



OZONE TREATMENT FOR RAW WATER IN PHARMA

ABOUT US:

ELTECH OZONE PVT LTD is the group company of ELTECH ENGINEERS PVT LTD, established in 1992. Eltech Ozone Pvt Ltd is an ISO 9001: 2015 and CE certified Indian Company manufactures different types of Ozone Generators from 1gm/hr to 2 kg/hr.

OZONE TREATMENT FOR RAW WATER:

Ozone treatment for raw water in a pharmaceutical water system is primarily used as a pretreatment step to ensure the microbiological quality of the incoming water before it undergoes further purification processes such as filtration, reverse osmosis (RO), or deionization. This method ensures that microbial contaminants and organic compounds are minimized early in the water purification process.

Why Ozone is Used in Raw Water Treatment for Pharma:

1. Microbial Control:

- **Disinfection:** Ozone is highly effective against a wide range of microorganisms, including bacteria, viruses, fungi, and spores. It ensures that raw water entering the treatment process is free of microbial contamination, reducing the microbial load on downstream purification systems.
- **Biofilm Prevention:** Ozone helps prevent the formation of biofilms, which are colonies of microorganisms that can grow on the inner surfaces of pipes and tanks, causing contamination issues later in the system.

2. Oxidation of Organic Matter:

- Ozone oxidizes organic compounds present in raw water, breaking them down into simpler, less harmful forms. This process helps in reducing Total Organic Carbon (TOC), which is important for maintaining water quality in pharmaceutical processes.
- By oxidizing dissolved organic matter, ozone also reduces the potential for microbial growth, as organic matter can serve as food for bacteria and other microbes.

3. Prevention of Fouling in Downstream Processes:

- Ozone treatment reduces the fouling of filters, membranes, and ion exchange resins in subsequent purification steps like reverse osmosis (RO) or ultrafiltration. By controlling microbial growth and organic matter, ozone minimizes the need for frequent maintenance or replacement of these purification components provided UV or SMBS dosing to nullify is considered.
- It also helps extend the life of the RO membranes by reducing biofouling and the accumulation of organic substances.

Ozone Treatment Process for Raw Water::

1. Ozone Generation:

- Ozone is generated on-site by an ozone generator, typically using air or pure oxygen as the feed gas. The generator uses electrical energy (corona discharge) to convert oxygen (O_2) into ozone (O_3).

2. Ozone Injection into Raw Water:

- Once ozone is generated, it is injected into the raw water stream using an ozone contactor or diffuser. This ensures the ozone is thoroughly dissolved in the water to maximize its contact with contaminants.

3. Reaction Time (Contact Time):

- Ozone must have sufficient contact time with the water to effectively disinfect and oxidize organic matter. The design of the contactor or treatment tank is critical to ensure that water remains in contact with ozone long enough for the disinfection and oxidation reactions to occur.

4. Monitoring and Control:

- Ozone concentration in the water must be carefully monitored to ensure optimal disinfection without overdosing. Excessive ozone can be harmful to downstream processes and equipment, so ozone dosing is precisely controlled.
- After the ozone has completed its disinfection and oxidation tasks, it quickly decomposes into oxygen (O_2), leaving no harmful residues. This ensures that the treated water remains safe for pharmaceutical use.

5. Ozone Destruction:

- In some cases, residual ozone must be removed from the water before it enters sensitive downstream processes (e.g., RO membranes) to prevent damage. This can be achieved by using ultraviolet (UV) light, which breaks down ozone into oxygen.

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Benefits of Ozone Treatment for Raw Water in Pharma:

- Effective Disinfection:

Ozone is one of the most powerful disinfectants available, capable of killing microorganisms much faster than chlorine or other chemical disinfectants. It is particularly effective against chlorine-resistant pathogens such as Cryptosporidium and Giardia.

- Reduction of Chemical Usage:

Ozone is a non-chemical disinfectant that does not leave harmful by-products or residues in the water. This is particularly advantageous for pharmaceutical applications where chemical contamination must be avoided.

- Biofilm and Organic Contaminant Control:

By oxidizing organic matter and preventing biofilm formation, ozone enhances the overall water quality and minimizes the risk of contamination in downstream processes.

- Environmentally Friendly:

Ozone is environmentally friendly as it breaks down into oxygen after its disinfection action, leaving no harmful chemicals in the treated water or the environment.

CLIENTS:



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O3 FOR RAW WATER

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