

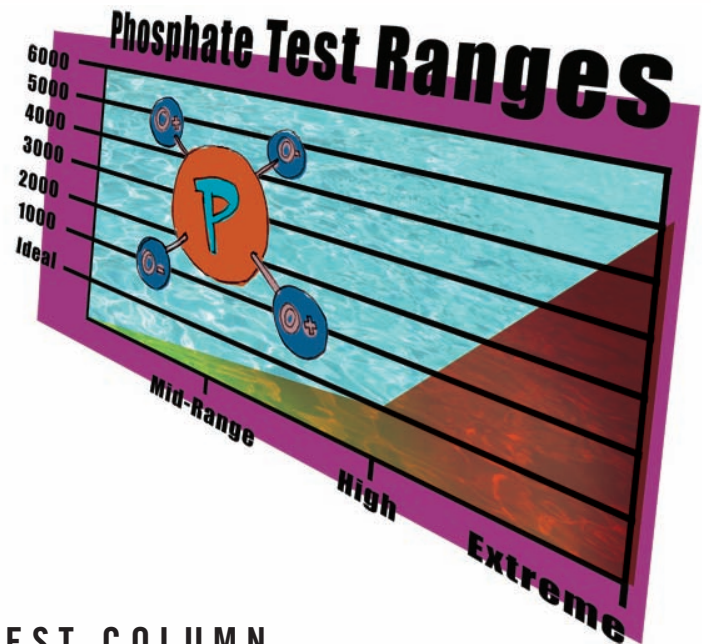
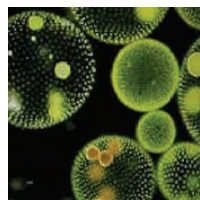
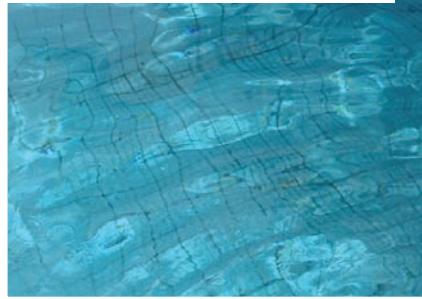


PHOSPHATE: THE GROWTH-LIMITING NUTRIENT

There are three vital resources that algae need to grow:

1. Nitrates
2. Phosphates
3. Carbon

Of these three, phosphate is scientifically termed as a "growth-limiting nutrient." This simply means that algae cannot thrive and flourish without phosphates. Even if nitrates and carbon are still present, algae cannot bloom without the presence of phosphate.



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Fighting Phosphates

TERRY ARKO

Technicians must wage a constant battle to keep algae out of their aquatic facilities. Doing so means keeping a close eye on phosphate levels. The connection between phosphates and algae growth is well documented. But what exactly are phosphates, how do they affect pool water, and how should service techs cope with them? Here's some insight.

What are phosphates?

Phosphates are biological building blocks that are formed when phosphoric acid comes in contact with certain metals. It is important to understand that phosphates exist in many different forms. Most of these come from natural sources such as rivers, lakes and oceans or mined rock. (The United States is one of the largest producers of phosphate rock.) Phosphate is termed a "pollutant" and is primarily used in soaps, detergents, shampoos and even soda pop. Other phosphate sources include fertilizers, organic debris such as leaves and bark, and some pool chemicals. Phosphate pollution in lakes and streams is caused mainly by overdevelopment, which causes extreme amounts of byproduct waste to end up in natural water systems.

The smoking gun and the bullet

Most of the phosphate in pool water enters in the form of a compound such as tri-sodium phosphate. Algae cannot use these combined phosphates as a nutrient for growth. It is not until the compounds of phosphate are broken down in the water to a free ortho-phosphate that algae can begin to thrive. Once ortho-phosphate is removed from water, it's harder for algae to obtain because it is not readily available until the phosphate compounds break down as a result of oxidation, hydrolysis or enzymatic digestion. In short, all phosphates end up as ortho-phosphate, which feeds algae. Think of it like this: Phosphate compounds are the smoking gun, but the ortho-phosphate is the bullet.

How much is too much?

The technology of phosphate removal is still new to the pool industry, and a lot of erroneous information is being communicated regarding the proper phosphate levels needed to ensure lack of algae growth. Some information states that phosphate removal is irrelevant because algae can grow at levels as low as 10 ppb. This would be correct if you were dealing with lake water. However, extensive studies in pool water have shown that algae cannot grow in a sanitized environment, even at levels in the 200-ppb range. However, these same studies showed that when the ortho-phosphate levels reached the 500-ppb mark, algae blooms would be present even in properly sanitized pools. The higher the phosphate level goes, the more the

algae flourishes and the more resistant it becomes. It is strongly advised that phosphate be maintained in pool water at a level of 125 ppb for an algae-free pool.

Remember, when it comes to swimming pools, we are only concerned with the free ortho form of phosphate. When testing pools for the presence of phosphates, use a test kit made specifically for free ortho-phosphate.

The role of algaecides

There is a belief that phosphate removal can take the place of algaecides. This needs some explaining.

First you must understand that phosphate removers don't kill existing algae. To accomplish a kill, you need to superchlorinate or use a good algaecide. When the existing algae has been eliminated, then the process of phosphate removal becomes crucial. As algae dies off, it exudes free ortho-phosphate that could lead to further growth, even in the presence of an algaecide.

Phosphate removal has been proved as the key in preventing this recurrence. However, anyone who has dealt with pool maintenance for a while can attest that there is no "magic pill" in the fight against algae. Basically, it takes conscientious work and a regimen that includes proper pool-water balancing, correct sanitizer levels, and regular doses of shock and algaecide. Phosphate removal is another effective, proven partner to help in the battle against stubborn, resistant algae.

Benefits of removal

Removing phosphates and maintaining proper levels can be very beneficial. First of all, you will improve the overall quality of the water. In many cases, high levels of phosphates can tie up free chlorine (especially with pools on salt generators). Also, using excessive amounts of algaecide can cause other problems such as foaming or staining from high mineral content. While we continue to learn more every day about phosphate removal, the benefits of its removal have been soundly proved in both the laboratory and the field. **RM**

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