

Ozone for Cooling Tower

Cooling Tower is a common device to lower temperature through evaporation. Most large buildings in Hong Kong have central air conditioning system and utilize cooling towers to release the waste heat from the refrigeration units. The water circulated in the cooling tower contains many microorganisms due to the warm environment and cause pipe line scaling, growth of bio-film as well as Legionella Disease (LD in short).

Scaling in pipe line and the forming of bio-film inside the cooling tower packing will definitely lower the thermal transfer efficiency. It is the responsibility of the cooling tower owner to ensure no dangerous LD outbreak to the atmosphere.

Cooling tower must allow water treatment. Traditionally, many water treatment chemicals have been applied for anti-scaling and the control of algae and bacteria growth. As the water evaporation would increase the concentration of minerals, the organic waste will increase gradually even though water treatment chemicals has been dosed in order.

Therefore, the circulated water of the cooling tower must be drained periodically and replenished by fresh water and this process is called "Blow Down". The periodic blow down process causes dumping of 25–50 % of total water consumption. The blow down water contains biocide and water treatment chemicals.

Every year, million tons of chemicals from cooling tower are dumped to sewer and finally to rivers and oceans. They are polluting our environment, wasting the precious water resource and money.

The advantages of Ozone are:

1. Low maintenance and operating cost.
2. Save manpower for chemical handling.
3. Increase thermal transfer efficiency and improves the overall performance of the cooling tower up to 20%.
4. Significantly reduce the " Blow Down " rate and have water saving up to 40 %.
5. NO THM and other harmful residual at all. Ozone decays to oxygen naturally.
6. High disinfection efficiency. Ozone kills most of bacteria, virus, cysts, alga species and fungi. It kills bacteria 3000 times faster than chlorine. Ozone kills LD and most kinds of Pathogen.
7. NO more cocktail disinfectants necessary.
8. NO more storage of the dangerous chemicals.
9. Ozone works at wide range of pH value.



**Conclusion : Ozonation for Cooling Tower are
100% Environmentally Friendly.
It Saves Water, Saves Chemicals and Saves Overall Cost.**

臭氧水塔水處理

冷卻水塔的原理是用水作媒體，透過水的蒸發，吸收熱能，達至散熱的效果。香港大多數商廈使用中央冷氣系統，冷卻水塔被廣泛應用。由於水塔水長時間在較暖的溫度下運作，容易滋生青苔和細菌。

其中的循環水必需處理，否則引至管道結垢，水塔填料生水藻，影響散熱功能。若水塔長時間缺乏處理，更會滋生致命的退伍軍人菌。按香港特區政府的指引，每一個水塔都必需作水處理，防止退伍軍人菌經空氣散播。

傳統的水塔水處理方法，是定期加進化學品(殺菌劑和除垢劑)。可是，隨著水塔水不斷蒸發，其中有機物和鹽度會不斷增加，影響殺菌除垢效能。故此，所有用化學品的水處理方法，都需要定時排放『舊水』，再補充新鮮自來水，保持水質。

這定期排走『舊水』的操作，使水塔耗用水量增多 25% - 50%。再者，此等『舊水』含大量殺菌劑和除垢劑，造成環境污染。每年便有數以百萬噸計，來自水塔的化學品，排至污水渠，而最終流往河流和海洋，污染環境。

用臭氧來取代傳統化學品，消毒冷卻水塔，其中優點包括：

1. 維修和營運費用降低。
2. 臭氧可省回開調化學品人手，減少調較失誤。
3. 臭氧除去水垢和生物膜後，可明顯增加水塔的散熱功能。使用臭氧後，可省回電能量達 20%。
4. 大幅度減少排放『舊水』的需要，省回用水量達 40%。
5. 完全不會有致癌的 THM 或其他有毒殘餘物；臭氧是會自然轉回成無害的氧。
6. 臭氧是極優秀的殺菌能手，能除掉細菌、病毒、水藻、蟲卵、青苔、霉菌、真菌等各類微生物。臭氧的殺菌速度，是氯的 3000 倍。臭氧能夠有效殺掉可怕的退伍軍人菌及其他病菌。
7. 單用臭氧，已能達致除垢和殺菌功能，不用再調製混合化學品。
8. 再不用存放大量危險和腐蝕性化學品。
9. 臭氧可應用在不同 pH 值的水中。



**結論：臭氧使用在水塔，100% 環保可靠；
同時可省水、省電和節省金錢。**