ADVANCED OXIDATION TECHNIQUES FOR SWIMMING POOLS

AOP (advanced oxidation process) are available for swimming pool water treatment. This involves the use of ozone, ultra violet rays and residual chlorine together to ensure that the properties of all the three are combined judicially to ensure that their advantages are maximized.

AOP systems are in particular very safe for their young swimmers who are very susceptible to infections contacted through pool water. With AOP the quality of swimming pool water will surpass any international standards.

Advanced Oxidation Process Technology (AOP)

The ozone that is produced at high concentrations (High concentrations required for AOP) is intelligently and partially converted into ozone and OH radical combination to maximize disinfectant and oxidation properties. This partial conversion takes place in a specially designed AOP reaction chamber. Within this AOP chamber the required OH radicals are produces and the pool water will be charged with high amounts of Ozone and OH free radicals. While ozone acts as a disinfectant, the OH radicals acts as an oxidizing agent removing micro pollutants, TOC, THM precursors, Chloramines and urine components from the swimming pool water. The small amounts of chlorine that is added after the reaction chamber will have the desired disinfectant level in the pool. (OH radicals are far superior oxidizing agents than Ozone & hence combined with ozone will have better results than using ozone alone).

Why is the Combination of Ozone and OH Radical so Effective?

If you understand the effectiveness of both ozone and the Free OH radicals, you will readily agree that using the combination judicially will produce excellent results .The effectiveness of OH radicals and ozone is indicated by what we call as Oxidation reduction potential. Each oxidizing agents are rated according to their Electro Oxidation Potential (EOP).

Oxidizing Agent	EOP (Volt)
Fluorine (F)	3.06
Hydroxyl Radical (OH)	2.80
Ozone (O_3)	2.08
Hydrogen Peroxide (H_2O_2)	1.78
Hypochlorite (HOCL)	1.49
Chlorine (Cl_2)	1.36

You will note from the above able that the EOP of chlorine is the lowest and that of OH radical is the highest (next to Fluorine). That is why combining both will produce such excellent results.

Advantages of Indizone AOP Systems

Pool Health Parameters	Chlorine only	Ozone & chlorine	AOP system
Bactericidal effects	Good	Very Good	Excellent
Removal colour , odour, taste	Very Good	Very Good	Excellent
Turbidity improvement	Good	Very Good	Excellent
COD REDUCTION	Good	Very Good	Excellent
TOC REMOVAL	Good	Very Good	Excellent
Virus inactivation (rota virus,polio1)	Satisfactory	Good	Excellent
Coliform reduction	Good	2 log reduction	3 log reduction
Destruction of Crypto & Giardia	No Effects	Good	Excellent
Destruction of legionella	No Effects	Good	Excellent
CHLORAMINE REMOVAL	No Effects	Very Good	Excellent
THM PRECURSORS REMOVAL	No Effects	Very Good	Excellent
Removal OD Urine Components	No Effects	Very Good	Excellent
Removal of Iron , Manganese	No Effects	Excellent	Excellent

Pre–requisites for AOP

- You need an ozone generator that produces ozone at high concentrations
- You should use oxygen as a feed gas.
- Ozone produced by UV lamps (UV ozone) will not yield OH radicals concentration required.
- Only Corona ozone production can produce ozone
- You need a carefully designed AOP reaction chamber to ensure only partial conversion of ozone to OH radicals
- You need an on line ORP probe to measure the electro potential of pool water
- You need a venturi that can guarantee more than 99 percent ozone mass transfer into the water
- We need to design UV lamp that works and produces the correct dose

AOP systems are very good for swimming pool water treatment. With this technology you will ensure that at all times, the pool water is clean and healthy and is very safe for the swimmers.

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