

Pettyjohn is an industry veteran of more than 18 years, and a water chemistry instructor for 16 years. He serves as director of sales, East/West, for SeaKlear and is based in Bothell, Wash.



Diligent maintenance can help service techs prevent scale and calcium buildup in spas

# Scaling Back

**C**alcium scaling is an all-too-common problem.

It typically appears when calcium attaches to carbonate in the water and grows less soluble at higher temperatures. The calcium eventually comes out of solution in the form of surface scale.

Because scale worsens as water temperatures rise, some of the most stubborn cases are found in hot tubs.

Once entrenched, scaling can be quite difficult to remove — and efforts to do so may even damage the finish on a spa.

To prevent scale, you must first understand the sources of calcium in the

water, and employ preventive measures through pH control and specialty chemicals.

Finally, continue to monitor any calcium buildup, and be prepared to drain the spa when necessary.

### Scale sources

High temperatures combined with increased aeration result in very quick evaporation rates for spas. This evaporation, in turn, leads to higher levels of calcium hardness.

The majority of calcium comes from the spa's fill water. Depending on the source, calcium levels may vary greatly from region to region. The Southwest, for

instance, typically generates very hard water, and calcium levels straight from the tap may reach 600 ppm.

But if the water source is especially soft, the spa often is treated with calcium chloride, either through a powder solution or straight liquid form. This chemical, unlike calcium carbonate, is engineered to be more soluble.

Calcium chloride, however, usually is only added to the spa during a refill.

A final source of higher hardness levels comes from calcium-based sanitizers such as calcium hydroxide, commonly known as cal hypo.

But more often than not, evaporation is the primary

cause of calcium carbonate buildup, particularly in climates with low humidity. Because many inground spas are left uncovered (mainly for aesthetics), a spike in calcium levels can occur in short order.

### Prevention

Calcium scale is tricky. It may appear at the waterline or, more generally, in areas with poor water circulation. And it creates an uncomfortable soak, potentially causing skin abrasions and rashes.

If left untreated, it could even damage the spa's finish.

The key, therefore, is prevention. The method: water chemistry.

SOURCES	SCALE ENABLERS	SOLUTIONS
Fill water Calcium chloride Calcium-based sanitizers	High pH Evaporation Oil and scum	Balanced water chemistry Scale and metal inhibitors Periodic draining

CHART: NICK ORABOVIC / PHOTO: AFSP

Scaling typically grows more stubborn as the water's pH level rises. Still, the spa should be maintained within the ideal range of 7.4 to 7.6.

Though 7.0 is pH neutral and decreases the risk of calcium coming out of solution, it still can be irritating to the eyes and skin.

Use a mild form of acid, such as sodium bisulfate, to regularly control pH in areas with naturally high calcium.

water's total hardness comes from calcium. The rest comes from mineral salts such as iron and manganese, which may potentially stain the finish.

But watch out because many products used to inhibit metal staining and scale formation also contribute complex forms of phosphate to the spa water. These eventually break down to a form of phosphate that can harm overall water quality.

scum buildup above the waterline also can attract calcium scaling. This may be prevented, however, by adding an enzyme treatment or a natural-based clarifier each week to trap and filter out contaminants, thereby reducing any such buildup.

**Testing and draining**

Testing for calcium hardness should be done regularly, much as you would for

pH and total alkalinity levels to avoid scale.

Soon, however, it will be time to replace the spa water. In fact, that's the only effective way to lower calcium levels.

Typically, spas are drained and refilled every six to 12 weeks. Alternately, a formula based on the number of users per day can help determine when the water should be drained and replaced:

**Many products used to inhibit metal staining and scale formation also contribute complex forms of phosphate to the spa water.**

As an additional safeguard, add a metal and scale inhibitor each time you refill the spa. These chemicals should be added before you introduce calcium chloride to raise the spa's hardness level.

Approximately 70 percent to 75 percent of the spa

Spa water should be tested monthly for phosphates, especially if they are tied into a salt system to generate either chlorine or bromine. The water should be maintained at a phosphate level no higher than 200 ppb.

Oil, bather waste and

alkalinity, pH and TDS.

According to the National Swimming Pool Foundation, the ideal range for calcium hardness in a spa is 150- to 250 ppm. When hardness exceeds 500 ppm, a service technician must closely maintain and monitor

*Number of gallons in the spa ÷ 3 ÷ users per day = number of days between drainings*

So unless you're looking to burn a few calories with regular scrub-downs, be sure to test regularly for calcium, and treat the spa with preventive chemicals as needed. n

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