

Introduction to ODOROX HYDROXYL Technology



Solutions for Odor Control

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“Neutralizing Harmful Gases and Micro-Organisms the Natural Way”

The ODOROX Hydroxyl Generator is a complete odor elimination, air decontamination and purification system. The manufacturer, HGI Industries Inc., is a U.S. based company whose hydroxyl technology is at the forefront of high-volume air processing. They have units that range from residential, to commercial, to industrial and agricultural applications. There is no job too large that these systems can't handle.

The ODOROX Generators use a multi-phase process to eliminate a long list of biological and chemical pollutants. One segment involves directing air through a sanitizing chamber. This chamber harnesses multiple nanometer wavelength and frequency ranges.

One segment of the optics deodorizes the air flow, while another segment destroys bacteria and other micro-organisms and prevents them from multiplying. The result is purified air which is then channeled back into the environment. These multi-nanometer wavelengths also combine with ambient air humidity to create hydroxyls, which are the key to the second part of the decontamination process.

Hydroxyls (-OH) occur naturally in our atmosphere when sunlight hits water vapor. They are so small that ten billion-billion would fit into a drop of rain. Despite their diminutive size, hydroxyls are probably the single most important cleansing agent for our environment. Hydroxyls are:

- 33% more effective at oxidizing pollutants in the air than ozone, and
- 2.5 times more germicidal and fungicidal than chlorine.

This makes them the most effective method of eliminating bacteria, viruses, germs, mold, volatile organic compounds (VOC's), chemical fumes, gasses, vapors and unpleasant odors that you can buy. The problem is that hydroxyls are not naturally occurring indoors, therefore, due to the absence of the hydroxyls, indoor air quality is said to be 10 to 100 times more polluted than outside air.

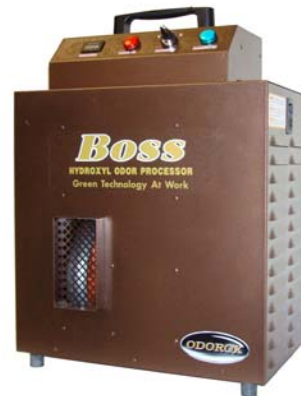


Figure 1 Portable Hydroxyl Generator Unit



Figure 2 Wastewater Odor Control Application

By mimicking the natural production of hydroxyls in the atmosphere, this technology will help to create a safe indoor environment for all who desire a healthy lifestyle, while reducing odors. The ODOROX clean air systems are:

- Not hazardous to people or animals
- Generate no accumulative ozone (<0.01 ppm)
- Use no harsh chemicals
- Require only low maintenance
- Uses very little power.

The hydroxyls produced are clearly a vital component to clean air, and it is no wonder they are often referred to as “Mother Nature’s Broom”. Now, because of the ODOROX Hydroxyl Generators, we can all experience cleaner and fresher air in our indoor environment as well.

Successful in the Toughest Odor Control Environments

When considering odor control applications, two of the most demanding environments are in wastewater and rendering plants. ODOROX Generators have been proven in both environments. Below are examples of current applications:

Wastewater treatment facility Case Study:

Odors (NH₃ and H₂S) were not being taken care of with the current ventilation system in the containment building. The wastewater plant had two odor control systems. Exhaust air from all potential Hydrogen Sulfide (H₂S) generating areas were being treated by two large carbon filters. The bio-solids production area was totally enclosed and air was treated by a wet scrubber.



Figure 3 Wastewater Plant Odor Control

Due to high accumulations of H₂S and other odor loading gasses, the twin carbon filters were exhausted after just six months of operation (the estimated lifespan was said to be a three year cycle). The carbon media replacement cost was estimated to be \$350,000 each time it needed to be recharged. This cost had now made the carbon odor control system too expensive to operate.

A pilot project was initiated for testing of the Hydroxyl Generator system. The result of the two month trial period was promising. Odor reduction was similar to the carbon filter system. The head losses were much less for the Hydroxyl Generator system with overall ventilation

efficiency improving significantly. The wastewater treatment facility decided to purchase the equipment and permanently install the system.

Rendering Plant Case Study:

The plant recycles bone meal, fats and oils from animal by-products. Like all rendering operations, odor control is an important issue. Conventional odor control equipment had been used with limited results. The very nature of the business makes rendering plants a "nuisance" type business that forces operators to the outer edges of their community. At one time, physical remoteness was all that was required. This is no longer the case; the plant is being surrounded by new development.



Figure 4 Rendering Plant Test Installation

The rendering plant manager investigated ODOROX Generators for odor control. Their findings were that the ODOROX system worked well. The free vapor odors were significantly less, in the order of 90%. Their insect problems have been eliminated to near zero. Their raw material bins emit almost no odors. The equipment is unobtrusive, consumes little energy and nearly maintenance free.

As a result of the successful test of the equipment, the plant manager is modifying the plant to accommodate the permanent installation of ODOROX Generators. They have contracted HGI to install, on a permanent basis, the new Hydroxyl Generators so that the machines will be mounted external of the building and vented via ductwork into the building. This project will better contain and circulate the hydroxyls for a more efficient system.

The plant manager and employees want to be good neighbors by controlling odors, and feel this investment will pay for itself in terms of employee retention, improved regulatory compliance and community goodwill. Furthermore, the solution of their odor control problem allows them to forego relocating the plant. The plant manager has become an enthusiastic advocate of the technology and encourages others to visit the plant so interested parties can see the system in action. The plant manager proudly will ask visitors to carefully look for insect and rodent infestation--there are none.

Frequently Asked Questions about Hydroxyls

WHAT IS THE SCIENCE BEHIND THE ODOROX CONCEPT?

The ODOROX Generator is new to the field of cleaning and indoor air quality. However the underlying scientific principles have been around for more than a century. Photo-catalytic disinfection protocols have been in common use in hospitals and in the food processing sector for many years. More recently, photo-catalytic disinfection has been used as one solution to the ‘Sick Building Syndrome’, dramatically improving the levels of indoor air quality (typically through duct system installations).

The website of Penn State University School of Aerobiological Engineering¹ provides a good reference source of studies that deal with photo-catalytic applications (sometimes in conjunction with filtration) and systems design. The goal being to combat poor IAQ which would include, mold infestations and anthrax bio-terrorism. Through the ODOROX Generator, we have taken this proven and safe core technology and placed it into a practical, cost effective form that for the first time gives the user mobility and high-volume air processing/decontamination capacity.

HOW DOES THE ODOROX SYSTEM WORK?

The ODOROX approach is based on a rarity in the industry, hydroxyl generating optics that incorporates multiple defined zones within each. Each zone produces a different nanometer frequencies. The later is an important feature as this is how we ensure that no harmful ozone is produced (this may happen with single frequency optics). Another crucial component of the ODOROX approach is the addition of correct, air-handling capacity. This is achieved by the inclusion of high efficiency fans on portable units and optimal design criteria for engineered, permanently installed units.

ODOROX Hydroxyl Generator frequencies disinfect indoor air from bacteria, viruses and fungi (including mold spores). An optimizing, fully reflective tunnel, assures that there is maximum effectiveness of the reaction chamber that is used to neutralize these bio-hazards. There are established protocols to calculate the air speed, light intensity and exposure times for mold species within a given or designed air volume. This chemical-free disinfection/decontamination system leaves no byproducts behind. All mold spores and particulate are rendered inert and ready for capture in our custom filter blocks provided in our mold-abatement models.

Other frequencies deodorize by means of the production of a quick-acting, yet mild anti-oxidants. These anti-oxidants are injected into the air stream as they pass through the reaction chamber. The multinanometer energy serves as a catalyst to break apart ambient water

¹ www.engr.psu.edu/ae/iec/abe/index.asp

molecules. This process yields hydroxyls that react with the chemical bonds of more complex molecules in odorless gasses such as solvents and VOC's (volatile organic compounds). This process of photo-catalytic oxidation rids indoor air and porous surfaces (such as fabric, wood and cement) of volatile contaminants. One example is the aftermath of an indoor fire scene ... after ODOROX treatment; the sooty walls are rendered odorless. The more reactive (odor causing) hydrocarbon compounds have interacted with the airborne anti-oxidants, thus leaving behind only the mineral substrates.

HOW LONG SHOULD ODOROX GENERATORS STAY ACTIVE AT THE JOB SITE IN ORDER TO BE ASSURED THAT THE DECONTAMINATION CYCLE HAS BEEN COMPLETED?

For optimal results, ODOROX units need to be present on the job site as early as possible. We recommend four to five days of generator operation. We further recommend the use of more than a single generator per job. To further assist you, use auxiliary equipment, such as air injectors (for walls) or extra air movers; always reduce or remove the contaminant source as soon as possible.

The type and number of ODOROX Generators required for each kind of restoration work are as follows:

- The size of the area to be treated.
- Determine whether the source of contamination has been effectively removed or not.
- The contamination type-is it particulate or a gas? Filter or no-filter options.
- Odor intensity; if of higher intensity, utilize more optics.
- Odor age or persistence-accumulated, ingrained odors require more time and additional considerations.
- The configuration of the room or structures that may hamper efficient air flow-use multiple, smaller generators and auxiliary air movement.

ODOROX Manufactured by:

HGI Industries, Inc.

2055 High Ridge Road

Boynton Beach, FL 33426

www.hgiind.com

(877) 735-3701



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