

# PIE Ozonation

## Ozone Systems for Laundry

*The results are primarily the reduction in both the consumption of the energy source for heating water, the reduction in the consumption of the bleaching agent and cut down the water usage as well as the operation time. Results are focused primarily on the resulting return on investment for the washroom entity of the laundry system.*

Many successful track records and are the leader in bringing successful customer usage, credibility and awareness to Ozone laundering. (Please see our customer feedback from **Tung Lum Buddhist Aged Home**). For added safety operation, PIE Ozonation offers with Ozone gas sensors that constantly monitor the surrounding air for Ozone levels. Each system is equipped with electrical shock protection devices.



In PIE Ozonation System of ozone laundry-system solutions, the set-up is similar to a conventional laundry. The main difference is the addition of the ozone-generating equipment and the use of cold water. Water from city-supply is directed to the PIE Ozonation System. The ozone is generated through the reaction for oxygen from air by using the integrated oxygen concentrator and the corona discharge ozone generators.. Thus, no additional chemical is necessary.

Ozone is a strong oxidizing agent, which disinfection power is much higher than chlorine. In addition, chlorine is retentive by synthetic fibers and the chlorine in the fiber discolors the fabric if not neutralized, that's why people are warned against using chlorine bleach on synthetic fabric. The greater performance of the ozone provides a better cleaning performance without any residual left at the fiber. Excess ozone decomposes back to oxygen very soon.

### Chemical Oxidizers (in order of strength)

1	Fluorine (F <sub>2</sub> )	3.06 V
2	Hydroxyl Radical (OH·)	2.80 V
3	Atomic Oxygen (O)	2.42 V
4	Ozone (O <sub>3</sub> )	2.08 V
5	Hydrogen Peroxide (H <sub>2</sub> O <sub>2</sub> )	1.78 V
6	Sodium Hypochlorite (NaOCl)	1.49 V
7	Chlorine (Cl <sub>2</sub> )	1.36 V



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### How the PIE ozonatio System works in Laundry Washing

The ozone is then dissolved in cold laundry wash water where it exerts its powerful cleaning action. Because it is so reactive, ozone readily attaches itself to fatty and other soils that bind dirt to clothing, destroying them rapidly. As one of the strongest known oxidizing agents, ozone is capable of breaking down virtually any organic soil into innocuous compounds such as carbon dioxide and water. Being a gas in solution, ozone penetrates and opens individual garment fibers, allowing faster cleaning and bleaching of garments with the use of less chemicals

### How PIE Ozonation System in saving

*Purifies and Disinfects* – Ozone is very effective against bacteria, viruses and other microorganisms. The key is achieving a “CT” value (contact time in minutes multiplied by ozone concentration in parts per million) of 1 or more. Modern, efficient PIE Ozonation system can provide high CT values to ensure complete disinfection of laundry.



*Reduces Energy Use* – Ozone enhances the effectiveness of chemicals, reducing the need for high temperature wash. Estimates of savings potential are as high as 80-100%.

*Reduces Water Use* – Ozone wash systems normally require fewer rinse steps, reducing water use by an estimated 30-45%. Closed loop systems are more expensive but recover most of the water, so reductions in water use can reach 70-75%.

*Reduces Chemical Use* – Ozone makes existing chemicals work better, and reduces overall chemical demand in several ways. Ozone helps supply oxygen to the wash water, which increases chemical Effectiveness and reduces chemical demand. Ozone oxidizes soils, making them easier to remove from the wash water. Ozone can reduce the need for harsh, high-pH chemicals traditionally used to remove Fats, Oils and Grease (FOG) by breaking molecular bonds in FOG and reducing them to simpler carbon compounds.

## Components Description of PIE Ozonation System

### Ozone Generator

Ozone is generated from corona discharge by using the advanced electronic circuit. 4.5 g/hr of ozone is dosed to create 3 – 4.5 mg/L of dissolved ozone into water for sterilization. A dissolved ozone testing unit is used to check the effectiveness of the system.

### Oxygen Concentrator

Pure ozone is generated from oxygen only. PIE Ozonation System is installed an oxygen concentrator, which is d the PSA technology, to generate the higher-grade ozone.

### Ozone Leakage Monitor

An ozone gas monitor is integrated inside the system to detect leakage of ozone into working environment in order to ensure operation safety.

### Vacuum Ozone Injection (without compressor design)

Injector and booster pump are to provide negative pressure for ozone and water mixing before they enter into the ozone reactor. Ozone gas is only produced in vacuum condition to ensure operator safety.

### Ozone Reactor & Off-gas Vent

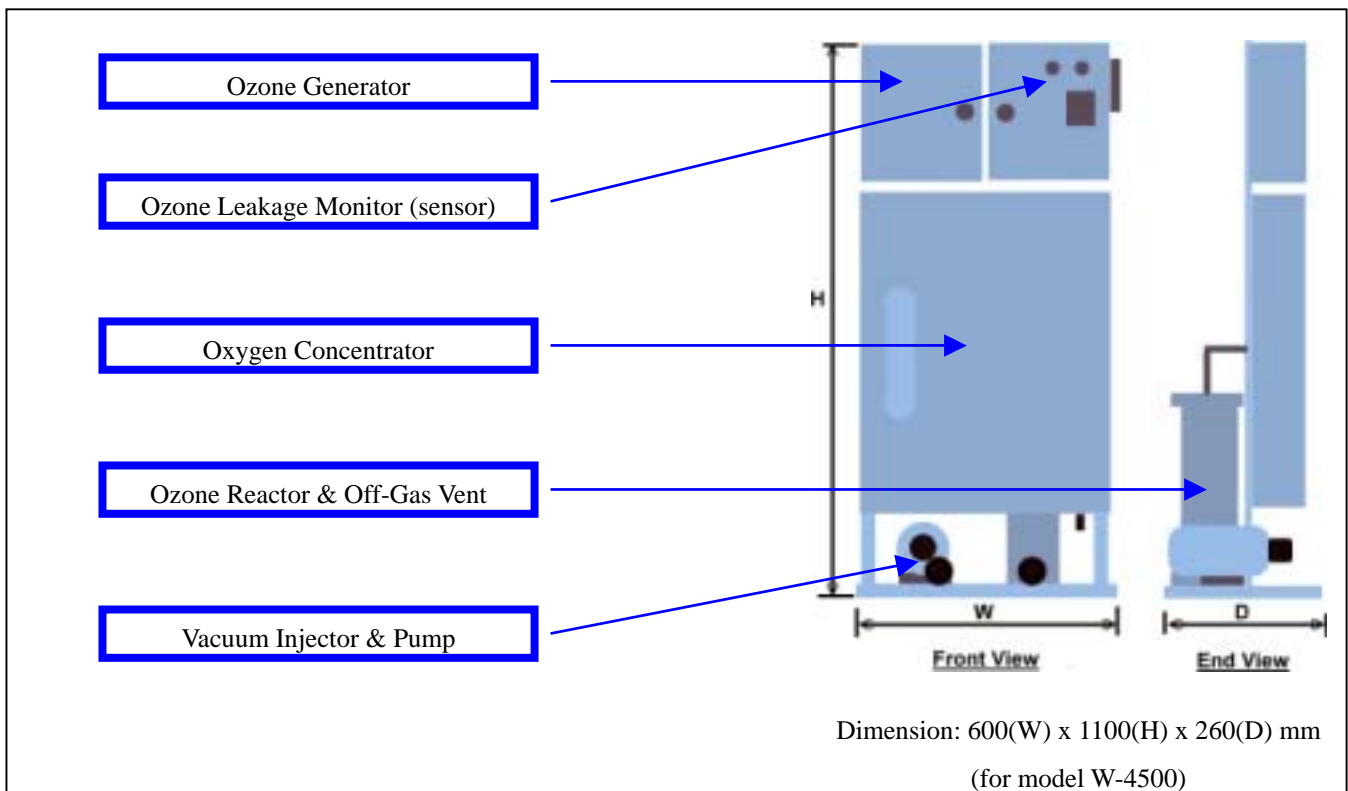
Ozone further reacts with water at the ozone reactor to enhance the sterilization purpose. Excess ozone gas is vented out from water to be decomposed back to oxygen at the ozone destructor, which installed with zeolite.

### Enclosure

All electrical and electronic components are fixed into the IP54 waterproof enclosure made from painted mild steel. Overheat, over-current and power-off interlock devices are incorporated to provide safe operation.

## Key features of PIE Ozonation System

- High efficiency ozone generation by using advanced corona discharge technique
- Low heat in ozone generation by applying high frequency / low voltage electronic circuit design
- Over-current and overheat protection circuit design
- Vacuum injection to reduce the risk of ozone leakage
- Ozone leakage detection to ensure operator safety
- Dissolved ozone monitoring to verify the disinfection effectiveness
- Ease of installation – just connect the water inlet and outlet, and power supply only



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**To Whom it May Concern**

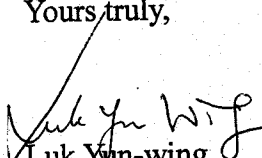
(Re: Ozone System at Tung Lum Buddhist Aged Home)

As superintendent of the Tung Lum Buddhist Aged Home, I would like to say how much we are pleased with the quality of services the Prominent International (Environment) Limited provided. Through the Prominent International (Environmental) Limited, we have installed an ozone system in our home. The system is a very simple, reliable, low cost and low maintenance one which is unique, efficient and durable. We use the ozone system as a sanitizer for:

- laundry washing,
- produce (vegetables) processing and
- dish-washing.

I can't remember a time when our residents' laundry has looked so nicely washed and dirt-free, our home's linens have been so clean, our vegetables has looked so fresh and our culinary utensils have looked so beautiful. The ozone system is definitely the next generation in cleaning and sanitizing without chemicals as it has been proved to save us lots of our energy, water and detergent. We really appreciate the way the Prominent International (Environmental) Ltd has cared for our cleaning and sanitizing need. I have recommended the ozone system to others because of our satisfaction with the system. I look forward to doing business with the Prominent International (Environmental) Limited for years to come as I have appreciated the friendly business relationship we have had with the company.

Yours truly,

  
Luk Yun-wing  
Superintendent

