus (Polymyelitis) 1, 2 & 3
- Rotavirus
- Echovirus 1, 5, 12 & 29
- Influenza

**FUNGUS & MOLD SPORES**
- Aspergillus candidus
- Fusarium oxysporum
- Penicillium digitatum (olive)
- Penicillium roqueforti (green)
- Rhizopus nigricans (black)
- Rhizopus stolonifer

**Application Comparisons**

<table>
<thead>
<tr>
<th>Method</th>
<th>Biotek Ozone Water</th>
<th>Alcohol Gel</th>
<th>Liquid Chlorine</th>
<th>Chlorine Dioxide</th>
<th>Heat &amp; Steam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand sanitation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Produce wash</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Uterus disinfection</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Surface disinfection</td>
<td>✓</td>
<td>❌</td>
<td>✓</td>
<td>✓</td>
<td>❌</td>
</tr>
<tr>
<td>Deodorizing</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Pre-storage rinse</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>

**Operation Comparisons**

<table>
<thead>
<tr>
<th>Method</th>
<th>Biotek Ozone Water</th>
<th>Alcohol Gel</th>
<th>Liquid Chlorine</th>
<th>Chlorine Dioxide</th>
<th>Heat &amp; Steam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficacy</td>
<td>highest</td>
<td>medium / low</td>
<td>medium / high</td>
<td>medium / high</td>
<td>high</td>
</tr>
<tr>
<td>No chemical residues</td>
<td>✓</td>
<td>✗</td>
<td>❌</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Initial cost</td>
<td>high</td>
<td>low</td>
<td>low</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>Running cost</td>
<td>low</td>
<td>medium</td>
<td>medium</td>
<td>medium</td>
<td>medium</td>
</tr>
<tr>
<td>Free from chemical storage</td>
<td>✓</td>
<td>✗</td>
<td>❌</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Reliable efficacy</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Safe operation</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Simple use</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Fast effectiveness &lt;10 mins.</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Energy/water expenditure</td>
<td>low</td>
<td>low</td>
<td>high</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

**Effectiveness and Convenience Comparisons**

<table>
<thead>
<tr>
<th>Method</th>
<th>Biotek Ozone Water</th>
<th>Alcohol Gel</th>
<th>Liquid Chlorine</th>
<th>Chlorine Dioxide</th>
<th>Heat &amp; Steam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective on bacteria</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Effective on viruses</td>
<td>✓</td>
<td>✗</td>
<td>❌</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Effective on pesticides</td>
<td>✓</td>
<td>✗</td>
<td>❌</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Residual disinfection</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Compatible with all materials (including raw food materials)</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Extend shelf time</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Environmentally friendly</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* Effective in lab controlled test but proven to be inconsistent in practical application
** Ozone has a residence time of 20 mins. Biotek ozone water will provide disinfection more than 10 mins. after output.
Biotek has engaged in research and development of electrolytic ozone generator technology for more than two decades and obtained more than 40 international patents, including 12 PCT patents. Its high purification performance has been approved by many international standard inspections and testings.

**NSF (National Sanitation Foundation)**

NSF is committed to protect the public safety and environment. It is an independent, non-profit organization that develops standards and certifies products for the world’s food, water and consumer goods. The standard of NSF is being recognized worldwide.

Biotek is the only ozone generator that has been approved in the official list of NSF 169 – Special Purpose Food Equipment and Devices.

**HACCP Australia – Hazard Analysis and Critical Control Points**

HACCP Australia is a leading food science organization specializing in the HACCP Food Safety Methodology and its applications within the food and related food industries.

Biotek has been endorsed as “Food-Safe” sanitation for food processing facilities.

**SGS**

SGS is the world’s leading inspection, verification, testing and certification company and recognized as the global benchmark for quality and integrity.

Biotek has passed various tests conducted by SGS on its effectiveness of disinfection on different micro-organisms.

**OSHA – Occupational Safety and Health Administration**

OSAH aims to assure safe and health working conditions by setting and enforcing standards and also providing training, outreach and education.

Biotek meets the U.S. OSHA's critical requirement for off-gas levels to be below 0.008 ppm/8 hr.

**FDA – Food and Drug Administration**

FDA is responsible for protecting and promoting public health through the regulation and supervision of foods and drugs produced in the U.S. or imported from other countries.

Ozone is approved to be safe for use as an antimicrobial agent on food, including meat and poultry in 2001 by FDA.

**Ministry of Health of the P.R.C.**

Biotek has been tested and proved that Biotek’s ozonated water complied with the standard for the use in medical disinfection.

**The Academy of Military Medical Sciences (AMMS) of the P.R.C.**

Biotek has passed various tests conducted by AMMS on its ozone concentration, effectiveness of disinfection on different micro-organisms etc.

**ISO – International Standard Organization**

ISO develops and uniform worldwide industrial and commercial standards.


**CE and UL**

CE is the uniform standard and regulation developed by European countries for safe operation of electrical products produced in EU or imported from other countries.

UL is an independent product safety testing and certification organization in the U.S.

Biotek complies with the essential requirements of both CE and UL in relevant health, safety, environmental protection legislations.
Applications

Application of Biotek Ozone Water

Hand Disinfection
Our hands come into contact with many different objects everyday and can be easily contaminated with bacteria and viruses and must be thoroughly cleaned before any food processing or eating.

Prewash hands with soap and rinse hands under ozone water for at least 20 seconds, microorganisms on hands can be reduced by 71.4%.

Floor / Utensil Surface Disinfection
Some chemicals are commonly used for floors and utensil surfaces, but not only these chemicals are ineffective to some bacteria and viruses, they are also harmful to be human body and the environment themselves.

Performing floors and utensil surface disinfection with ozone water will eliminate up to 99.9999% of microorganisms and chemicals, ensuring a clean and safe environment.

Food Disinfection and Preservation
Food safety has always been the most important criteria among all precaution procedures. It mainly involves cleaning processing and preserving.

Cleaning and processing food with ozone water will not only minimize contamination and reduce microorganisms up to 99.9999%, it will also prolong the shelf life of food by as much as 200%.

Ice Disinfection
Whether for drink or storage, ice is also an issue that cannot be overlooked.

Making ice with ozone water, the ices are not only safely for eating, but also safe from contamination of foods for storage so as to keep the freshness and shelf life of foods.

FAQ

Q: Is it safe to use Biotek?
A: It is absolutely safe. Biotek generates high concentrated ozonated water for eliminating pesticides, harmful chemicals, viruses and bacteria etc. It will naturally revert to oxygen, leaving no harmful by-products or residues. It is certified by OSHA in the USA, that the off-gas level of Biotek is below 0.008 ppm / 8 hrs.

Q: Biotek generates highly concentrated ozonated water for applications. However, will it be harmful to humans?
A: It has been tested and proved that there are no harmful effects on humans when applying 4 ppm ozonated water generated by Biotek onto human skin and fingers. Please refer to PSE Certification.

Q: What kind of bacteria and viruses as can be killed by Biotek’s ozonated water?
A: Please view the list of micro-organisms that can be disinfected by Biotek’s ozonated water.

Q: Can the ozonated water generated by Biotek be drunk?
A: Biotek is designed to be used for cleaning foods and tools, such as decomposing pesticides on fruits and veggies, sanitizing hands and kitchen wares before handling of foods, eliminating germs on seafood and meat for longer preservation. Therefore, it is not recommended for drinking.

Q: There is a traditional generation method named “Corona Discharge”. How is it different from Biotek’s?
A: The “Corona Discharge” method uses high voltage electrical discharges, giving energy to O2 in the input air and to form ozone. However, the volume and concentration of ozone generated by this method will be affected by the quality, humidity and temperature of air. Also, only less than 0.5 ppm ozone can be dissolved in the water for applications and thus the effectiveness of disinfection is low. Moreover, there are the by-products of nitrogen oxides and dioxides (NOx) which are harmful to human.

Biotek’s electrolytic ozone generation technology uses normal tap water, goes through Biotek’s electrolytic ozone generator, generates ozone to be dissolved in water via its injection system and provides instant high concentration ozonated water. After the oxidation process, ozone will revert to oxygen, leaving no harmful by-products or residues.
Distributor of Biotekozone in HK:
Total Nutrition Center Ltd.
Tel: (852) 2881-8270  Email: enquiry@tnc.com.hk
Website: www.tnc.com.hk