

We bring you this special column each month on various aspects of ozone technology. This column is actively supported by Ozone Association of India. Today ozone technology is increasingly becoming an integral part of most water treatment applications and yet very little information is available on it. Therefore, we aim to try and bridge this gap for the benefit of the water technologists and create an increased awareness on the advantages of using this "green" technology. For membership, readers can contact Ozone Association of India. To get solutions from ozone experts, send your ozone related enquiries to us at content@eawater.com

Plastics & Ozonation

Ozone applications are increasing in India. Numerous such instances have been noticed where applications are decided without due consideration given to the materials of construction. We are providing here some information on plastics and ozone's effect on them. Two groups of plastics are discussed here - plastics termed as Thermoplastic Materials and other group of plastics is the Thermosetting Plastics. They find numerous uses in the industries and each type of plastic is used for different purposes, dependant on the physical and chemical properties of each.

The effects of ozone on each of these materials will depend totally on the configuration of the polymers that make up the plastics. Crossed linked plastics such as poly propylene, poly-ethylene, poly-vinyl chloride and silicone or fluorine combined plastics are sufficiently impervious to ozone to enable their use in direct contact. Most of the mineral water plants all over the world use plastics in some form or the other and the knowledge of each of these will help understand the likely effects with the use of ozone.

From a careful study of different kind of plastics, some forms of polymers are readily attacked by ozone and are not recommended, there are other forms which are quite resistant and take a longer time for effects of ozone, while others are attacked immediately and not recommended.

For example, Silicon and Teflon are some materials that are used safely with ozone. However, the long terms effects of these are normally later than the useful life of the materials. Hence, all the ozone generator parts that are in contact with ozone are normally of these materials.

DO YOU KNOW:

- ◆ In Brazil, more than 60% of the hospital laundries are ozonated.
- ◆ Cuba is one country where research, in the use of ozone, is the maximum.
- ◆ Some of the largest aquariums in Malaysia, Singapore, and Korea are all ozonated.
- ◆ In Malaysia and Thailand, more than 90% of the hatcheries and shrimp farms are ozonated.
- ◆ With the present rate of growth of ozone applications, India could be world's largest ozone user of ozone in the next 5 years.
- ◆ Even some car parks in Singapore are ozonated, to detoxify exhaust fumes.

Since most of the mineral water manufacturers prefer residual ozone, and they invariably use PET Bottles, Poly Carbonate Jars and PP Filters, which are all polymer materials, the question of whether they are safe with ozone is frequently asked. The effects of ozone in the long run could unzip some of these polymers to form by-products, but they are all dose, concentration and time related, that invariably the effects are known after the useful life of these materials is surpassed.

For example, Poly Carbonate has been shown to be very resistant to UV and like water is classified as a universal solvent. Ozone can also be classified as a universal reactant - the only question is how much does it react. Through practical experience, it is very insignificant. For that matter, ozone is also supposed to be corrosive to stainless steel. But the corrosion is concentration and time related and therefore stainless steel is regarded safe with the use of ozone. In fact, many ordinary plastics that give out smell (the popular PVC tank) can also be held suspicious, more than ozone which imparts no flavour to the water. The action of ozone on plastics also depends on whether ozone is used as a gas or solution. Nylon appears to break down faster when in contact with ozone-air mixture than ozone solution.

In fact, the use of chlorine as a disinfectant produces more harmful by-products in the water which are proven carcinogen, but we rarely question this fact as we believe that chlorine cannot be substituted. In spite of knowing this, chlorine is still being used. There are reported incidences that chlorine by-products are still present in the water inspite of the use of the best activated carbon filters. The use of ozone, therefore, is much safer in as much as many of it's by products have not been identified and proven toxic.

Of course, the best way to avoid these controversies is to remove ozone after its use as disinfectant in cases of doubts. Most of the times, benefits of the use of ozone outweighs the other reported and unproven toxic effects.

For detailed list of plastics and their effects with ozone, you can contact Ozone Association of India at the e-mail given below.

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