



TECHNICAL NOTE

37 Phosphate in pool water

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This technical note provides guidance on the significance of phosphate levels in pool water; including what safeguards are recommended.

In general, the better the quality of pool water, the less chance there is of the presence of unwelcome organisms. Bacteria and algae flourish in water containing the key nutrient, phosphate. If phosphate can be absent, bacterial and algal growth will be minimised.

Sources of phosphate

Many water authorities introduce phosphates to the mains water supply as it helps to protect old lead pipework from corrosion. There is no official limit for phosphorus or phosphate concentration in drinking water. Approximately 90% of water supplies contain phosphate at dosing concentrations of between 0.7-1.9mg P/l (2.14-5.82mg PO₄/l).

For years much mains water has contained phosphate at concentrations of 2-3mg/l as PO₄ with no adverse effect on pool water. But without chlorine, eutrophication (excessive richness of nutrients, often due to run-off from the land, causing a dense growth of plant life) can begin with as little as 3mg PO₄/l – the maximum concentration that water companies can discharge as waste water after treatment.

Phosphates are present in cleaning materials, and descalers may contain phosphoric acid. It is one of the reasons that the use of general cleaning materials in the vicinity of the pool is not recommended. Some hypochlorite formulations also contain sodium hexametaphosphate to reduce scale precipitation, though its concentration appears to have minimal effect in encouraging algal and bacterial growth in pool water.

Dealing with phosphates

Very occasionally, high phosphate concentrations can prevail and a phosphate remover may need to be considered. This applies only if free chlorine concentrations cannot be maintained at a level sufficient to deal with algal growth. Flocculants containing lanthanum are effective at filtering out low levels of phosphate from pool water. Flocculation treatment containing a phosphate remover must continue until the algae are removed, even when the concentration is zero, because organic phosphate can re-enter the water by lysis of bacteria and algae. An algal cell or spore can be thought of as a little packet of phosphate: rupture of the outer membrane by oxidation opens the packet and releases the phosphate.

Measuring phosphate

Phosphate can easily be measured on site using comparator or photometer systems. Most kits can measure phosphate down to low levels and are therefore ideal for monitoring levels and checking the performance of phosphate removers. Care should, however, be taken to avoid false positives. Many common pool-testing tablets contain phosphates; over time, these can build up on the side of the sample tube or vial. The phosphate testing tablets are extremely sensitive and will detect any phosphate adhering to the tube sides and thus give a false reading.

The following recommendations will overcome this.

- Keep the phosphate testing equipment separate from other kits.
- Have sample tubes / vials specific for phosphate testing.
- Thoroughly rinse the tubes immediately after use with deionised water (not tap water) to prevent phosphate build up.
- From time to time rinse tubes with a weak acid solution (e.g. diluted vinegar) to remove any phosphate.
- Always follow the manufacturer's testing procedures.