Spartan Environmental Technologies
Air and Water Treatment

Technical Bulletin

Ozone Cooling Water Treatment

Introduction

Ozone has been effectively used to treat cooling water in a large number of cooling towers. It offers a number of important economic and environmental advantages if applied correctly. This technical bulletin briefly describes the benefits and proper application of this technology. A US DOE Federal Technology Alert provides a detailed review of the use of ozone for cooling water treatment including case studies (To see this detailed report, follow this link Ozone Cooling Water Treatment).

Benefits of Ozone Water Treatment

Ozone offers important benefits to owners of cooling towers when properly applied. These include:

- Improved Biofilm, Bacteria and Virus Control – Ozone act as a powerful biocide that is many time more effective than chlorine. This includes inactivation Legionella pneumophila.
- Reduced Chemical Usage – Chlorine can substitute for several chemicals in a cooling tower treatment package, reducing and possibly eliminating the use of such chemicals.
- Energy and Water Savings – Biofilm and the scale that it allows to build on heat exchange surfaces reduce heat transfer efficiency. Improved control or elimination of the biofilm improves heat transfer efficiency saving energy. Ozone can also save water. Compared to chemical treatment, ozone treatment contributes far less to the tower's dissolved solids loading in the circulation water and is therefore more amenable to operation at higher cycles of concentration thus reducing blow down.
- Easier Discharge of Blow Down - Ozone will dissipate quickly and not be found in the blow down water. This reduces the overall chemical load found in the discharged water, making it easier to comply with regulations.

Application

To be effective, like any cooling water treatment technique, must be applied properly. Ozone is not a cure all and in some cases may need to be used in conjunction with other treatment chemicals. Ozone is typically applied to cooling water through a side stream of the circulating tower water as is illustrated in Figure 1.

Spartan Environmental Technologies, LLC
Phone : 800-492-1252, Fax : 440-368-3569, e-mail : info@SpartanWaterTreatment.com
Web : www.SpartanWaterTreatment.com

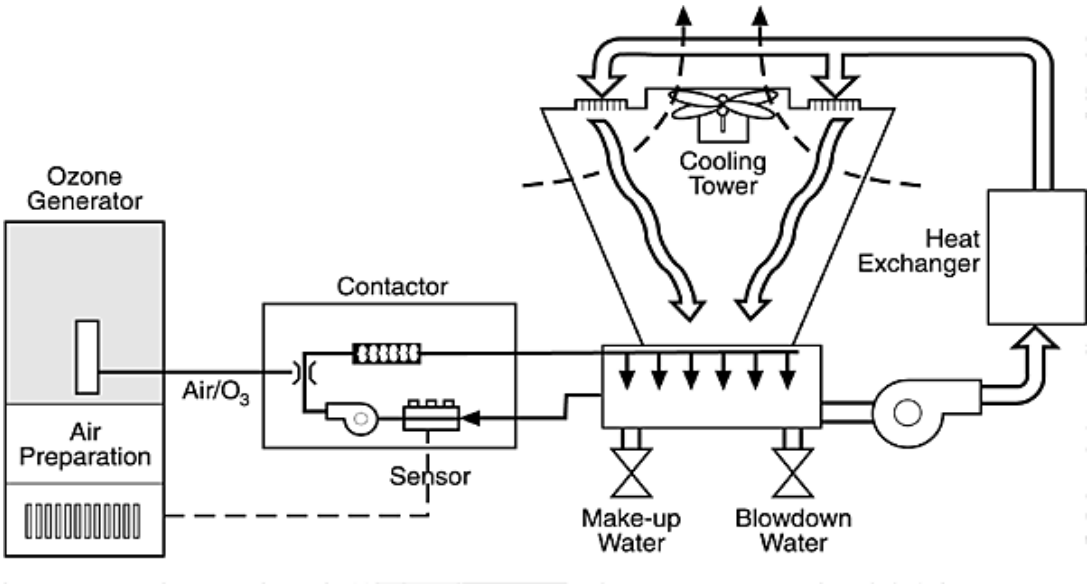

Figure 1 – Ozone Cooling Water Schematic

In general, cooling towers associated with chillers for commercial HVAC and light industrial process cooling are good candidates for ozone water treatment. For smaller towers, a single injection point may be acceptable, but for larger towers with volumes of 100,000 gallons or more multiple injection points may be required. Material in the ozone-treated system should be compatible with ozone. The ozone distribution line from the generator to the gas/water contactor carries the highest concentration (1 to 4% by weight of ozone); therefore, the line material should be constructed of stainless steel or PVC.

Ozone treatment of cooling water needs to be carefully considered if the water is high in COD, has temperatures exceeding 110^{o}F (43^{o}C), water hardness exceeds 500 mg/l CaCO3 or long piping systems generate excessive residence time.

Spartan Ozone Generators

Spartan supplies a number of ozone generators for use in cooling water treatment. Call Spartan or follow the link to www.SpartanWaterTreatment.com for more information.

Spartan Environmental Technologies, LLC
Phone : 800-492-1252, Fax : 440-368-3569, e-mail : info@SpartanWaterTreatment.com
Web : www.SpartanWaterTreatment.com