

DESIGNING AN OFF GAS VENT OZONE DESTRUCTOR

The use of ozone in potable/process water and wastewater treatment requires appropriate contact times for ozone reactions in the water/wastewater. In most of these applications you require a contact tank, either built in SS for smaller applications like potable water and process water or in concrete in larger applications like in waste water treatment. During ozone contacting in the contact tanks, ozone gas can get stripped from solution and escape through the vent of the contact tank. This escaped ozone gas need to be neutralized to avoid toxic gas accumulation in the plant room or in the vicinity of the contact tanks.

Vent ozone destructors for SS tanks: These are for smaller applications where the capacity of the ozone contact tanks varies from 3 KL to 30 KL total capacity. It is normal to incorporate in the design of these contact tanks off gas vent that facilitates tank breathing during filling and emptying. The size of these vents is in accordance to the capacity of the contact tank.

For ozone contacting, the contact tanks should have 2 vents of appropriate size – located at 180 degrees apart. It is in one of these vents that you fix a well designed vent ozone destructor, suitable to handle the air that is drawn into the tank during emptying of the tank. The air drawn will sweep across the inside of the tank and remove all the ozone gas inside the tank and destroy the same when passed over the vent ozone destructor. A wrong design of the vent or the vent ozone destructor can cause an implosion of the SS tank. The SS tanks can be totally destroyed when it collapses. If the ozone destructor is not designed well ozone gas can leak inside the plant room or around the contact tanks.

Vent ozone destructors are of 2 types .The thermal ozone destructors utilize heat to destroy ozone. The temperature that has to be reached for 100 percent ozone destruction within a few seconds would be as high as above 250°C. This is very challenging as the surface of the destructor gets extremely hot and effective control of the temperature rise assumes importance. The power requirement will be sometimes more than the power required for the ozone production. Thermal type vent destructors are not very common for small applications and are very difficult to source. Few reputed companies manufacture larger thermal type but they are very expensive and high on operation costs.

The catalytic ozone destructors are most common and very reliable. They are easy to install, operate and maintain. They contain specialized catalysts that

have proven record of destroying ozone. This catalyst lasts a long time (3–4 years) if the ozone destructors are designed well.

Carbon must not be used as vent ozone destructor catalyst. It has been noted that many small timer ozone manufacturers design their own vent ozone destructors and use carbon media to destroy ozone off gas. This is not advisable. Carbon media is used to remove ozone only from water and not from off gas. Carbon media if used as catalyst in vent ozone destructors can produce Methane gas which is more toxic than ozone. You are replacing one toxic gas with another. More over adsorption of ozone is an exothermic reaction and the heat produces can cause explosive mixture with methane gas.

Catalysts used in vent ozone destructors have to be used carefully. They are poisonous and so the design and the installation of the vent ozone destructor should prevent this catalyst of falling into the tank when they crumble. Moisture from the ozone tank can clog these catalysts, and prevent tank breathing, causing implosion of ozone contact tanks. The ozone destructor design must prevent crumbling and clogging of the catalyst, enable free tank breathing.

Vent filters must be ozone resistant and made of Teflon preferably. They need to be changed once in 6 months as Teflon also tends to become brittle over time.

Large vent ozone destructors for concrete tanks normally have in built demister and blower to ensure the air is stripped of moisture and the blower allows continuous flow of air through the vent ozone destructor. This ensures longer life of the catalysts.

Water treatment consultants who recommend ozone need to exercise these cautions and explain these intricacies to the end user. They are best advised to source well–designed ozone destructor from a reputed manufacturer instead of recommending cheap, ill–designed vent ozone destructors that are bound to put the end user in deep trouble.

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