

## AN OZONE ASSIST

### LAB NOTES

◆Bart Bartholomew of Discount Spas in Norman, Okla., writes: The term "chemical-free spas," when used to describe spas equipped with ozone generators, suggests that ozone eliminates the need for other sanitizers. According to ozone-equipment manufacturers, however, this is not true. Is it necessary to add sanitizers to spa water even when the spa has an ozone generator?

◆First of all, ozone itself is a chemical and so there is no such thing as a chemical-free spa" equipped with an ozone generator.

Second, it is important to know that the concentration of ozone used in a typical spa is *not* sufficient to kill algae. To do so, the ozone concentration should be about 1 part per million throughout the *entire* vessel.

The ozone present in a typical spa may indeed kill some free-floating algae as it passes by the injection point or the contact chamber where ozone is actually added to the water. But if, say, algae is attached to the spa steps or hand rags, the ozone will never reach it.

If you check with most ozone-generator manufacturers, they will tell you that ozone does all its killing and oxidizing within a few feet of the injector, or inside the contact chamber. And in testing spas in the field, I have found ample concentrations of ozone at the contact point. But I have found very little or no ozone *at all* just a few feet away.

Why? Because by its very nature, ozone dissipates quickly. Under lab conditions, the element has a half-life of between three and 18 minutes **in** water; in a spa, ozone likely lasts less than a minute.

This is, in fact, why spas with ozone generators require an additional sanitizer residual: Ozone disappears from the water so rapidly that alone it cannot offer adequate protection against disease, algae or other contaminants once the equipment has been off for three minutes or so.

What's more, because it reacts so slowly with ammonia and amine compounds, ozone is not very good at destroying ammonia, chloramines, bromamines or other ammoniated compounds found in spa water. Many other contaminants added by bathers are also difficult for ozone to oxidize.

Don't get me wrong: Ozone is powerful stuff. Depending on what it's oxidizing, ozone can be 50 to 2,000 times more powerful than chlorine. But it's still necessary to add another chemical to spa water to provide a lasting residual and oxidize any contaminants ozone can't.

In our industry, your two sanitizer choices are chlorine and bromine. And while you need not keep a residual as high as you would *without* an ozone generator on the spa, you should maintain between 0.5 to 1.0 ppm chlorine or between 1 to 2 *ppm* bromine.

The exact amount needed in any particular spa depends on how much ozone is being applied to the water and how long it is being applied each day. If the spa's ozone generator is on 18 hours a day, you would obviously need less chlorine or bromine residual than you would with a spa that is treated with ozone for only one or two hours a day,

There is a dangerous myth that must be dispelled here: It is *not true* that if you run a spa's ozone generator for 24 hours each day, you will not need to add any chlorine or bromine. You may be successful in keeping your spa clean this way for a while, but eventually you will develop problems with algae, smelly water or even skin rashes.

Again, there are some things that ozone simply will not oxidize or sanitize. Of course, there are also some things that chlorine or bromine won't oxidize or sanitize either. This is why you should use ozone *and* chlorine or bromine to properly maintain spa water.

In fact, on occasion, you may also need to use a non chlorine shock treatment to oxidize contaminants that ozone, chlorine and bromine cannot. If the spa you're maintaining has a waterfall or overflow, you may even need to use an algaecide. (Remember, sunlight destroys bromine and chlorine residuals far more quickly in situations where sunlight penetrates an inch or more of water.)

A caution: Care must be taken when choosing an algaecide for use with an ozone generator. Ozone is such a powerful oxidizer, it can destroy some of the chemicals in the algaecide. Always check with the manufacturer of any algaecide to be sure the product you're considering is compatible with ozone.

I must mention one last reason why you should not rely solely on ozone to care for spa water: Ozone generators put out a fixed amount of ozone regardless of the bather load, and this may not be enough to keep up with the biological load. Indeed, if several people get into the water all at once, all of the ozone in the water will be used up very quickly.

A high bather load may use up the chlorine or bromine residual right away as well, but you can always add some extra chlorine or bromine to take care of the additional contamination.