

OZONE DESIGN

Thumb Rule of Ozone Dose

Ozone is an exceptionally powerful oxidizing and disinfecting agent. It is fast, reliable and eco-friendly. As with all good technologies, capex has been a great stumbling block for a wider usage spread. The cost of an ozone system will be totally dependent on the design of the system. Lack of design knowledge could increase the cost of ozone system manifold. Many consultants, water treatment specialists have a similar opinion.

Beginning this article, we shall try to address each and every aspect of ozone application that could increase/ decrease the cost of application.

Ozone Dose

This is the mother of all design criteria. Knowledge of ozone dose/ concentration required could well determine the overall costs of the applications. Off course, the ozone dose will depend a lot on the flow of liquid/ batch size/ quality of the liquid/ results required, etc, but there is always a thumb rule criteria that is available for all ozone applications. This thumb rule criteria will help the consultant/ prospective user to evaluate his requirement, availability of funds/ and comparing the same with other technologies. Many a times, ozone is thrown away, when the inaccurate design makes its overall invest costs prohibitive when compared to other viable technologies available with the consultant.

Most often, higher doses are suggested to compensate the deficiency of the ozone generator to produce the suggested quantity of ozone for the application. By having some knowledge of the does required, a prospective user would be able to evaluate the system and choose a correct design to minimize the cost of the whole ozone system.

S. No.	Ozone Application	Thumb Rule Dose	Contact Time	Remarks
1	Municipal Water			
	Pre Ozonation	1 gm/M ³	2-3 mins	
	Inter Ozonation	1-2 gms/M ³	4 mins	
	Iron/ Manganese Removal	0.5 gms/M ³	1 min	Depends on Iron Content
2	Potable Water	1-2 gms/M ³	2-6 mins	
	RO Permeate	1 Gms/M ³	1-3 mins	
3	Packaged Water	1 gms/M ³	On line	
4	Swimming Pools	0.2 to 0.3 ppm of recirculation flow		1ppm International Standards

6	STP Water	5-10 ppm	15 mins	Depend on TSS
7	ETP Water			
	Color Reduction	100-300 ppm	30 mins	Depends on Color Content
	COD Reduction	1-2 grms/gms COD	20-30 mins	Depends on Type of Effluent
8	Cooling Towers	0.2-0.4 ppm Recirculation Flow	On line	Depends on Makeup Water Quality
9	Ozonolysis	Specialized Process		Consultant Recommendation
10	Pulp Bleaching	Specialized Process		Consultant Recommendation

Table 1: Thumb Rule Ozone Dose for Various Applications

You can determine the total ozone requirement based on the above thumb rule dose that will more or less be accurate. Exceptions are always there, depending on the quality of the water and the result level accepted for the process.

How to exercise caution:

- ▶▶ Know what you exactly want from the ozone application.
- ▶▶ Consult and obtain an ozone process design suited to the application.
- ▶▶ Verify ozone dose recommended, if required cross check with consultants.
- ▶▶ Select a suitable ozone generation system and accessories to go with it.
- ▶▶ Ensure that the capacity of the ozone system matches the required ozone with a 10-15% more ozone production.
- ▶▶ Insist on ozone test certificate for confirmation of the capacity. This will protect your interest and drive away fly by night ozone vendors.
- ▶▶ Insist on process guarantees.
- ▶▶ When you request for competitive quotes, do not request quotes on ozone generators alone, but obtain quotes for the entire process. This will avoid overdesigning of ozone requirement by some vendors to protect delivery of systems that do not generate required ozone production.

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