

# Stain and Scale Guide



stained scale

This guide explains the causes of stain and scale,  
as well as provides remedies,  
preventive measures and good practices.

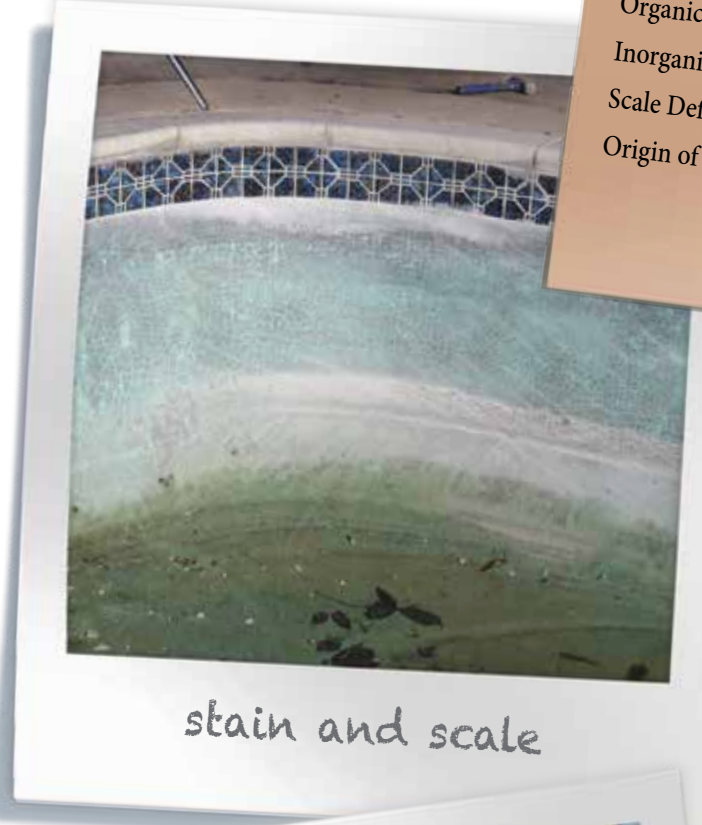


**AquaThORITY**  
POOLS & SPAS, LLC

*the clear choice in pool care*

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stain and scale



organic stain

## Introduction

Scale is a form of calcification (deposition of lime and/or insoluble salts/metals). If not kept in solution (attached to water molecules) through water chemistry, scale deposits which are in the water will precipitate (come out of solution) and attach (aka: plate) to the surfaces of plaster and painted concrete in-ground pools.

Typically, scale deposits are caused by water chemistry which is unbalanced, e.g.: low or high pH, alkalinity, or calcium hardness. The age and condition of the pool's surface is irrelevant.

## Organic Matter (non-metals)

Organic matter such as algae and bacteria can discolor the water and deposit themselves on pool surfaces in a rainbow of colors: greens, blacks, yellows, pinks. Algae deposits are distinguished from stains in that they are on the surface and not impregnated into the plaster.

Other organic materials such as leaves, worms, or other vegetable matter can also stain pool plaster. An organic stain can usually be removed by sprinkling granular chlorine on it.



inorganic stain

## Scale Defined

Although there are many forms of scale, the 2 most common are:

- Calcium carbonate**
  - white or clear crystal deposits on parts or all of the surface
- Calcium silicate**
  - colored/stained crystal deposits on parts or all of the surface

*NOTE: calcium silicate is a more stubborn form of scale*

Scale can form during the swimming season when the pool is opened and operating. But it's more common for it to occur during the off-season when the pool is closed. That's why it's imperative that water is balanced prior to winterization.

Adding the standard closing chemicals (stain and scale, algaecide and borate floater) with winterization is an important safeguard that should be taken on the occasion of closing a pool.



calcium carbonate



calcium carbonate



calcium silicate



calcium silicate

## Inorganic Matter

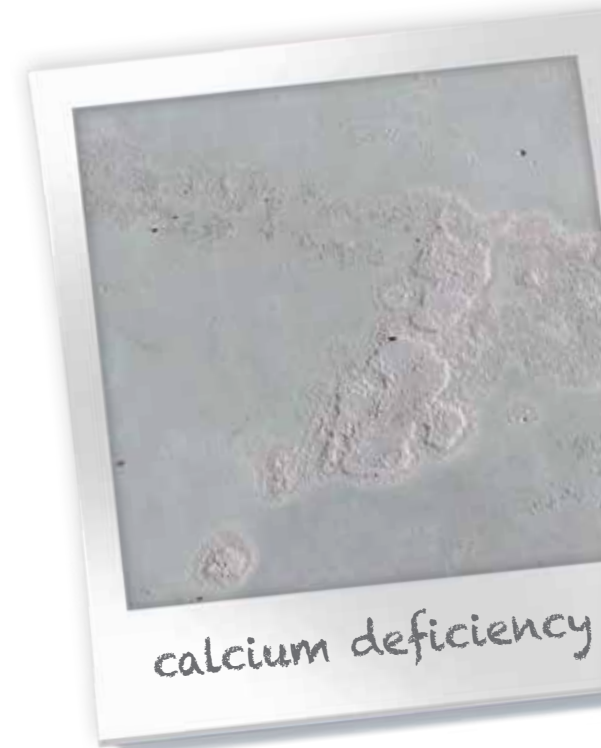
Inorganic elements (metals/minerals) such as copper, iron, magnesium, calcium or aluminum can cloud or discolor the pool water, and stain or scale the pool surface when they (metals/minerals) precipitate (come out of solution) and are released from the water molecules.

## Origin of Scale

When minerals, such as carbonates of magnesium and calcium, precipitate (come out of solution) they can cloud the water and/or form a whitish crystallized deposit known as scale. If the precipitated minerals have color, as heavy metals often do, they will deposit themselves in the form of stained scale.

Metal	Sources	Colors
Calcium	Plaster, grout, mortar, cal-hypo chlorine shock	white or clear crystals
Cobalt	Fiberglass Shells	red, blue, gray, or black
Copper	Copper algacides, ionizers, corrosion of copper and brass pipes, fittings and heaters	blue, green and blue/green, black, dark red, or teal
Iron	Well water, corrosion of iron pipe and fittings	dark, red, brown, black, gray or green
Manganese	Well water	pink, red, black or red

Metals such as iron, calcium and copper exist naturally in varying amounts in pool water. They may originate from the source water (e.g. well), the environment (e.g. landscape) or incidental sources such as iron and copper pipes, fittings and equipment.



## Correcting Mineral Problems

Simply stated, scale is the term for minerals which have fallen out of solution (precipitated) and formed mineral deposits which suspend in the water and then plate to the surface. Calcium is the most common deposit but others include phosphates, silicates and sulfates.

For pools that are discolored or cloudy due to precipitated minerals, the path back to clear blue water may be accomplished by:

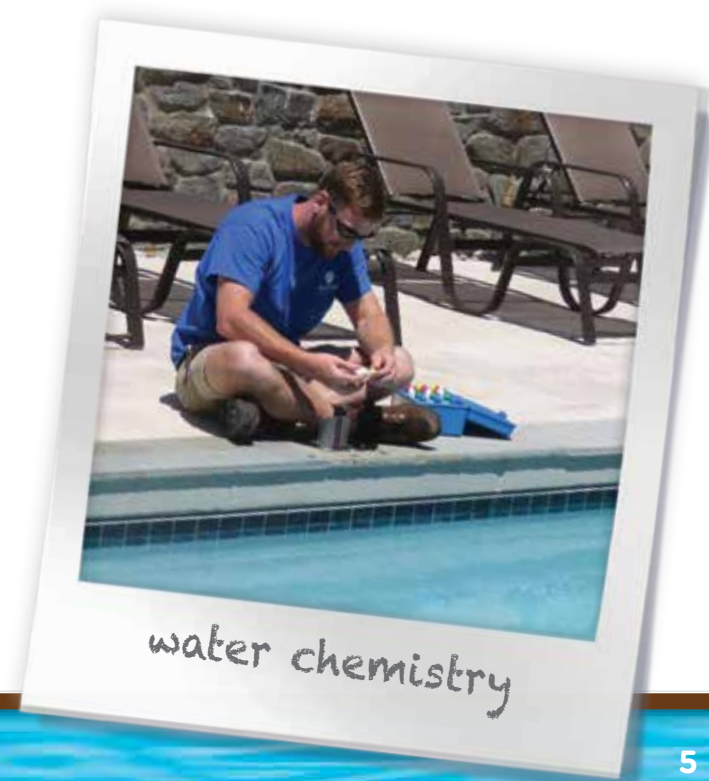
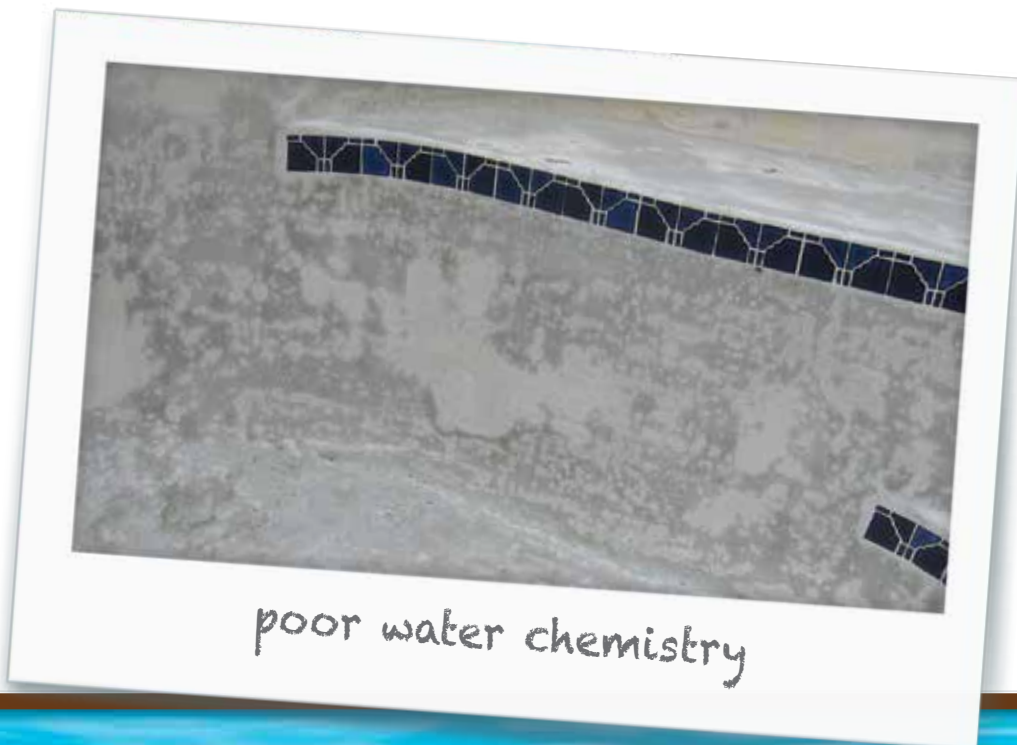
- balancing water: pH 7.2 to 7.6; alkalinity 80 to 120ppm; calcium 200 to 400ppm
- shocking the water aggressively with liquid chlorine and the addition of a clarifier
- adding stain and scale product to sequester the precipitated minerals/metals
- use of a flocculent to drop suspended particles to the floor for vacuuming and filtering
- partial drainage and dilution of the pool water, especially in cases where the pool is at or near saturation (calcium/hardness level greater than 400ppm) or high TDS (total dissolved solids)

## Preventing Stain and Scale

At the most basic level, pool water must be balanced to prevent and mitigate stain and scale. Out-of-range pH, alkalinity and calcium hardness levels, individually or in tandem, can promote mineral precipitation (come out of solution and plate/attach to the surface) and cause scale.

Although scale can be removed from the pool, it will return if the water is not treated and balanced on an ongoing basis. Scale has a tendency to creep back onto surfaces during the winter, when calcium accumulates in the water, and pH and alkalinity levels fluctuate.

A part of good water chemistry practice should include a stain and scale additive, aka: sequestering agent. The ongoing use of a stain and scale additive, in tandem with balanced water, helps keep the minerals tied up in solution and, therefore, prevents precipitation of such.



# AquaThority Scale Program

## Scale Policy

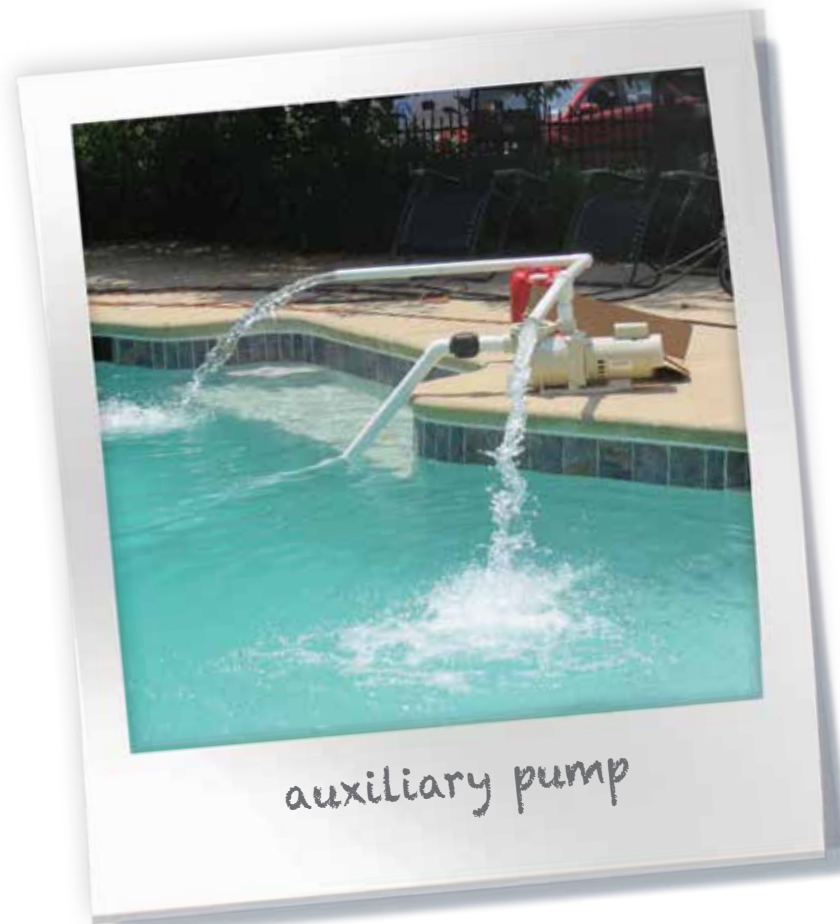
As previously defined, scale is a natural phenomenon which can appear on the surfaces of pools constructed with cement based products (e.g. concrete and plaster). And while scale can be largely prevented through good water chemistry practices, it can still occur.

Although AquaThority can treat the condition, under no circumstance, is AquaThority responsible for the occurrence of scale or the cost for treatment. This policy applies to new and old plaster pools as well as new and old painted plaster or concrete pools. It also applies to all customers, including AquaThority maintenance customers.

## Aggressive Scale Treatment

Scale can be effectively removed and prevented, per the following.

*NOTE: treatment program typically takes 7 to 10 days, start to finish*



### IMPORTANT INFORMATION:

- water temperature needs to be 65 degrees or warmer
- cease all chlorination of water
- no swimming (people and pets) during treatment cycle
- heaters, salt generator systems, ionizers or mineral systems must be bypassed (if employing the pump of the pool equipment; not necessary if employing an auxiliary pump)
- remove pool cleaners (e.g. Polaris) and all floaters, toys, etc.
- remove chrome pool light(s) and place on pool deck
- run filter or auxiliary pump continuously 24/7

*NOTE: this treatment program will cause calcium hardness level to increase significantly; in the event that it exceeds 400ppm, then a portion of the pool water will need to be replaced with potable water.*

## Treatment Application

### Day 1

#### Spots of record

- identify several spots where the scale is evident and reachable (e.g. top steps, benches, below tile band) and, if possible, touch and record the level of roughness and appearance and also, take pictures

#### Pump

- if available, set-up auxiliary pump (may be provided by AquaThority) and shut-down pool pump
- if employing pool pump: bypass heaters, salt generator systems, ionizers or mineral systems
- start-up pump and run 24/7 until treatment program is complete

#### Chemicals

- test alkalinity, pH and calcium hardness and record readings

If alkalinity reading is 80ppm to 100ppm

- add .5 gallon of muriatic acid per 1,000 gallons of water (e.g. 10 gallons acid for 20,000 gallon pool)

If alkalinity reading is 100ppm to 120ppm

- add .625 gallons of muriatic acid per 1,000 gallons of water (e.g. 12.5 gallons acid for 20,000 gallon pool)

If alkalinity reading is 120ppm or greater

- add .75 gallons of muriatic acid per 1,000 gallons of water (e.g. 15 gallons acid for 20,000 gallon pool)

Jack's Magic Solution #2

- add 10 lbs. of Jack's Magic Solution #2 per 10,000 gallons of water

Jack's Magic Magenta Stuff

- add 1 quart of Jack's Magic Magenta Stuff per 10,000 gallons of water

## Day 2

- test alkalinity level and add more muriatic acid as needed
- brush entire surface
- check the spots of record
- slimy film (to the touch) on the plaster surface may start to become evident

## Day 3

- add 1 quart of Jack's Magic Magenta Stuff
- brush entire surface
- check the spots of record
- slimy film (to the touch) on the plaster surface should become increasingly evident

## Day 4 to completion (daily)

- brush entire surface
- check the spots of record
- clean-out pump basket (as needed)
- slimy film (to the touch) on the plaster surface should definitely be evident

## Summary of daily activity

- check the spots of record for scale eradication
- check for the slimy film on the plaster surface
- check the overall appearance of the pool
- brush the entire surface (walls and floor)



drain and clean pool

## Additional Measure (as needed)

Following the completion of the treatment program, the additional measure of draining and cleaning the pool may be necessary if any or all of the following conditions apply:

- most of the scale has been eradicated but not entirely, and areas require concentrated cleaning
- calcium level far exceeds 400ppm (e.g. 500ppm) and, therefore, water needs to be replaced entirely
- scale which has been released from the surface overwhelms the pool and requires extensive cleaning



balance water

## Balancing Water (once scale is removed)

### Reversing the process

- once the scale has been freed from the surface, the treatment should then be reversed by returning water chemistry to normal levels

### #1 Back-wash

- if employing pool pump, back-wash initially

### #2 Alkalinity

- test and raise alkalinity to range of 80 to 100ppm by adding sodium bicarbonate (alkalinity increase)

*NOTE: follow label instructions*

### #3 pH

- once alkalinity is in range, raise pH to range of 7.2 to 7.6ppm by adding sodium carbonate (pH increase)

*NOTE: may not be necessary as sodium bicarbonate used to raise the alkalinity will likely raise pH*

### #4 Calcium hardness

- adjust to 200ppm to 400ppm
- if over 400ppm, some of the pool water will need to be replaced with new water (public or well)



liquid reagent test kit



drain and clean pool

**#4 Labor cost (if we conduct the regimen)**

- Bypassing equipment (as needed)
  - if employing pool pump, temporarily cut-out heaters, ionizers or mineral systems
  - if employing auxiliary pump, set-up poolside
  - \$85 per man hour plus parts (PVC pipe and fittings)
- Orchestrating and managing daily regimen of program
  - visit pool once per day and conduct regimen
  - \$85 per visit
- Reconnecting equipment (as needed)
  - reconnect heaters, ionizers or mineral systems
  - \$85 per man hour plus parts (PVC pipe and fittings)
- Draining and cleaning pool (as needed)
  - drain and clean pool
  - \$1,200 + cost of water

**Tools, Chemicals and Costs**

**#1 Tools needed:**

- water chemistry liquid reagent test kit (not strips) . . . . . \$55
- good condition nylon brush and functioning telescopic pole
- auxiliary pump (may be provided by AquaThority)

**#2 Chemicals needed:**

NOTE: volume of chemicals needed based on size of pool (gallons) and initial alkalinity reading

- muriatic acid: . . . . . 5 gallons. . . . .per 10,000 gallons of water
- Jack's Magic Solution #2: . . . . . 10 pounds. . . . .per 10,000 gallons of water
- Jack's Magic Magenta Stuff: . . . . . 1 quart. . . . .per 10,000 gallons of water
- alkalinity increase (sodium bicarbonate): . . . . . 10 lbs. . . . .per 10,000 gallons of water
- pH increase (sodium carbonate): . . . . . 10 lbs. . . . .per 10,000 gallons of water

**#3 Chemical costs:**

- muriatic acid: . . . . . 5 gallon. . . . . \$32.00
- Jack's Magic Solution #2: . . . . . 10 pounds. . . . . \$80.00
- Jack's Magic Magenta Stuff: . . . . . 1 quart . . . . . \$30.00
- alkalinity increase: . . . . . 10 lbs. . . . . \$18.00
- pH increase: . . . . . 10 lbs.. . . . . \$17.00

**Chemical cost summations**

- 15,000 to 22,000 gallon pool: . . . . . \$354.00
- 23,000 to 32,000 gallon pool: . . . . . \$531.00
- 33,000 to 42,000 gallon pool: . . . . . \$708.00

**Scale Prevention**

**#1 Water chemistry**

Keep your water balanced throughout the season.

- alkalinity range: 80 to 120ppm
- pH range: 7.2 to 7.6
- calcium hardness: 200 to 400ppm

Stain and scale additive (sequestering agent)

- add a stain and scale preventer on a weekly basis (follow label instructions)

**#2 Off-season water chemistry**

Make sure that your water is balanced prior to its closing for the season. Make sure that closing chemicals (stain and scale preventer, algicide and borate floater) are added at time of closing.



monitor chemistry



Founders: Tim DeMirjian  
& Bob Nask

## People You Can Trust

Since the 2005 inception of AquaThORITY Pools and Spas, LLC, founders Bob and Debi Nask, and Tim and Jackie DeMirjian have been practicing what they preach to their employees and promise their customers throughout Chester, Delaware and Montgomery counties: be responsive, accountable and honest.

While this mandate is always welcomed and refreshing in the home contracting business, it's proven to be especially appreciated in the pool business: where a homeowner's experience with pool companies, and contractors as a whole, too often are negative due to no-shows, poor performance and lack of trust.

AquaThORITY is different. We do not subcontract.

Whether it's a routine pool opening, closing or service call, or a more involved pool repair, equipment installation or renovation, AquaThORITY honors its commitments by performing the work as promised and expected.

For those homeowners who have had trouble tracking-down contractors in the past, you'll be pleased to know that AquaThORITY does not subcontract; our employees perform all the work with owner oversight.

Also, unlike contractors who are typically "one and done", AquaThORITY is a service provider and will always be in the neighborhood providing the ongoing pool services our over 1,000 customers have come to rely upon.

Learn about us...through our customers.

We encourage you to call our references to seek their personal experience with AquaThORITY. And read our reviews on Angie's List from whom we received the distinguished Super Service award.

We appreciate your consideration and hope that you'll choose AquaThORITY Pools and Spas, LLC, the clear choice in pool care.

  
**Trust AquaThORITY with your pool  
and enjoy peace of mind.**

- Better Business Bureau A+ rated
- Angie's List Super Service award
- National Plasterers Council member
- Home Advisor Pro recommended
- PA Registered Contractor: PA083523



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