

Ozone Generator Problems – Part 2 (Backflow Prevention)

Welcome back to ozone problems. It has been a long time since most of you read the last article (Ozone Generator Problems – Part 1 (Air Preparation)) and I wanted to give a quick update on that before starting on the backflow prevention problems.

Being with a company that deals with your problems on a day to day basis we like to attempt to communicate these as we find out about them. We want to be at the forefront of problems and not being reactive to them.

One of the more recent issues with air preparation systems are when a pressurized feed gas source is feeding a vacuum fed ozone generator. By this we mean an ozone generator that operates under a vacuum condition (using an injector) although the air dryer or oxygen concentrator requires pressure. We have seen systems in which the vacuum on the ozone generator extends back to the air/oxygen system and causes failure on this device. *Operating the air dryer(oxygen concentrator) under a vacuum condition will cause failure of the ozone system.* A pressure swing dryer or oxygen concentration media utilizing a molecular sieve material is designed to absorb nitrogen “under pressure”. When the pressure is lost so is its ability to work. Some sort of vacuum break (valve) is required between the air source and the vacuum ozone generator. This valve MUST have pressure/compound gauges before and after it to ensure that both sides (air preparation equipment and ozone generator) are in the environments they want.

Backflow Prevention

The second major cause of problems with the ozone generator (again the first on is air preparation) is having water get inside the “lightning storm in a can”. We go to great lengths on the air preparation to ensure we have a dew point of – 80° F going to the ozone generator. The dryness of the air ensures a reliable efficient ozone production. In this nice dry environment we have an electrical discharge (lightning storm); NOT a good thing for a drop of water. The water will eliminate the dryness, cause a tremendous amount of heat, glass breakage, do we need to continue? Let’s just leave it at AVOID getting water into the ozone unit.

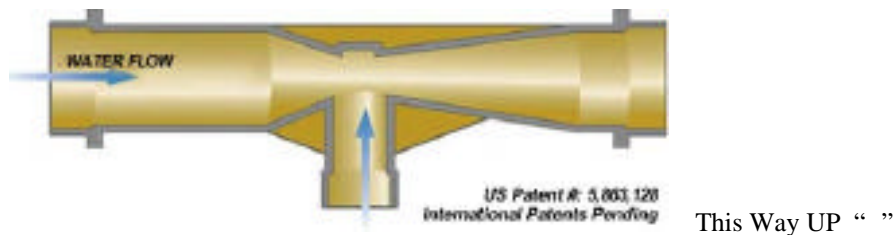
Now that we have identified the problem of keeping water out of the ozone generator we have to ask ourselves how do we do this? Systems 10-15 years ago utilized stone diffusion (yes remember those aquarium stone type diffusers?). The gas from the ozone generator would travel up 15-20’ (above the water level in the contact tank) and then back down into the distribution network of stones in the bottom of the water tank. This hydraulic loop prevented water from getting back to the ozone generator.

Today, we mostly all utilize Venturi Injectors to inject the ozone into water. The injectors are more susceptible to the potential of water backflow than the good ole days of the hydraulic loop “static system”. The injectors operate under a “dynamic” condition

in which water pressures before and after the injector affect the gas suction and thus the potential for water to flow to the ozone generator.

As most systems today utilize injectors we need to figure out how to protect ourselves. The simplest way is with a simple spring check valve. These are typically installed in most injectors you buy. They consist of a Teflon ball with a spring. The Teflon ball creates the “seal” while the spring provides the force to keep the ball sealed “closed”. These springs usually sealing pressure of around ± 1 psi. When the pressure difference between where the ozone gas is coming (ozone generator) and water stream is great the check valve works great. The problem occurs when the pressure differential is minimal (in the 0-1 psi range). Water will seep across the check valve and eventually find its way back to the ozone generator. Once the system is up and running the vacuum created during normal conditions will pull this water back into the water stream.

INSTALLATION TIP: As the spring and ball close the check valve, the injector should be installed with the gas suction port facing vertically down (with the suction port facing towards the ground). This best utilizes the force of gravity and is the best way to avoid the faulty check valve.



Multiple check valves should always be installed in injection type ozone systems. The injector should have a check valve, and the ozone generator gas discharge should have a check valve AT A MINIMUM! The more the better...just like beer.

Check valves are a deterrent not the solution. Over time they all will fail. So what to do? How do we devise this super safe ozone unit? “Super Ozone Condom” is the solution according to Courtney (last name held private).

There are devices that provide a multiple barrier device to prevent water from backing up to the ozone unit. These devices provide a way to monitor this gas line between the ozone generator and the contact device and ensure that any water that is detected in the line GET NOTICED and ensure something is done about it. It is like that dude who noticed the hole in the dam. He stuck his finger in it to keep the water from flooding the town. If we could find someone like this they would sit and watch the gas line 24 hours a day. When they notice water in the line they would close a valve to protect the ozone generator. Simple huh?

There are devices that can do this monitoring. A valve can be made to close when the following happen:

1. Water is detected in the ozone gas line.
2. No gas is fed to the ozone generator
3. Power failure
4. Ozone Generator Failure (Please Help Me – Shut the Valve)

All of these conditions leave the ozone generator susceptible to water attack. These components of the active backflow are multiple barriers to the problem. Again, the more barriers the safer the ozone generator and less likely chance you will have to call us to discuss water in your ozone unit.



“Typical Backflow Panel”

If there are any questions or we can provide any additional information on anything related to this article please send an email to [“overby@ozonewatersystems.com”](mailto:overby@ozonewatersystems.com)

Stay tuned for part 3 – Ozone Control Interlocks.

P.S. “Yard Sale”

By the time this is published we (www.OzoneWaterSystems.com) are going to have a website that you can log into and trade/barter/sell/buy all the equipment you have and aren't using. This will be a FREE site. The intent of the site will be an "E-Bay" type of site that will allow you private access amongst one another. Please stop by, register, and start swapping stuff.