The "RETRO PLATE" Process

"Concrete Processing" is: the act of changing an existing concrete surface by means of a mechanical process that involves cutting and/or refining the surface to a desired finish.

Polished Concrete is one of many end results in what is the "processing" of the concrete surface by mechanical refinement through the use of multiple abrasives measured in grits. This is the same processes used to polish stone such as marble and granite.

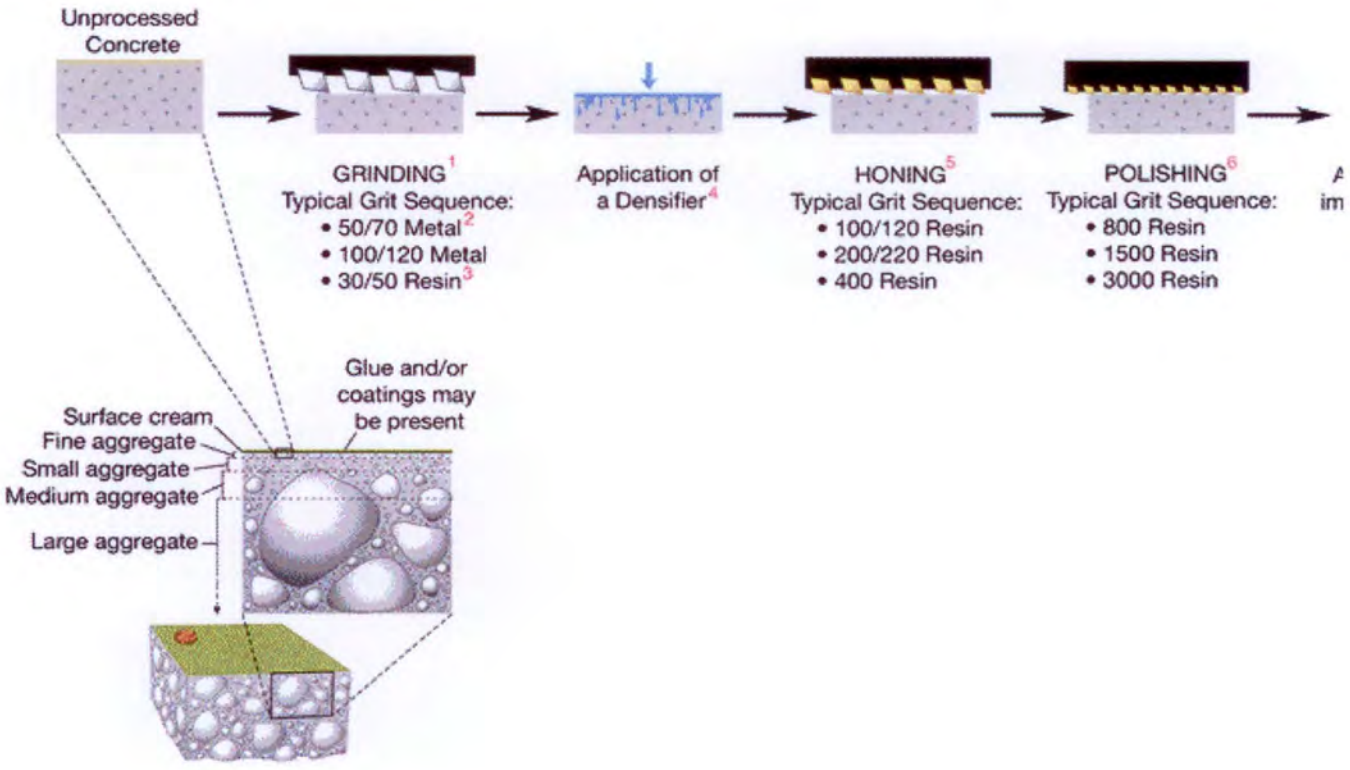
Currently, the industry breaks down the process of Concrete Polishing into grinding and polishing. Some within the industry simply use the word "polishing" for the entire process.

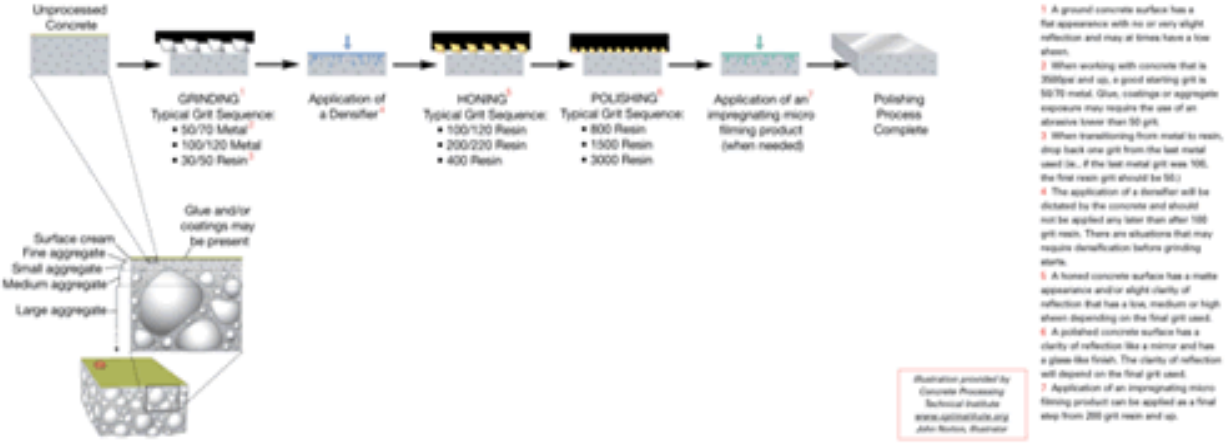
The process of Polishing Concrete consists of three consecutive categories: grinding, honing and polishing. Each category is then broken down into multiple steps, consisting of consecutively finer grit abrasives. During the processes a densifier or hardener is applied that is absorbed into the concrete creating a chemical reaction that makes the concrete more dense and hard.

Recent advances in polishing equipment and techniques has allowed concrete to be ground, honed and polished to a high polish with clarity of reflection and depth when looking straight down that does not use any type of coatings or sealers. Grinding, Honing and Polishing concrete is similar to sanding wood or buffing your finger nails with progressively finer abrasives. The process is performed with large planetary head machines where the main head rotates in one direction and smaller satellite heads spin in the opposite direction.

"Polished Concrete" is: the processing of the concrete surface through means of a mechanical process that uses an abrasive medium where each step is refined to its purest possible form on a microscopic level from one progressively finer abrasive to the next until the desired level of 'polish' is achieved.

The result is a beautiful, durable and efficient surface which eliminates the need for carpets or tile that requires expensive replacement, maintenance and use of harsh cleaning chemicals. The natural concrete floor can be customized and provides long-lasting beauty and ease of maintenance with environmental benefits.


Unprocessed Concrete
GRINDING[1]
Typical Grit Sequence:
• 50/70 Metal[2]
• 100/120 Metal
• 30/50 Resin[3]
Application of a Densifier[4]
HONING[5]
Typical Grit Sequence:
• 100/120 Resin
• 200/220 Resin
• 400 Resin
POLISHING[6]
Typical Grit Sequence:
• 800 Resin
• 1500 Resin
• 3000 Resin
Glue and/or coatings may be present
Surface cream
Fine aggregate
Small aggregate
Medium aggregate
Large aggregate



Maximum "clarity of reflection" and "durability" of the surface is determined by the precision with which a contractor executes the grit sequence and the full refinement of the concrete surface. Even if the desired result is not clarity of reflection or a glass like finish, each grit must be fully refined to obtain the maximum durability and a clean crisp look of the finished surface. Full refinement of the surface extends beyond replacing scratch patterns from one progressively finer grit to the next. Once a scratch pattern has been replaced additional refinement of the surface can be achieved.

It is imperative not to skip a grit in the processing sequence and when transitioning from metal to resin bond abrasives the first resin bond grit used must be one grit lower than the last metal grit used. For example, if the last metal grit abrasive used is a 100 then the first resin grit abrasive used must be a 50 grit.

IMPORTANT - The Craftsmanship of the Polishing Processes

The processes of polishing concrete is very technical in nature and requires real craftsmanship.

Just because two contractors have the same grit sequence specified the significant factor to take into consideration is that maximum refinement of each grit is performed. Refinement goes beyond replacing the scratch pattern from one grit to the next. Some contractors reduce refinement to

the process of replacing the scratch pattern from one grit to the next. This is a misconception. Once the scratch pattern has been replaced from the previous grit, further refinement of the concrete should take place.

Contractors need to understand and be able to explain what maximum refinement of the surface means.

There are many variables a contractor has to contend with throughout the processes. Knowing what these variables are and how do deal with them separates the knowledgeable contractor and the contractor just going through the motions of the processes.

Variables Within Contractor Control

Equipment – Weight, RPM's, The speed at which the machine is moving over the surface in a liner motion, Planetary Movement – Active/Passive and Direction of planetary movement.
diamond grit in the bonding, Hardness of diamond bonding, At what point do you switch to an abrasive that will close the surface faster?
Densifiers - Timing of application in the process, Type of densifier

- **Physical Grinding, Honing and Polishing.**
- **Identifying necessity and timing of repairs.**
- **Degree to which the concrete surface is cut**
  Level of clarity of the cut surface.
- **Thorough refinement of the concrete from one grit to the next**

Variables Outside Contractor Control

Is the concrete hard or soft?
What imperfections need to be removed?
Is the surface level and flat? Level means the whole slab. This refers to the angle at which the whole slab sits. Flat means areas of the slab. This refers to high and low spots within the slab.
What type of concrete mix is it? The concrete for a residential garage is different from the concrete used on bridges, roads and warehouses.
What types of ad mixtures were used? Retarders make the concrete

cure slowly, Accelerators make it dry faster, Air-entrainers add and distribute air into the concrete, Plasticizers increase the workability of the concrete, A variety of fibers and polymers may be used to add strength, Aggregate (some with different densities) may vary depending on geographical location.

Was the concrete vibrated to remove air?
How was it troweled? By hand? Mechanically?
Were any additional coatings, glues or mastics applied?

Visual Facets and Characteristics

There are four visual facets of Polished Concrete Aggregate Exposure, Clarity of Reflection, Color and Existing and Planed Characteristics.

1. Aggregate Exposure

- Surface Cream
- Fine Aggregate
- Medium Aggregate
- Large Aggregate

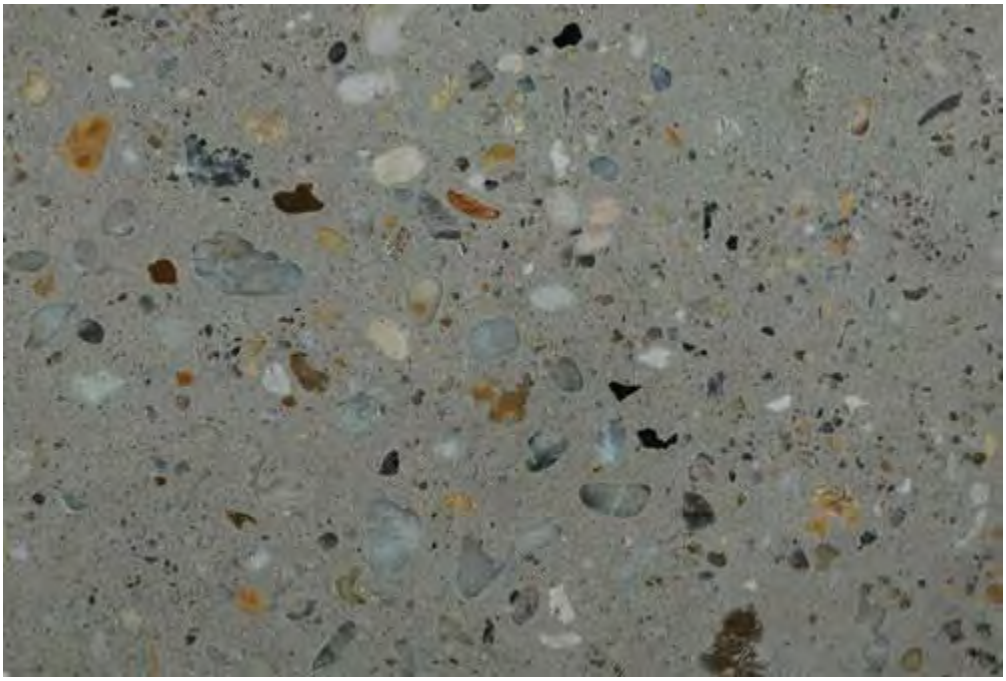
The goal is to refine "to" and remain "within" the desired layer and make it as consistent as possible throughout the entire area being processed. These layers can vary in thickness throughout the surface and the area of the slab being processed.

The Surface Cream layers are distinguished by color variations. There are several layers within the cream.

The Fine Aggregate layer is distinguished by aggregate that is the size of sand grains to 1/16 of an inch. This layer is the purest, the most consistent in color and has the most imperfections removed before exposing medium aggregate. This is the preferred processing layer for an aggregate free or as close to an aggregate free floor as possible.

Medium Aggregate

Large Aggregate



2. CLARITY OF REFLECTION

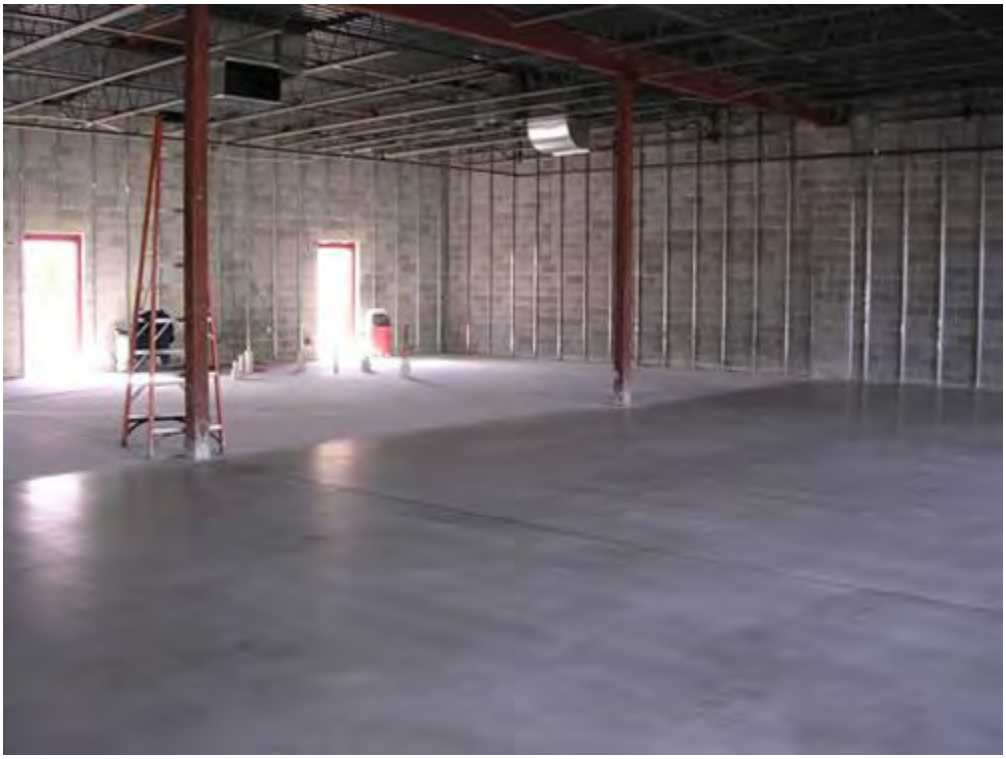
Clarity of reflection refers to how defined, crisp and clear the reflection of objects are in the new concrete surface. There is a difference between a crisp and clear reflection and a muffled one.

Clarity of reflection refers to how defined, crisp and clear the reflection of objects is in the concrete surface.

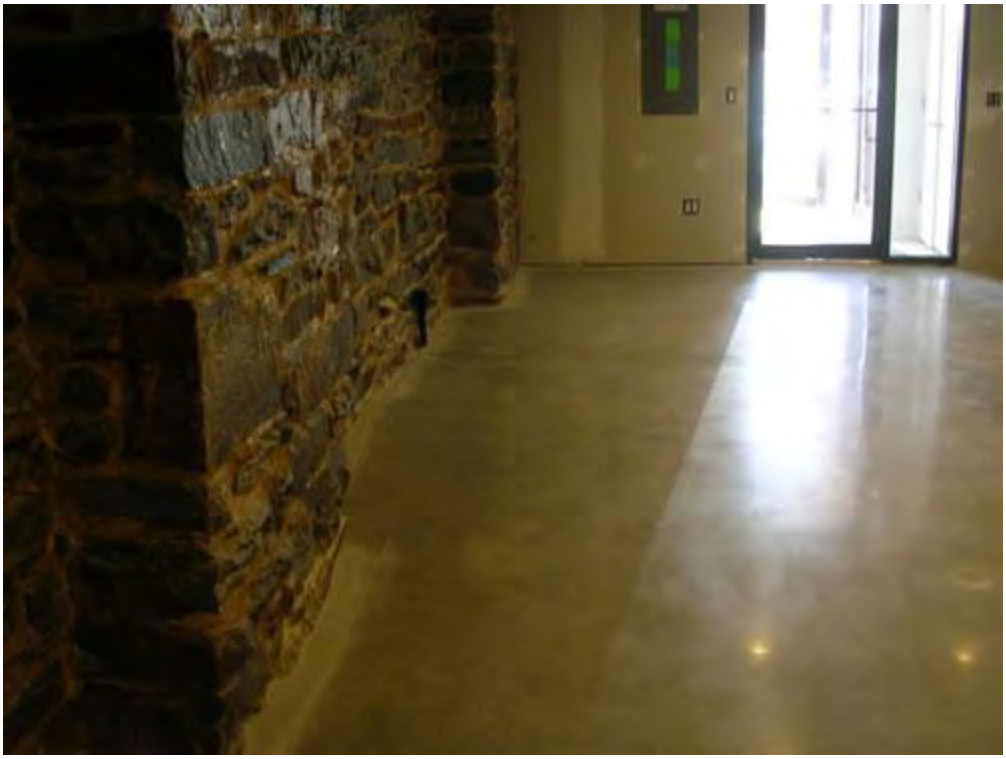
- Ground
- Honed
- Semi Polished
- Highly Polished

Ground concrete has a flat appearance with no reflection.

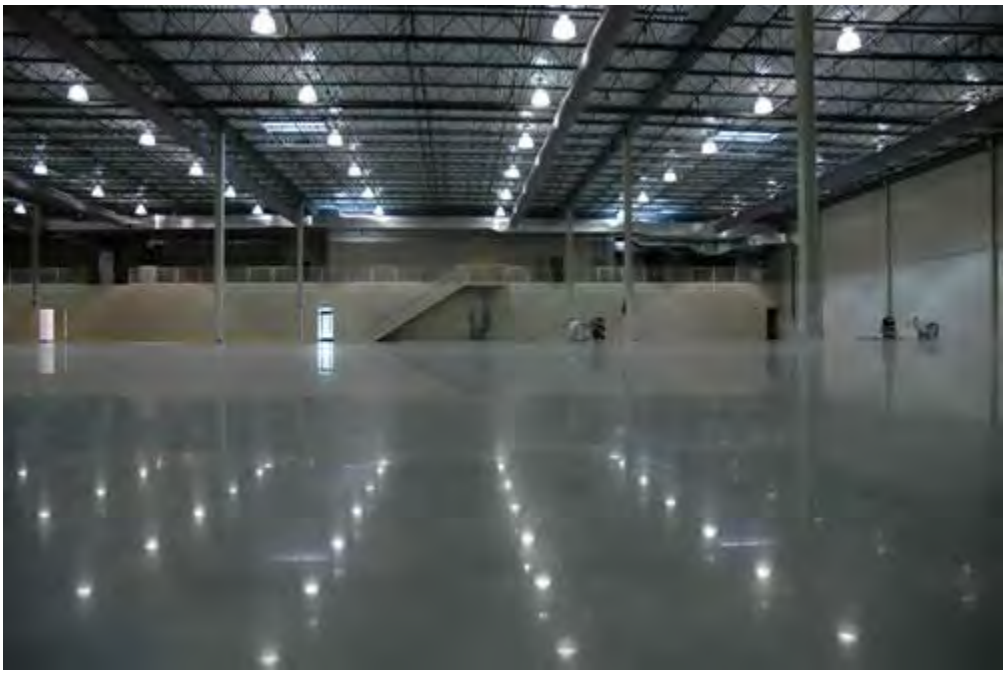
Honed concrete will have a well-refined and even appearance to the finish with a muffled shine lacking clarity of reflection but does have a clean and refined appearance. A honed finish stops at 200 or 400 grit.



Semi Polish concrete will have greater reflection with a crisp appearance. A semi polished finish stops at 800 grit.



Highly Polished concrete will have depth and clarity of reflection like a mirror. A highly polished finish stops at 1,500 or 3,000 grit.



3. COLORING

There are four primary ways concrete is colored:

- Integral - Performed at the time of pour and is considered environmentally friendly.
- Water Based Dyes - Performed during the polishing process and is considered environmentally friendly.
- Solvent Based Dyes - Performed during the polishing process and is not considered environmentally friendly.
- Acid Stain - Performed during the polishing process and is not considered environmentally friendly.

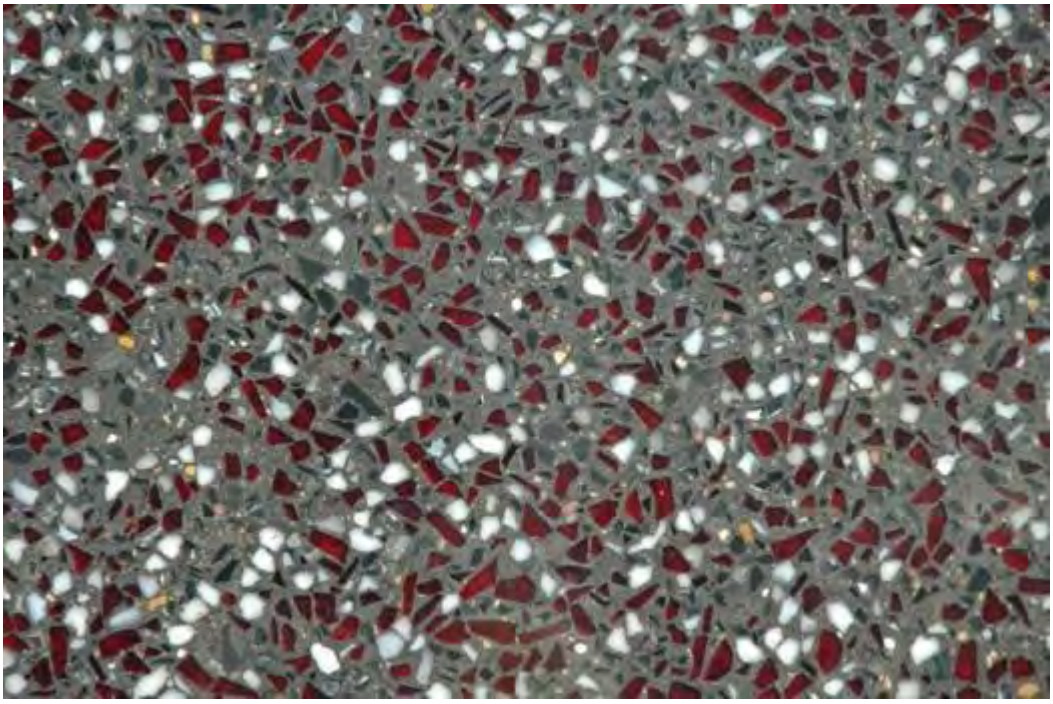
4. EXISTING AND PLANNED CHARACTERISTICS

Concrete contains multiple variations like a piece of wood. Each piece of concrete has its own character.

PLANNED CHARACTERICS

Metal Strips, Stained and Exposed Aggregate

Recycled Glass Mixed with Black Cement



EXISTING CHARACTERISTICS

Two different mixes separated by a cold joint. See the different aggregate?

A patched crack.

Surface crazing created by improper curing or a mix with too much water.

Pieces of wood in the concrete.

Rebar