Ozone vs. Hydroxyl Radicals and the FreshStart AOP

Efficacy & Safety in the Elimination of Pollutants

OZONE

Efficacy: Within normal ambient conditions, for ozone to be effective as a decontaminant to eliminate the viability of allergens, pathogens, viruses, bacteria, mold spores, and/or odors within less than eight (8) hours, ozone needs to be present in a concentration of greater than 10 parts per million.

A current OSHA regulation requires human exposure to be at levels below .05 ppm and has identified levels of .01 ppm as safe for up to 8 hours.

Ozone is not effective as a decontaminator at these levels of concentration.

The half-life (the time for an active agent's efficacy to be reduced by half) of ozone is 20 minutes. The half-life of hydroxyl radicals is 10^{-9} second (1 millionth of a second). Hydroxyl radical molecules are MUCH more active than ozone molecules (half-life is an indicator of activity – the more active the molecule, the faster it does its work). Hydroxyl radicals are much faster at breaking the molecular structure of pollutants and rendering them inert/non-viable/ineffective, and turning them into inert carbon and oxygen, with no negative impact on one's health or quality of life.

Think of a Pac Man analogy. If Pac Man is ozone, he takes a bite every 20 minutes. If Pac Man is a hydroxyl radical, he's taking a million bites every second, or gobbling at a rate 2 trillion times faster than ozone.

Safety: If exposed to unsafe levels of ozone over time (.01ppm or higher), people can develop asthma, COPD, and even pulmonary edema. Several companies have gone out of business because people were misusing their ozone generating machines and the machines were producing more than .05 ppm – possibly up to 8 – 10 ppm.

1. Hydroxyl Radical: highly reactive (unstable) and consequently short-lived neutral form of the hydroxide ion – an oxygen and a hydrogen atom held together by a covalent bond, and carrying a negative electric charge – existing in a gaseous (radical) state, i.e. outside a water state.
2. Hydroxyl: a chemical functional group containing an oxygen atom connected by a covalent bond to a hydrogen atom, a pairing that can be simply understood as a (stable) substructure of the water molecule – existing in a water state – liquid water or water vapor.
3 Other hydroxyl generation methods may create certain types of hydroxyl radicals but they would have little if any effect on pollutants outside their enclosed environment. Any pollutants that these hydroxyl radicals would affect would be only those pollutants that make their way into the enclosed environment and come in contact with them. The differences between using only ozone versus hydroxyl radicals in association with the *FreshStart* AOP are significant for both speed and efficacy of pollutant removal.

HYDROXYL RADICALS with the FreshStart AOP

Efficacy: The *FreshStart by Prompt Care*® Advanced Oxidation Process (AOP) is a unique method of distributive creation of hydroxyl radicals.

The patented *FreshStart* AOP creates a gaseous state of 3% hydrogen peroxide and brings the relative humidity (RH) of an interior space being treated to no greater than 98%. Introduced into this interior space is ultra-violet light (UV) at a 158 nanometer wavelength that triggers the dissociation of the H_2O_2, creating the most powerful type of hydroxyl radicals.

These hydroxyl radicals are created directly on pollutants, the hydroxyl radicals react with the pollutants (break down their molecular structure) rendering them inert/non-viable/ineffective, turning them into inert carbon and oxygen.

It is ONLY through this patented AOP that the creation of hydroxyl radicals can be distributed directly onto the surfaces of pollutants and not restricted to within the enclosed environment of a machine[3].

The *FreshStart by Prompt Care*® AOP is virtually unlimited in its effective coverage of both the air and surfaces of interior spaces, treating them within a matter of minutes to a few hours. Prompt Care, Inc. has successfully treated indoor spaces measuring over one million cubic feet.

Methods other than the *FreshStart* AOP require significantly more time (usually several days) to have any appreciable effect on the pollutants they are attempting to reach.

Safety: It is not safe for humans or any living creature with lungs to be exposed to hydroxyl radicals. Therefore, the patented *FreshStart by Prompt Care*® AOP[4] requires no human exposure during a treatment. Strict precautionary procedure is enforced to ensure that there is no human exposure during each *FreshStart by Prompt Care*® treatment.

4 Patent Process No. US 7,407,624 B2, using Patent Pending equipment App. No. 134/262,059, marketed as *FreshStart by Prompt Care*®

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