

# Pebble: Origin of the Species

By **Rob Blake**, POOLCORP Product Manager, Pool Finish



Pebble pool finishes were introduced into the North American pool market in 1987 by Pebble Technologies based in Scottsdale, AZ. They acquired the rights from an Australian company, and for the first 10-15 years, Pebble Tec had a monopoly on the material and installation process. That all began to change when the industry realized there were good resources for pool finish pebble, (white, gold and black) in America and Mexico.

*Last year, our NPT brand reached an auspicious milestone by selling over a million bags of pebble.*

NPT® launched the StoneScapes® brand of pebble pool finishes in 2003 to take advantage of the pent up demand. In 2003, pebble was predominately a dealer direct option – not readily available through traditional wholesale Sales Centers like ours. NPT changed the market dynamics by providing pebble to applicators looking to sell and install these premium finishes.

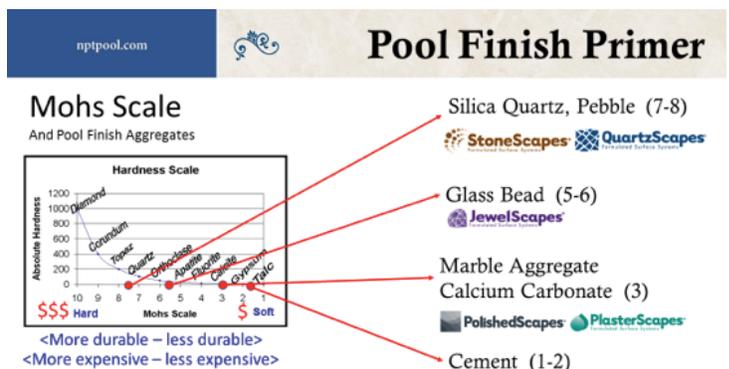
Sales of pebble finishes took off. They continue to be the go-to pool finishes for many builders and remodelers looking for a “bullet proof”, aesthetically pleasing pool finish that will last for years. Pebble finishes came along at a time when the pool industry was struggling with the quality and consistency of white Portland cement. Thanks to the natural color variegation in the pebbles themselves, a pebble pool finish has built-in “camouflage” for hiding problems with cement, so applicators began to rely on pebble finishes more and more.

Last year, our NPT brand reached an auspicious milestone by selling over a million bags of pebble. That equates to thousands of installed pool finishes over the course of one year. Any idea on how many pebbles there are in a pool featuring 8 batches of StoneScapes? Roughly 400 MILLION pebbles!

## History of Pool Finishes

The modern pool industry began to take a firm hold in the US in the years following WWII. Pools became more affordable for the middle class and the number of pools being built began to rise steadily. In the beginning, silica quartz aggregates were the preferred choice for swimming pool plaster finishes because of its color, strength, and durability. During the 1960s sources for silica aggregates were being depleted and marble aggregates began to take their place. Marble aggregates became the most common aggregate for pool finishes until the introduction of pebble finishes in the late 80s.

The pebble used to make pebble pool finishes is also, in fact, a silica quartz aggregate – even though we call it pebble. NPT’s QuartzScapes, StoneScapes and ColorScapes finishes all feature hard, durable silica quartz aggregates. The Mohs scale is a logarithmic scale which means that the whole number value is a tenfold increase, (think Richter scale). Marble aggregate is a 3 on this scale and silica quartz is 7 to 8. So, silica quartz is more than 100,000 times harder than marble aggregate. (1)



Continued on next page

# Pebble: Origin of the Species

## Be Size Wise

There is no industry-wide accepted guideline or criteria for the pebble that goes into a pool finish. It's totally subjective and continues to change over the years. The original pebble finishes featured large round aggregates. **Now, 80% of all pebble sold is Mini Pebble.** When pebble began to be sourced domestically, the parameters changed as the product changed. Because this is a natural resource that is mined, the product changes as sources become depleted and other sources emerge.

There are three sizes of pebble commonly used for making pool finishes:

- 12:20 aka "Micro" (looks like **QuartzScapes®**)
- 8:16 aka "Mini" (Largest aggregate retained by #8 screen to Smallest aggregate retained by #16 screen)
- 6:10 aka "Regular"

These numbers refer to the largest and smallest sorting screens that are used to separate out the material at the pebble processing plant. (Think of it as a pebble sieve.) All pebble is processed using gravity to aid in the sizing process. Unsorted pebble is fed to a screen deck which houses multiple screens in various sizes that are designed to sort the pebble by size as it vibrates across the screens. The goal is to sort the pebble to fall within certain parameters, like screen size 8 = largest pebble and 16 = smallest pebble.



When we say a pebble is "out of spec", we mean that it is not within the expected sizing parameters associated with a specific name like 6:10 & 8:16. A *sieve analysis* is a way to determine the gradation – distribution of aggregate particles, by size, within a given sample of the material. (2) A sieve analysis is the easiest way to analyze and compare the sizing of two similar products/pebbles. A sieve analysis for pebble looks like a classic bell curve with the vast majority of the material falling in the middle or highest point on the curve.

ANDERSON ENGINEERING CONSULTANTS, INC.  
10205 ROCKWOOD ROAD, LITTLE ROCK, ARKANSAS 72094

MECHANICAL GRAIN SIZE ANALYSIS (AASHTO T11 AND T27)

Project: SHERIDAN WHITE ROCK MISCELLANEOUS TESTING Project No.: 13705  
Contractor: SHERIDAN WHITE ROCK Date: 06/25/14  
Material: 6/10 REGULAR Sample No.: 6/23/14-1 Depth of Sample: N/A  
Soil Description: 6/10 REGULAR

| Sieve or Screen | Weight Retained (Grams) | Cumulative Weight Retained | Percent Retained | Percent Finer | Specification ASTM C 144 |
|-----------------|-------------------------|----------------------------|------------------|---------------|--------------------------|
| 3/8"            | 0.0                     | 0.0                        | 0.0              | 100.0         | —                        |
| #4              | 0.0                     | 0.0                        | 0.0              | 100.0         | —                        |
| #6              | 32.1                    | 32.1                       | 4.6              | 95.4          | —                        |

| LOSS BY DECANTATION (AASHTO T 11) |             |
|-----------------------------------|-------------|
| Original Weight:                  | 700.3 grams |
| Final Weight:                     | 700.3 grams |
| Washing Loss:                     | 0.0 grams   |
| Loss by Decant:                   | 0.0 %       |

The screens can be round or square and are about 4 feet in diameter. Screens wear out and can develop holes which is when we have issues with the size of the product that we receive. Typically, you see larger than expected aggregates in the mix when there is a hole in the screen. And yes, we have seen this with both gold and black pebble this year. If the pebble plant doesn't have storage silos, then they will feed the unsorted pebble directly to the sorting screens. Some pebble plants will clean and screen the pebble, then make huge piles of it on their property as they wait for orders to fill with the processed material.

It is very important that the pebble plant include *magnets* in the sorting line to remove any metal contaminants from the pebble. The best plants have multiple magnets in line so that there are multiple opportunities to filter out any metal objects. Some plants put the magnets at the end of the conveyor belts so that the pebble passes over them on their way to the screen decks. Other plants set up a "stack" of magnets with the pebble passing over 4-6 individual magnet decks before it is directed to the screen deck. Once the pebble has been sized properly, it is either fed to a silo where it waits to be bagged or it is dumped in large piles where it will sit until orders for it are received.

The three main colors of pebble that we use in our **NPT®** finishes: Gold, Black, and White each come from very specific geographic areas. The area where the pebble comes from determines how the pebble is mined and processed.

## Pearl River Region

About 30 miles east of POOLCORP's Support Office in Covington, LA lies the Pearl River; our primary source for **GOLD** pebble. (Or as Donna likes to refer to it, Yellow pebble, which in reality is a more accurate description of the pebble that everyone calls gold.) The Pearl River meanders for about 444 miles through Mississippi and Louisiana. (3) This river has been supplying the pool industry with pebble for many years. Think of all of the pool finish products that have the name "Pearl" in them and you begin to realize the impact that this region has had on our industry and exposed aggregated pool finishes. I find it a bit ironic that, though this region of the country is one of the main sources for pool pebble –

Continued on next page

# Pebble: Origin of the Species

pebble pool finishes are not nearly as popular here as traditional quartz finishes. I think that point speaks more to the fact that there are not enough qualified pebble applicators to support the product locally.



Gold pebble is extracted from large ponds (tributaries to the Pearl River), using diesel powered dredges. A dredge is a very powerful vacuum that is mounted on a floating barge with a large diameter pipe, (think fat straw), reaching down to the bottom of the pond sucking up pebbles off the bottom. The dredge pumps the pebble through pipes to an area beside the pond where it can be scooped up and loaded into large dump trucks to be taken to the pebble processing plant. The pebble being extracted from the ponds has been in the water a very long time and has migrated down river for many miles/years.



So Gold pebble is *alluvial* by nature which means that as it travels down river in constant contact with other aggregates it tends to wear the edges down and make them a bit smoother. Gold pebble from this region can range in color from yellow, to light brown, to reddish brown. It includes a fair amount of clear aggregates as well, which is normal considering that this is all silica quartz material. Too much clear quartz can pose a problem as the aggregate takes on the color of the cement which can vary greatly if a pigment is used.

## Viva Mexico

For years, Baja California, Mexico has been the primary source of black pebble. The area of Baja where the pebble comes from is a type of ecological preserve and the government has very strict guidelines for the mining of the pebble. The product comes from the beaches along the central coast of the peninsula and is heavily dependent on storm activity in the Pacific Ocean

to bring the pebble to shore. Along this stretch of coast, there are larger and more frequent waves in the winter months which means that is when the most pebble can be harvested. It is harvested by hand, from the sea, and there can be a “drought” when there are not enough waves to bring the pebble to the shore. “Miners” literally scoop up pebble in buckets to get it off the beach and to areas where it can be loaded into trucks and taken to the processing plant.



It is not uncommon to find bits of seashells in the bags of Mexican pebble. If you look at a StoneScapes® Black sample in your Design Center, chances are you will see some seashell. The black pebble can have green, gray, or brown highlights in it as well. Keep in mind that all of these pebble aggregates are natural and, as such, tend to have ever-changing highlights of color throughout them as the product changes. This variegation is normal in natural stone products as part of its inherent beauty.

All of the black pebble comes into the US via Tecate, a small border town about an hour east of San Diego, CA which is known for Tecate beer. (**Fun fact:** anyone of drinking age in Mexico is allowed one free beer each day at the Tecate plant. Step right up and they give you a nice cold one which you are supposed to drink before you leave.) Some of you may have encountered truckloads of black pebble with holes in the bags. This happens when the customs agents inspect the loads on their way into America. They poke holes in the bags to look for contraband hidden inside.

Like gold pebble, black pebble spends quite a bit of time in the water being smoothed out by constant contact with other aggregates. A good example of this action is Mexican Beach Cobble which comes from the same area as the pool pebble. The cobble is very smooth which makes it highly sought after for landscaping and architectural elements.

Continued on next page

# Pebble: Origin of the Species

## Hunter's Paradise

My first impression of the land where white pebble comes from – Sheridan, AR, about 75 minutes south from Little Rock – is that it looks more like a place that you would be deer or pheasant hunting rather than a somewhere you would be mining for pebble. The area is heavily forested and the white pebble is found below the surface – from a few feet down, to more than 50 feet deep in layers or strata of rock.

Before they can begin mining for the pebble the land must be cleared of all trees and “over burden” (i.e. anything that stands between the miners and the pebble). This process takes quite a bit of time and leaves the area looking torn up with mounds of earth and deep trenches scarring the land. All of these trenches and low lying areas fill up with water during the rainy season which is why the supply of pebble slows down dramatically during the rainy months.



The miners must divert the land to open up canals to allow the water to drain. They will also use large pumps to move the water out of areas that would not otherwise drain fast enough. They also create large ponds to divert the water to. Once they find a layer of good aggregate, they work the area, expanding in all directions until they hit the end of the vein. Since it comes from underground, white pebble is much more labor intensive than black or gold pebble. The miners are looking for golf ball sized or larger aggregates which they call “feedstock” because it will then be fed into a crusher to break the material down into specific sizes. These crushers are very expensive at approximately \$250,000 new – and they wear out.



Because the white pebble is crushed down from a larger size it is much more **angular** in nature than black or gold pebble. Hayden Gravel and Sheridan White Rock, our two main suppliers for white pebble, are right next to each other on a small country road. White pebble is by far the most popular pebble we sell each year. 8:16 Mini White pebble is the #1 pebble product we currently sell. ♦

## Parting Shot!

nptpool.com
Ponder This...

### 8:16 Mini White Pebble

- 1 ounce = 5,308 pebbles Palm of your hand
- 1 pound = 84,928 pebbles
- 5 pounds = 424,640 pebbles
- 1 x 50 lb. bag = 4,246,400 pebbles
- 1 600 lbs batch = 50,956,800 pebbles
- 8 batches = 407,654,400 pebbles Swimming Pool

- (1) <http://science.howstuffworks.com>
- (2) [http://www.in.gov/indot/div/mt/aashto/testmethods/aashto\\_t27.pdf](http://www.in.gov/indot/div/mt/aashto/testmethods/aashto_t27.pdf)
- (3) [https://en.wikipedia.org/wiki/Pearl\\_River\\_\(Mississippi%E2%80%93Louisiana\)](https://en.wikipedia.org/wiki/Pearl_River_(Mississippi%E2%80%93Louisiana))

## Additional Information Available Now

| StoneScapes®<br><small>Formulated Surface Systems</small> |  | Product Specification Sheet |  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
|---|--|-----------------------------|--|--------|-------|------------|------------------|------|----------------|--------------|-----------------------|------|------------|--------------|-----------------------|------|----------------|--------------|-----------------------|------|-------|------------|------------------|------|-----------------|--------------|-----------------------|------|--------------|--------------|-----------------------|------|-------------------------------------|--------------|--|------|------------------------------------|--------------|--|
| <b>Description</b>  | StoneScapes® is a formulated pool finish system which utilizes naturally occurring quartz pebble, specialty aggregates, high quality iron oxide pigments, and white Portland cement to create a pool finish that represents the best that mother nature has to offer, enhanced by advanced technologies. The end result is a spectacular and long lasting pool finish. StoneScapes® is ideal for both commercial and residential installations due to its strength, integrity, texture, color palette, and over all aesthetic appeal. To maximize the performance and service life of any StoneScapes® pool finish make sure to use Azteca/NPT Modifier in each batch to achieve the highest compressive strength as well as a more tenacious bond with the substrate as well higher resistance to degradation by chemical imbalance or abuse.   |                             |  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| <b>Benefits</b>   | Strength, Durability, Longevity, Etch Resistance, Ease of Maintenance, Wide Range Standard Color Palette, Custom Colors Available, POOLCORP® Supported, 10 Year Standard Warranty  |                             |  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| <b>Test Data</b>  | <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <caption>Light Reflectance Value Test Results</caption> <thead> <tr> <th>Rating</th> <th>Color</th> <th>NPT® Brand</th> <th>Pool Finish Type</th> </tr> </thead> <tbody> <tr> <td>56.1</td> <td>Zanzibar White</td> <td>StoneScapes®</td> <td>Natural Quartz Pebble</td> </tr> <tr> <td>49.7</td> <td>White Mini</td> <td>StoneScapes®</td> <td>Natural Quartz Pebble</td> </tr> <tr> <td>45.6</td> <td>Aqua Cool Mini</td> <td>StoneScapes®</td> <td>Natural Quartz Pebble</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <caption>Dynamic Coefficient of Friction(DCOF) Test Results</caption> <thead> <tr> <th>DCOF</th> <th>Color</th> <th>NPT® Brand</th> <th>Pool Finish Type</th> </tr> </thead> <tbody> <tr> <td>0.73</td> <td>White - Regular</td> <td>StoneScapes®</td> <td>Natural Quartz Pebble</td> </tr> <tr> <td>0.71</td> <td>White - Mini</td> <td>StoneScapes®</td> <td>Natural Quartz Pebble</td> </tr> <tr> <td>0.67</td> <td>Aqua White - TOG: Puerto Rico Blend</td> <td>StoneScapes®</td> <td>Natural Quartz Pebble + 25% glass bead</td> </tr> <tr> <td>0.66</td> <td>Aqua Cool - TOG: Puerto Rico Blend</td> <td>StoneScapes®</td> <td>Natural Quartz Pebble + 25% glass bead</td> </tr> </tbody> </table> <p><small>* Average of three measurements</small></p> |                             |  | Rating | Color | NPT® Brand | Pool Finish Type | 56.1 | Zanzibar White | StoneScapes® | Natural Quartz Pebble | 49.7 | White Mini | StoneScapes® | Natural Quartz Pebble | 45.6 | Aqua Cool Mini | StoneScapes® | Natural Quartz Pebble | DCOF | Color | NPT® Brand | Pool Finish Type | 0.73 | White - Regular | StoneScapes® | Natural Quartz Pebble | 0.71 | White - Mini | StoneScapes® | Natural Quartz Pebble | 0.67 | Aqua White - TOG: Puerto Rico Blend | StoneScapes® | Natural Quartz Pebble + 25% glass bead | 0.66 | Aqua Cool - TOG: Puerto Rico Blend | StoneScapes® | Natural Quartz Pebble + 25% glass bead |
| Rating  | Color  | NPT® Brand                  | Pool Finish Type                       |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| 56.1  | Zanzibar White   | StoneScapes®                | Natural Quartz Pebble                  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| 49.7  | White Mini   | StoneScapes®                | Natural Quartz Pebble                  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| 45.6  | Aqua Cool Mini   | StoneScapes®                | Natural Quartz Pebble                  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| DCOF  | Color  | NPT® Brand                  | Pool Finish Type                       |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| 0.73  | White - Regular  | StoneScapes®                | Natural Quartz Pebble                  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| 0.71  | White - Mini   | StoneScapes®                | Natural Quartz Pebble                  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| 0.67  | Aqua White - TOG: Puerto Rico Blend  | StoneScapes®                | Natural Quartz Pebble + 25% glass bead |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| 0.66  | Aqua Cool - TOG: Puerto Rico Blend   | StoneScapes®                | Natural Quartz Pebble + 25% glass bead |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| <b>Test Lab:</b>  | The Council of North America, Inc. • 100 Clemson Research Blvd. • Anderson, SC 29625<br><small>Test Performed December 28th, 2015</small>  |                             |  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| <b>Test Method:</b>                                       | ANSI A137.1-2012 Section 9.6.1: "Wet Dynamic Coefficient of Friction (DCOF)"   |                             |  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| <b>Test Procedure Notes:</b>                              | <ul style="list-style-type: none"> <li>• Samples cleaned with Resovator #120 prior to testing</li> <li>• Three (3) pool finish samples were tested in all four directions with 10" long measurements</li> <li>• The SBR sensor was verified using a standard prior to testing.</li> <li>• Testing was performed under wet conditions using 0.05% SLS water</li> <li>• Testing was conducted under laboratory conditions at approximately 70°F &amp; 50% relative humidity</li> <li>• Tested using a calibrated BOT 3000E device.</li> </ul>  |                             |  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |
| 1   |  |                             |  |        |       |            |                  |      |                |              |                       |      |            |              |                       |      |                |              |                       |      |       |            |                  |      |                 |              |                       |      |              |              |                       |      |                                     |              |  |      |                                    |              |  |