

# TECHNICAL BULLETIN



19 Motivation Dve Wangara, WA, 6065 AUSTRALIA  
T +61 8 9302 4000 | FREE 1800 999 196 | F +61 8 9302 5000

## CHLORAMINES IN POOL WATER

When any type of chlorine is added to water, it usually forms hypochlorous acid (HOCl the most powerful killing form of chlorine in water) and a hypochlorite ion (OCl<sup>-</sup>), a relatively weak form of chlorine in water. The percentage of HOCl and OCl<sup>-</sup> is determined by the pH of the water. As the pH goes up, less of the chlorine is in the killing form and more of the chlorine is in the weaker form. The total of HOCl and OCl<sup>-</sup> is the free available chlorine.

Chlorine can combine with ammonia and nitrogen compounds in the water to form chloramines, sometimes called combined chlorine. By combining with ammonia and nitrogen, free chlorine in the water is disabled. Chloramines are 60 to 80 times less effective than free chlorine. Chloramines are formed any time ammonia and nitrogen are in the water. Some of the ammonia and nitrogen compounds are introduced into the water by swimmers and bathers in the form of perspiration, urine, saliva, sputum and faecal matter. An active swimmer sweats one pint per hour. The average person sweats three pints per hour in a heated spa. Ammonia and nitrogen compounds are also introduced into the water by rain. Each drop of rain has some dissolved nitrogen from our atmosphere and from automobile emissions.

Chloramines smell bad. This is the smell most often associated with pools and spas in health clubs. Chloramines are eye and skin irritants, and they can cloud the water.

Chloramines can be removed from the water by the following three methods:

1. By adding a mega-dose of chlorine. Usually 3 to 6 times more chlorine than a normal dose is added to the water, or the level of chlorine is raised to 5 to 10 ppm and held there for 4 hours. This is called super chlorination. To remove chloramines, the ratio of chlorine to ammonia must be at least 7.6 to 1. If this ratio is not obtained, then more chloramines will be produced. Swimmers and bathers should not enter the water until the level of chlorine has dropped to 3 ppm or less.
2. By adding a non-chlorine shock to the water. The most common chemical used for this is potassium peroxymonosulfate. This "shocking" requires the addition of 1 kg of shock for each 100,000 litres of pool water.
3. By adding ozone to the water. If an ozone generator is installed and wired so that it comes on each time the pump comes on, then oxidation of the ammonia and nitrogen compounds will take place on a continuous basis. This eliminates the need for superchlorination or shocking. Each time ammonia and nitrogen enter the ozonated water, they are oxidized immediately.

Ozone oxidizes soap, deodorant, hair spray, cologne makeup, perfume, body lotion, hand cream, sun tan lotion, saliva and urine. In addition, ozone kills all pathogenic

# TECHNICAL BULLETIN



19 Motivation Dve Wangara, WA, 6065 AUSTRALIA  
T +61 8 9302 4000 | FREE 1800 999 196 | F +61 8 9302 5000

bacteria, germs and virus. Ozone takes care of the big job of oxidizing all these organic contaminants. Ozone frees up the combined chlorine leaving the chlorine free

to provide a residual. Ozone ultimately enhances the performance of chlorine and bromine.

Less chlorine or bromine will be needed to maintain a residual. Commonly, ozone reduces chlorine or bromine use by 50-90 percent. The quality of water will be dramatically better with the combination of ozone and chlorine or the combination of ozone and bromine than that with chlorine and bromine alone.

F:\TECHBULL\CHLORAMINES IN POOL WATER.doc