

START-UP PROCEDURES



NATIONAL PLASTERERS COUNCIL

THE FOREMOST AUTHORITY
IN THE CEMENTITIOUS
INTERIOR POOL FINISHING INDUSTRY

GENERAL CONSIDERATIONS

The pool interior finish is especially susceptible to staining, scaling, and discoloration within the first 28 days.

Initial start-up procedures include frequent brushing and daily testing and adjusting of the pool water.

The following recommended start-up procedures are based on common trade practice and methods shown to produce the best aesthetic results and longevity of the interior finish.

Due to uniqueness of the fill water or other environmental factors, some portions of the start-up procedures may need to be modified to protect the pool finish. For example; filling the pool with water having extremely high/low calcium hardness, high/low pH, or high/low total alkalinity may necessitate changes to these procedures.

Maintaining the proper initial and ongoing pool water chemistry, brushing the surface, a good pool cleaning system, and regular equipment maintenance are vital to achieve the anticipated lifespan of the finish.

POOL FILLING DAY

1. Make sure the pool filtration equipment is operational.
2. Place a clean cloth on the end of the hose and position the hose in the deepest area of the pool to prevent damage to the surface. If a water truck is required, an initial 24 inches (60 cm) of water should be placed at the deepest area for a water cushion, followed by the water from the water truck cascading into the accumulate water.
3. Fill the pool to the middle of the skimmer (or operating water level) without interruption as rapidly as possible with clean potable water to help prevent a bowl ring, and to decrease shrinkage cracking.
4. Do not allow any external sources of water to enter the pool to help prevent streaking. It is not recommended to swim in the pool until the water is properly balanced and sanitized.
5. At no time should any person or pets be allowed in the pool during the fill.
6. Test fill water for pH, total alkalinity (TA), calcium hardness (CH) and metals. Record test results.
7. Start the pool equipment filtration system immediately after the pool is full to the middle of the skimmer (or operating water level). DO NOT turn on the pool heater until the water is chemically balanced and no cloudiness ('plaster dust') remains in the pool, as per manufacturer's recommendations.

IT IS IMPORTANT TO FOLLOW EACH STEP IN THE RECOMMENDED ORDER PRIOR TO PROCEEDING TO THE NEXT STEP

DAY 1

Step #1. Test fill water for pH, total alkalinity (TA), and calcium hardness (CH). Record test results.

Step #2. High alkalinity should be adjusted downward to 80 ppm – 100 ppm using pre-diluted muriatic acid (31–33% hydrochloric acid). Always pre-dilute the acid by adding it to a five gallon (19 L) bucket of water.

Step #3. Low alkalinity should be adjusted upward to 80 ppm using sodium bicarbonate (baking soda).

Step #4. pH should be reduced to 7.2 – 7.6 adding pre-diluted muriatic acid (after the alkalinity is in range 80 ppm – 100 ppm).

Step #5. Low calcium hardness should be adjusted upward to 80 ppm – 100 ppm. Adjustments of hardness increaser (calcium chloride) should be dissolved and added in 10 lb. increments, with each dosage separated by several hours. Never add hardness increaser (calcium chloride) and alkalinity increaser (sodium bicarbonate) at the same time.

Step #6. Brush the entire pool surface thoroughly at least twice daily to remove all plaster dust. **Wheeled vacuums or wheeled pool cleaners should not be used in the pool until after 28 days** (brush vacuums or non-wheeled pool cleaners are allowed).

Step #7. Although optional, it is recommended by many to add a sequestering agent, following the manufacturer's recommended initial start-up dosage, and when used, to continue dosing at the recommended maintenance dosage thereafter.

Step #8. Continuous operation of the pumps and filtration system is mandatory for seven days, or until the plaster dust has been brushed away and filtered out, and the water is no longer cloudy (minimum of 72 hours).

Step #9. DO NOT add chlorine for 48 hours. DO NOT turn on pool heater until there is no plaster dust in the pool.

DAY 2

Step #1. Test pool water for pH, total alkalinity (TA), calcium hardness (CH) and repeat steps of DAY 1, except for Step #7.

Step #2. Once the total alkalinity (TA) is adjusted to 80 ppm – 100 ppm and the pH is adjusted to 7.2 – 7.6, then adjust calcium hardness (CH) upward to 100 ppm – 150 ppm. Adjustments of hardness increaser (calcium chloride) should be dissolved and added in 10 lb. increments, with each dosage separated by several hours. Never add hardness increaser (calcium chloride) and alkalinity increaser (sodium bicarbonate) at the same time.

DAY 3

Step #1. Test and adjust pH, total alkalinity (TA) and calcium hardness (CH) as per DAY 2 Step #2, and repeat Steps #6 and #8 of DAY 1.

Step #2. Add pre-diluted chlorine or liquid chlorine to 1.5 ppm – 3.0 ppm level (**IMPORTANT:** For salt water (SWCG) pools, do not add salt within the first 30 days).

Step #3. Brush the entire pool surface thoroughly at least twice daily to remove all plaster dust.

DAY 4 – 28

Day 4 – 7

Step #1. Test and adjust pH and total alkalinity (TA) maintaining ranges of DAY 2 Step #2, and repeat Steps #6 and #8 of DAY 1 each day for seven days to help prevent the scaling of the pool surface.

Step #2. In-floors and directional eyeballs may be added once water chemistry is balanced.

Day 4

Step #1. Calcium hardness (CH) should be increased slowly (if necessary) to a minimum of 200 ppm.

Step #2. Begin adjusting the cyanuric acid (CYA) to 30 ppm – 50 ppm. Add CYA through the skimmer while the pumps and filtration system are running for a minimum of three days. After each addition brush the entirety of the interior finish. **Concentrated CYA can cause pigmented finishes to discolor.**

Day 7 If there is any plaster dust remaining, remove it using a brush pool vacuum.

Day 7 – 28 Once plaster dust is removed, and with a good pool cleaning system in place, brushing can be limited to the removal of visually observed material (leaves, dirt, etc.) or when adding chemicals.

**ALWAYS ADD A CHEMICAL TO WATER
NEVER WATER TO THE CHEMICAL**

AFTER 28 DAYS & BEYOND

It is critical that maintenance of the finish and balanced water chemistry continue throughout the year.

The pool water chemistry constantly changes and must be continually monitored and chemically adjusted.¹ Especially, strive to maintain the pH and carbonate alkalinity³ (CA) in their proper ranges. A negative (-) LSI will cause leaching, etching, or discoloration of the surface. A positive (+) LSI will cause mineral scaling, metal staining, or discoloration on the surface.

The Langelier Saturation Index (LSI) must be maintained between 0.0 and +0.3 for ongoing maintenance, especially within the first six months after the initial start-up, to avoid potentially serious damage to the interior finish surface.

- Free Chlorine = 1 ppm to 3 ppm
- Total Chlorine = 1 ppm to 3 ppm
- Sequestering Agent = as per manufacturer recommendations
- pH = 7.2 to 7.6
- Carbonate Alkalinity = 80 ppm to 120 ppm³
- Calcium hardness = 200 ppm to 400 ppm
- Cyanuric acid = 30 ppm to 50 ppm (ideal operating range)²
- TDS = 300 ppm to 1800 ppm (non-salt pools)
- Salt Level = as per manufacturer recommendations (salt chlorination ONLY)

$$\text{pH} + \text{C} \text{arbonate} \text{A} \text{lkalinity Factor} + \text{C} \text{alcium} \text{H} \text{ardness Factor} + \text{Temp} \text{erature Factor} - \text{TDS} \text{ Factor} = \text{Langelier Saturation Index (LSI)}$$

¹ When possible, pre-dilute chemicals prior to adding into the pool water. Add chemicals while the pumps are running, and when possible, in the deep end away from benches, steps, and suction lines, followed by brushing of the area to disperse the chemicals. Chemical feeders should be installed and maintained in a manner that does not allow chemicals to enter the pool in concentrations that would cause deterioration, color loss, discoloration, or scaling of the interior finish.

Always follow the manufacturer's and/or plasterer's recommendations and instructions. Always add a chemical to water, never water to the chemical.

² **CAUTION:** Research has shown that cyanuric acid (CYA) levels of 100 ppm (mg/l) and above may cause permanent deterioration to the pool surface. High cyanuric acid levels may require the CYA test to be diluted to calculate an accurate reading. CYA readings near 100 ppm should be retested using a solution that is diluted by 50% with tap or bottled water, then multiplied by 2, to reach the corrected CYA level. If the reading is still near 100 ppm after using a 50% dilution, it is recommended to drain the pool and/or treat the water to within the normal operating range for CYA (30 ppm – 50 ppm).

³ **Total Alkalinity (TA) – 1/3 Cyanuric Acid = Corrected or Carbonate Alkalinity (CA)**

These procedures are sound technical practices in the industry and are advisory and non-binding. The National Plasterers Council does not regulate, control, or monitor the acts of its members or others in terms of conformance to any of the guidelines, recommendations, or other information contained in these technical procedures.

LSI CALCULATOR			
CA ppm	CH ppm	Temp F° (C)	Total Dissolved Solids (TDS) ppm
FACTOR	FACTOR	FACTOR	FACTOR
5 = 0.7	75 = 1.5	32 (0°C) = 0.0	Up to 1000 = 12.10
25 = 1.4	100 = 1.6	37 (3°C) = 0.1	1000 = 12.19
50 = 1.7	150 = 1.8	46 (8°C) = 0.2	2000 = 12.29
75 = 1.9	200 = 1.9	53 (12°C) = 0.3	3000 = 12.35
100 = 2.0	300 = 2.1	60 (16°C) = 0.4	4000 = 12.41
125 = 2.1	400 = 2.2	66 (19°C) = 0.5	5000 = 12.44
150 = 2.2	800 = 2.5	76 (24°C) = 0.6	
200 = 2.3	1000 = 2.6	84 (29°C) = 0.7	
300 = 2.5		94 (34°C) = 0.8	
400 = 2.6		105 (41°C) = 0.9	

CALCULATED LSI*

*Use the closest factor to the chemistry reading.

For example, if pool water chemistry is:	pH	7.8
pH 7.8	CA Factor	2.1
CA 125	CH Factor	2.1
CH 300	Temp Factor	0.8
Temp 90°F (32°C)	TOTAL	+12.8
TDS 950	Subtract TDS Factor	-12.1
	LSI =	+0.7

A calculated (+) positive LSI has scaling tendencies. | Target calculated 0.0 to +0.3 is considered balanced.

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