

# Greene Air Technology

## Home and Facility Sterilization

Question	Answer
WHAT IS OZONE?	<p>Ozone, sometimes called "activated oxygen", contains three atoms of oxygen rather than the two atoms we normally breath. Ozone is the second most powerful sterilize in the world and its function is to destroy bacteria, viruses and odors in nature. Interestingly ozone occurs quite readily in nature, most often as a result of lightning strikes that occur during thunderstorms. In fact that "fresh, clean, spring rain" smell that we notice after a storm most often results from natures creation of ozone. Ozone is also created by water falls. However, we are probably most familiar with ozone from reading about the "ozone layer" that circles the planet above the earth atmosphere. Here ozone is created by the sun's ultra-violet rays. This serves to protect us from the ultra-violet radiation. Additionally, each of us is exposed to high levels of ozone daily for short periods of time. This happens in heavy traffic conditions or during times when the weather forces the industrial gases to remain lower to the ground than is otherwise normal. The combination of these two factors can result in ozone readings as high as 4 or 5 times the "regulatory" levels for continuous exposure with absolutely no adverse affects as our exposure is for such short periods, and the ozone itself decays back to normal oxygen so rapidly.</p>
HOW DOES OZONE WORK?	<p>While ozone is very powerful, it has a very short life cycle. When it is faced with odors, bacteria or viruses the extra atom of oxygen destroys them completely by oxidation. In so doing, that extra atom of oxygen is destroyed and there is nothing left...no odor...no bacteria...no extra atom, only oxygen. In addition to the effectiveness of ozone, we also know that it is safe to use. We know this from our own safe exposures daily to ozone, weather, as noted earlier, resulting from being locked in traffic, or passing through industrial areas. These exposures have no effect on us beyond our acknowledging the unpleasant odor associated with this "filthy air". It is the very unpleasantness of this air that provides ozone with it's "built in" safety mechanism. Ozone is safe because we notice it's unpleasant odor at very residual levels. By residual we mean, the amount of ozone that is produced in excess of the required amount to eliminate whatever contamination that may be present in the room. This equipment, when installed correctly will not exceed government guidelines for continuous safe exposure. Even if installed incorrectly, ozone provides its own protection, as ozone warns us in a manner similar to smoke in a room. Ozone does this by becoming so offensive at 1.5 parts per million that we would not be able to stay in the environment for any more than a short period. This is much like what would happen if we entered a smoke filled room. However, while smoke might harm us, research has proven that such a limited exposure to such a low level of ozone would have no serious long term affect on us just as it does not affect us when caught in a traffic jam during rush hour. Carrying that example one step further, this equipment is incapable of producing ozone in sufficient quantities even if installed incorrectly and left running continuously, to cause any long term risks to your health even assuming that you could stand there and be exposed to it (remember the smoke example).</p>
HOW IS OZONE PRODUCED?	<p>There are basically two methods of producing ozone...ultra-violet and corona discharge. Most equipment in the past used the corona discharge method, simulating in essence, lightning. Equipment utilizing UV is now becoming the standard since new technology has allowed higher amounts of ozone to be produced using super HO tubes and new adjustable ballasts allow variable outputs with UV ozone. UV ozone is also the purest, most reliable, and have the least maintenance of any generator available.</p>

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<b>HOW LONG DOES THE OZONE LAST?</b>	As soon as ozone is formed in the generator and dispersed in a room some of it decays back into oxygen. This step occurs by several processes including the following: Natural decay (or reversion to oxygen) due to ozone chemical instability. Speeding up of the above process by the presence of such as walls, carpets etc. stimulating the decay process. Oxidation reaction with odor causing organic material, which removes ozone. Reactions with bacteria etc., which again consumes ozone by oxidation reactions. Additionally ozone itself has a half life which means that "residual" ozone created (extra unneeded ozone) will return to oxygen within at most 30 minutes, in amounts equal to half its level. What this means is that after each subsequent 30 minute period there would be half as much residual ozone left at the end of the period as was present at the beginning of the period. This is similar to a geometric progression of 16;8;4;2;1. In practice the half life is usually less than 30 minutes due to temperature, bacterial, and other contaminants in the air. Therefore, ozone while very powerful doesn't last long...just does it's job and disappears.
<b>WILL THE ODOR COME BACK?</b>	No. If ozone is applied properly it destroys (oxidizes ) the source of the odor. However, in the case of mildew the odor will return if you are unable to get rid of the moisture that is the source of the mildew
<b>HOW DOES OZONE HANDLE TOBACCO SMOKE?</b>	It eliminates the irritation caused by phenol gasses, by oxidizing them. Phenol gasses are the invisible part of tobacco smoke that causes such discomfort to one's eyes and create the offensive odors. Ozone rids any environment of the effects of smoke completely, rather than merely filtering out some of the visible particles like an "electronic air cleaner".
<b>WILL OZONE REMOVE STAINS AND NICOTINE BUILD?</b>	No, ozone will not remove the stains or nicotine build up. Ozone will deodorize and help to decontaminate the problem but will not remove the actual substance.
<b>WHAT IS THE RIGHT LEVEL OF OZONE</b>	The right level is when all the generated ozone is being used up accomplishing its job. However, this is difficult to obtain because it becomes a balancing act. Initially the machine's output is set high to get rid of the problem odor as quickly as possible. As this is being accomplished less ozone is required for the diminishing odor etc., thereby leaving some residual ozone in the air. If the machine output is not turned down after awhile then more residual ozone will be in the air. If there is a heavy smell of ozone, then there is more ozone present than is required to do the job. Simply turn the rheostat (output level control) down. This is a case where more is not considered better. Sales successes result when the dealer ensures that the results are what the customer expects. The most successful dealers usually install equipment on a trial basis and return to the trial location 24 hours later to ensure that residual ozone levels are not too high and that the customer knows how and when to regulate the machine to avoid a strong ozone smell.
<b>IS OZONE HARMFUL AND WHAT IF ANY ARE THE LONG TERM EFFECTS?</b>	Ozone has been known for almost a century now, so quite a lot is known about it. Several regulatory agencies, including OSHA - Occupational safety and health agency - have stipulated that the safe allowable level of residual is .08 ppm. based upon the historical safety of ozone. Note that this permissible level is for continuous exposure throughout an entire 8 hour day for 5 days a week. If anyone is exposed to that concentration of ozone, it is usually as the by product of an industrial process like arc- welding. The temporary affects of such a low exposure would range from headaches, to sore throats, irritation in the eyes, nose and the like, similar again to what we

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would experience in a traffic jam.