



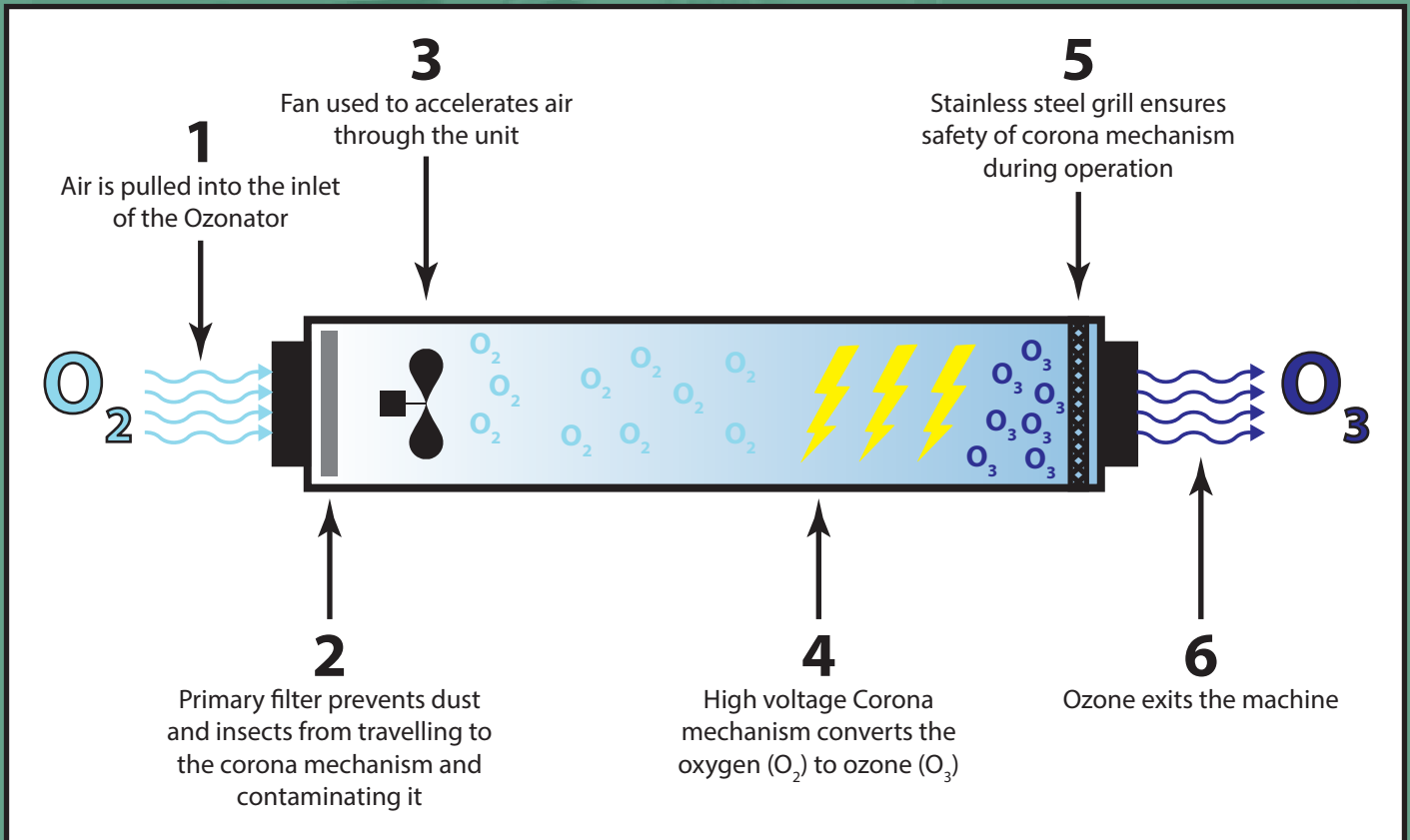
KANKU KENYA LTD
WATER, CHEMICAL & ENERGY SPECIALISTS

AQUA OZONATOR



OZONE CHARACTERISTICS AND FORMATION

Ozone is a triatomic allotrope of oxygen and is formed through the recombination of oxygen atoms. In the atmosphere, ozone is formed naturally under high pressure and temperature conditions such as lightning and thunderstorms. Synthetic ozone is created by applying the same principle under a process called the Corona Discharge Process.



Ozone is a colourless gas with a mild odour detectable at very low concentrations. It is approximately 3,000 times more powerful at oxidising compounds than chlorine. This powerful oxidising property enables ozone to be a highly effective disinfectant, deodoriser, decolouriser and oxidiser.

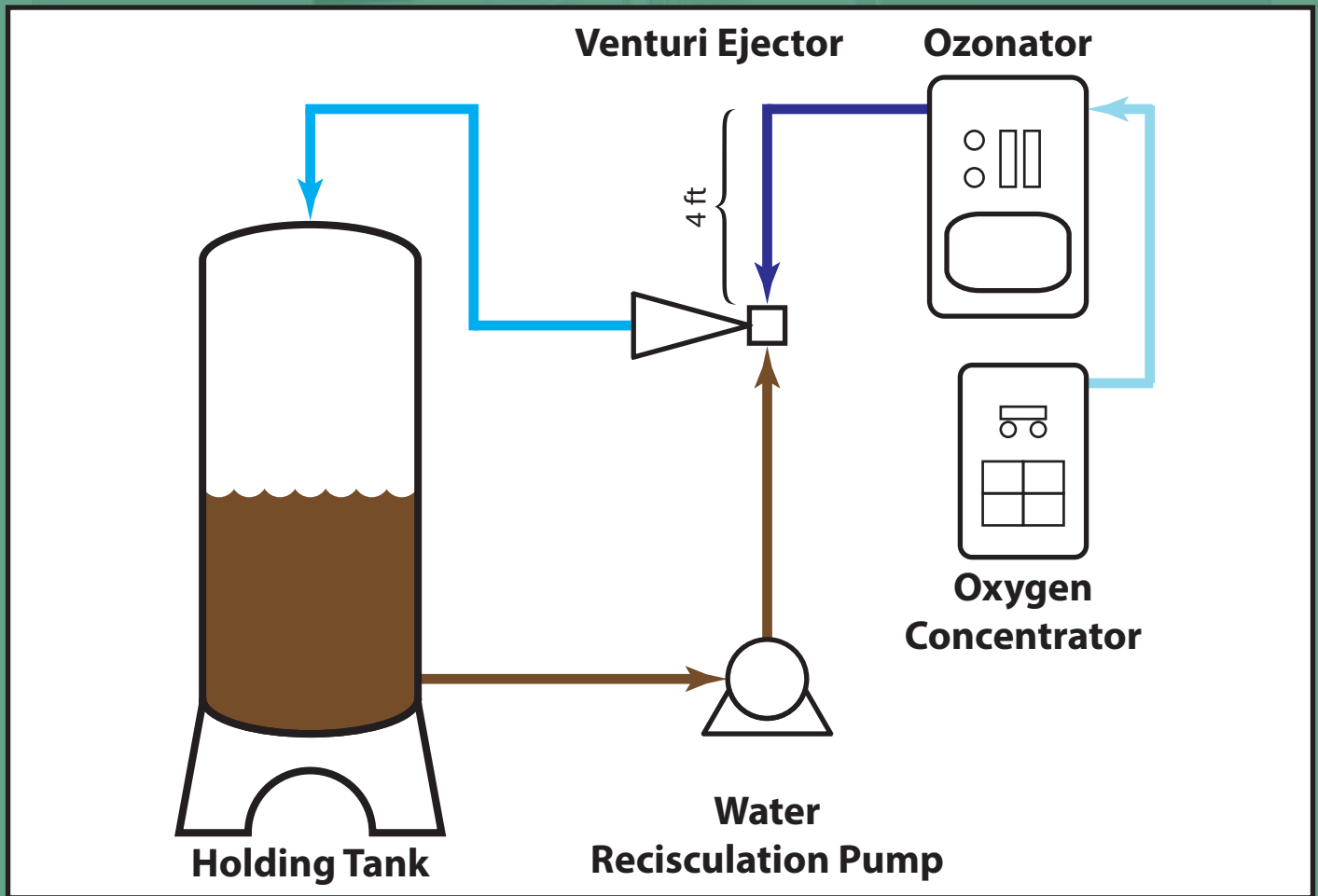
How OZONE WORKS

Ozone has strong oxidising properties. It reduces itself to oxygen gas leaving behind a nascent oxygen atom. This oxygen atom is the key oxidising agent and can oxidise the cellular structure of micro-organisms thereby rupturing them instantly unlike the slower effects of chemical disinfectants. It can also oxidise chemicals compounds into non-harmful components.

Ozone application for water treatment works in a similar fashion. The stray oxygen atom causes oxidation of harmful compounds such as salts, colloids, dissolved ions whereby they lose electrons and convert into their individual components.

OPERATING THE AQUA OZONATOR

The diagram below shows how to use the Aqua Ozonator. First the oxygen concentrator and ozonator produce ozone. Using a submersible or external pump, a stream of the effluent is extracted from the holding tank. These two streams; the ozone and effluent are mixed together in a venturi ejector whereby a vacuum created ensures thorough mixing. Ozone stream must be introduced into ejector from a minimum height of 4 feet so as to prevent backflow of mized streams into ozonator



The clean water is now returned to the holding tank. Over time, the effluent in the tank is converted to clean water.

BASIC MECHANISM

- Oxygen concentration
- Ozone generation
- Effluent recirculation stream
- Mixing at venturi extractor
- Effluent converted to clean water over time

APPLICABLE INDUSTRIES FOR OZONATOR

- **Agricultural Industry** - Pretreatment of irrigation water for farming, Decolourisation of process water from industry, Sterelisation of water for Abattoirs where process meat requires cleansing
- **Commercial Applications** - Sterelisation of process water commercial establishments such as restaurants that need clean water for cooking etc
- **Residential Applications** - Sterelisation of water for drinking purposes in residential establishments

ADVANTAGES

- Chemical Free
- Simple operation
- No moving parts
- Low maintenance
- Low operation cost
- Highly Effective Disinfectant
- High oxidation properties
- Reduced health risks

PRODUCTION GUIDE

- **Oxygen Generator** - The Oxygen generator takes in air and uses a physical separation process to single out oxygen gas which it ejects through the outlet. There are a number of features on the oxygen generator.

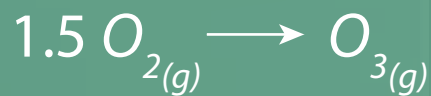
On/Off Switch - This is used to switch the machine on or off. Care must be taken when switching off the machine as there needs to be a time gap of 5 minutes between cycles of turning the machine on and off.

OK light – If the machine is functioning properly, then the “OK” light will be on. This is a sign that there are no leakages within the machine and that proper flow of oxygen gas has been enabled.

Alarm Light – This light will go off when there are problems within the oxygen generator. Problems could include leakages, compressor malfunction among others. A thorough assessment of the unit by an authorised personnel will enable for a proper diagnostic of the problem at hand.

Flow Meter – This is essentially the control of the machine. By opening and closing the valve on the flowmeter, one is able to correctly control the amount of oxygen that is being produced by the generator. The unit of flow is in Litres/Minute.

- **Ozone Generator** - The basic mechanism of Ozone generation has already been discussed earlier within the brochure. Below is a chemical representation of the process that oxygen undergoes to produce ozone gas



The Above equation shows that for a mole of ozone gas to form, it requires one and a half moles of oxygen gas to react together. Therefore, the amount of ozone generated is directly dependant on the amount of oxygen that is fed into the feed stream of the Ozonator.

Cooling Water In – This is where cooling water to keep the machine from overheating is introduced

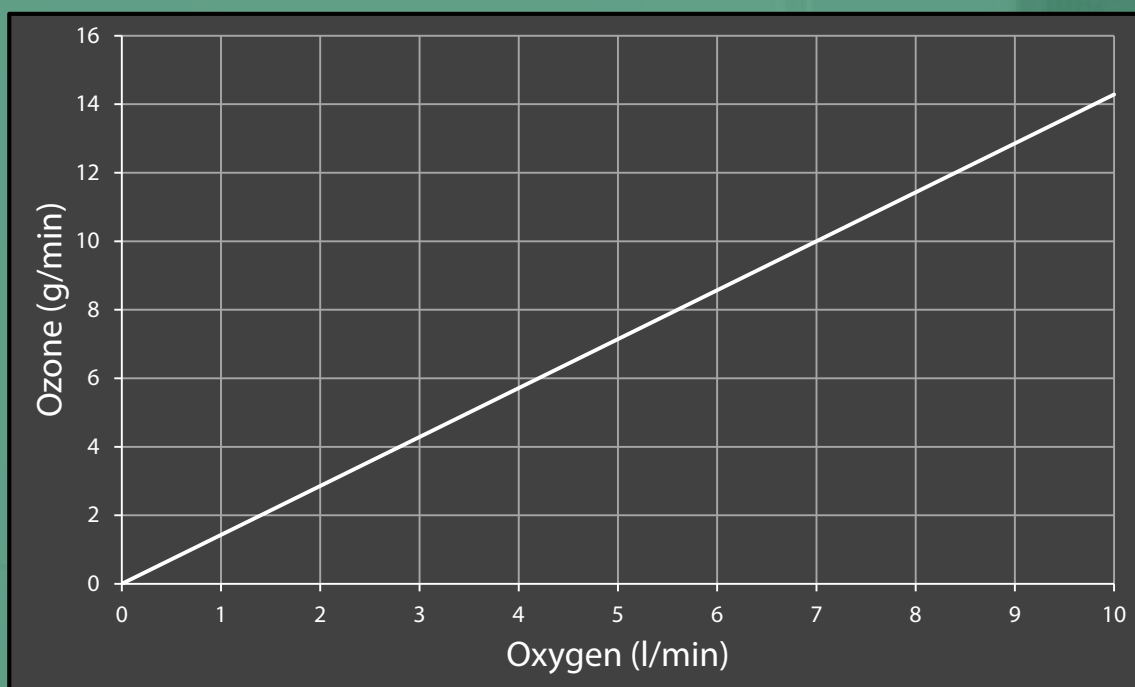
Cooling Water Out – This is where water from the cooling circuit exits the ozonator

Oxygen / Dry Air Inlet – This is where the oxygen produced by the oxygen generator is introduced into the ozonator

Ozone Outlet – This is where the ozone generated within the machine is ejected from

Digital Meter – This meter measures the amount of current flowing within the ozonator. Any fluctuations or decrease in current flow can help point to potential ozone production problems

Flow meter - This is essentially the control of the machine. By opening and closing the valve on the flowmeter, one is able to correctly control the amount of oxygen that is being introduced into the ozone generator. This in turn controls the production of ozone gas. The chart below gives a description of the relation between ozone gas production and oxygen feed flow.



SAFETY PROCEDURE

Generally the ozonator and oxygen concentrator machines are not dangerous to operate. Below is the start-up and shut-down procedure for ozone production

● Start-Up

Switch on the water cooling circuit on the ozonator. Water pressure should be minimal as large pressure stream is not required in cooling circuit

Switch on the oxygen generator and set the Flowrate to desired amount

Switch on the ozonator and set inflow of oxygen to match the outflow of oxygen generator

Introduce the ozone stream into the venturi ejector for treatment of water/effluent

● Shut-Down

Switch off the ozonator

Switch off the oxygen generator

Wait for 10-15 minutes for pressure within the ozonator and oxygen generator to disperse

Switch off the cooling water cycle after step 3 above has been fulfilled

● General Procedures

Ozone gas is toxic and should not be inhaled for extended periods of time. Personnel working in close proximity of ozonator should wear protective masks while doing so. Keep the machines in a cool & dry place as moisture will affect circuitry of the device.