

TENDERING AN OZONE SYSTEM - WHAT SHOULD BE CONSIDERED?

By Shreyas B



Ozonation is relatively a new technology. Ozone is being proposed regularly in most water and waste water treatment to meet the very stringent environmental controls.

Architects, water and wastewater consultants, MEP consultants, chief engineers, project heads of governmental bodies - all require various inputs to come out with a correct and optimum tender specifications that will allow the user to choose the best, the most economical and the most reliable and efficient system. Often, the exercise is one of a cut and paste mode that probably compromises critical technical specs so importantly required for that project. Often, more importance is given to details that may not even be of any importance to the project, escalating the costs of the project. Mostly this substandard tendering of an ozone system is due to ignorance and hesitance of the consultant to seek technical support and most of the time by willful wrong guidance from irresponsible manufacturers with vested interests. The result, cost escalation, compromised engineering, with end users ending up with unreliable systems and facing the probability of failures. This probably is true for all technologies, but when the options are few, risks are greater. www.otsil.net

Most Critical Aspects of Ozone that Need to be Considered While Tendering

- ▶ **Qualification Criteria:** With mushrooming of ozone manufacturers in the country, this is very important. Many companies do not have expertise in some applications. Deciding the qualification criteria, it is very important to ensure that the client gets the better and more experienced vendor. Restriction of vendor should be based on experience of the company, reference base, service availability, financial strengths and reliability. Care is to be taken not to restrict vendors in such a way that the tender provides undue advantage to a particular vendor. All such criteria should be removed to make the tender more competitive. The qualification criteria should place on even keel all the prospective vendors who have similar capabilities, financial strengths and experiences. This gives a relatively large prospect for the project to succeed in the long run.
- ▶ **Know Your Application:** How important this is, you will understand from the fact that out of 10 large projects (ozone above 250 grams), there is a likely hood of more failures than application successes. Ask any

client that you know of, who has used this technology, he will vouch for this. There is no point concluding that ozone is inefficient, ozone is a failure etc, the main reason is there is an application flaw. Look away from India, than this percentage is almost 100 percent. So, for ozone work, you need only that, to get the right person who can help you out with correct application techniques. Do not leave the selection of the ozone dose with the vendor, as this will unnecessarily raise controversies and make it difficult for you to decide. Do all your home work before you decide on the tender specifications.

- Know what ozone is expected to do for you. Work out the doses, concentration, the mass transfer devices only based on this. Decide where you want to locate the ozone injection.
- Have a flow sheet of the process ready in detail. Cross verify the process details with more ozone manufacturers. Ask as many questions you want and access the authenticity of the answers based on your experience, work out your process specifications based on these information on process. Not considering these will have severe repercussions on the performance of ozone.

THIS ARTICLE DISCUSSES SOME IMPORTANT ASPECTS OF OZONE TECHNOLOGY THAT NEED TO BE CONSIDERED WHILE TENDERING AN OZONE SYSTEM.

- Simultaneously have some details on alternate technologies available. Sometimes it may be better to combine ozone with classical technologies to better the performance and at the same time reduce the cost of applications

» **Know More About the Ozone System:**

Being ignorant on what an ozone system is all about, could put you in lot of trouble. Simple knowledge on the working of an ozone system can save you lots of hassles later on. You can economize the application costs by spending little time on this.

- In deciding the spare capacity, you will realize that sometimes if reliability is proven, you do not even have to consider a spare ozone system. Imagine the savings you can bring about. If the manufacturer can provide you a service network, and guarantee high ozone availability, you do not need spare. There are Indian examples that even in process industries running 24x7, no ozone spares have been considered and risk has been minimized by increasing the reliability factor.
- Modular systems often do not provide high ozone availability as claimed by many manufacturers. It is the reliability of the entire system that often counts. When a process requires 12 kg ozone, having a modular system, to provide a 2 kg spare is not a viable proposition. The risk of multiple modules failing is as great as one failing. The more common spare design for ozone capacities around the world is normally 100% X 2, or 25% X 5 or 50% X 3. A 10% X 11 spare design have a higher risk factor, higher maintenance costs, higher footprint and higher operation costs than a 2 x 100% design. Spare designs are not decided on capabilities of the manufacture to provide single large systems.
- Knowing about ozone system can most of the times enable you to access the total operation costs of the system. A judicious choice of ozone concentration can bring about a total reduction of



Inside an Ozone Generator

CAPEX, OPEX and application ease. Most of the ozone mass transfer choice is selected based on these attributes.

- Do not waste too much time on ozone hardware specifications. You will notice that most of the ozone generators have different hardware specifications and no ozone generator is the same. So by going too much on the construction of the hardware like transformers, converters, and dielectrics would be a total waste of time. What that is essentially required is to judge how the individual components would affect the performance of the ozone generator and the operations costs and compare them with other manufacturers. If you specify the construction of an ozone generator, than you are limiting your choice as no one will be able to match this. Matching construction details need not be necessarily the best for the client.
- » **Know Well Who Your Prospective Vendors Could be:** Obviously this is the best way to judge and evaluate the prospective vendor. How do you evaluate the process, the ozone system and the vendor?
- **Vendor Profile:** Build a database of the vendor. The more number of

years the vendor is in business the more experience he is likely to have on ozone. Small time players are not fit enough for large projects since they would lack the experience. Knowing about ozone does not mean enough experience. Experience in ozone means the references the manufacture has. The more references he has the more experience he would be having. The more experience the vendor has on different ozone applications the more knowledgeable he would be. Often repeat customers are an indication of a good vendor.

- **Experience in One Application Does Not Mean Experience in Another:** Different application, this is a common mistake made by many clients. Ozone experience in one application does not mean the vendor has experience in another application. All parameters are different from application to application, ozone chemistry changes and so does application methodology.
- **Very Often Clients Check Up and Seem to prefer on Local Experiences of Supplier:** For ozone projects, this is often a stumbling block for a better and more experienced vendor. For example, a sewage treatment in India is similar to a sewage treatment



Ozone Generator with an Oxygen Plant and Chiller System

anywhere around the world. Chemistry is the same and so application is similar. So, not having application references locally is not a disqualification. What that should bother the client is reliability of the equipment, experience in similar operating environment for example (hot and humid conditions differ from cold and snowy conditions), operation and maintenance costs, availability of service network and most importantly the credibility of the manufacturer.

- **Consider Total Costs:** Operating and maintenance costs play a very crucial role in any ozone project. While providing basis of evaluation in a tender it is very important that the total costs are considered to decide on the vendor. For example, an ozone system total cost includes cost of ozone generator, costs of oxygen plant, costs of chiller plant, power costs for ozone production, power costs for oxygen production, the power costs for ozone injection, cost of annual maintenance of the ozone and oxygen system, costs of replacement of dielectrics, cost of spare parts of the ozone system. If the project vendor is decided only based on the cost of the equipment, there is all likely hoods that the client is likely to spend enormous money of operation and maintenance costs. A good technical bid will comprise of evaluating the whole ozone system

in its totality, including all accessories, spares and annual maintenance costs. This is important since once a vendor is selected for ozone, it is a marriage for life and there can be no divorce.

Caution

Do Not Cut and Paste Specifications: Often tender specifications are available over internet and in some companies' websites. Specifications are available in past tenders. Tender specifications need to be precise, in tune with the requirement of the project and cutting and pasting available information on specifications would result in wrong design, increased costs and may be application failures. Overall costs could make the project non-viable. During engineering client can experience demands for changes due to wrong specification and design and this would be responsible for delays, cost overruns etc. Clients' best bet will be to approach knowledgeable ozone experts and seek advice and directions to proceed, obtain the right design, equipment specifications. This will also hold good while preparing a DPR.

Spare Design

Spare design could increase overall costs multifold. A prudent detailed project report should provide engineering standards that provide limited risks of shutdown of the process. No projects can be economically designed for 100 percent risk of breakdown. In that case all equipments must have 100 percent spare capacity. 100 percent spare capacity is normally recommended in equipments

that have moving parts and if the equipment is crucial for continuous performances. Often 100 percent spare design can be avoided by recommending reliable equipments and vendors. Spare design can be optimized if the equipments are easy to service, if the service network of the vendor is proven and spare parts are available locally. Pay a little extra for a reliable equipment and vendor is much better than increasing the reliability by providing 100 percent spare capacity.

Recommending modular ozone system does not ensure 100 percent reliability as if one modular can fail, many can also fail. It is the overall reliability that needs to be keeping in mind. That is why knowing the vendor, availability of local service network and spares can all go to lower the CAPEX. Visiting the manufacturing premises of the prospective vendors, discussion with the engineering team, personal visits to installed projects of the vendor, talking to the end user, conducting a due diligence on the vendor and their operations, all provide vital information that makes decision making easier and more accurate. Ozone would then become comparable to other technologies in terms of CAPEX and OPEX and would find wider uses.

About the Author

Shreyas B is one of the Directors of a Chennai based Ozone company OTSIL. Shreyas joined OTSIL after his basic engineering and chemistry degree from BITS Pilani. Shreyas is also an Alumni of IIM Ahemadabad. He had his training from his father Mr. V.Baratharaj, who has 25 years of ozone experience and is one of few ozone specialists in India.

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