

Do you know your  
stone floor type?

Yes

No

This is a interactive PDF. To  
navigate, simply select icons  
instead of scrolling page-to-page.

Click anywhere to get started!

close

**Do you know your  
stone floor type?**

**Yes**

**No**



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CARE GUIDE

## Stone Flooring

**Tip**- There are thousands of varieties of natural stone and man-made stone used today. This guide will help to narrow down and classify what group of stone your floor is in and how to best treat it. Although stone can vary a lot across types, usually it only takes a few questions to get a good idea of what type of stone it is.

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# **3M** FLOOR CARE GUIDE

Stone Floors

Tile

Rectangle

Slab/Pour

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# **3M** FLOOR CARE GUIDE



Stone Floors

Tile

Smaller than  
12"x 12"

Larger or  
Equal to  
12"x 12"

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# **3M** FLOOR CARE GUIDE



**Stone Floors**

**Tile / Larger or Equal to 12"x 12"**

**Textured  
(Rough Sawn,  
Natural)**

**Not Textured  
(Honed,  
Polished)**

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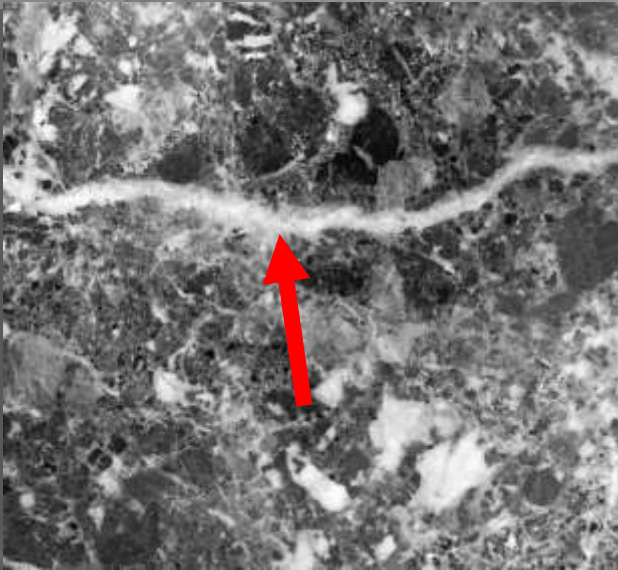
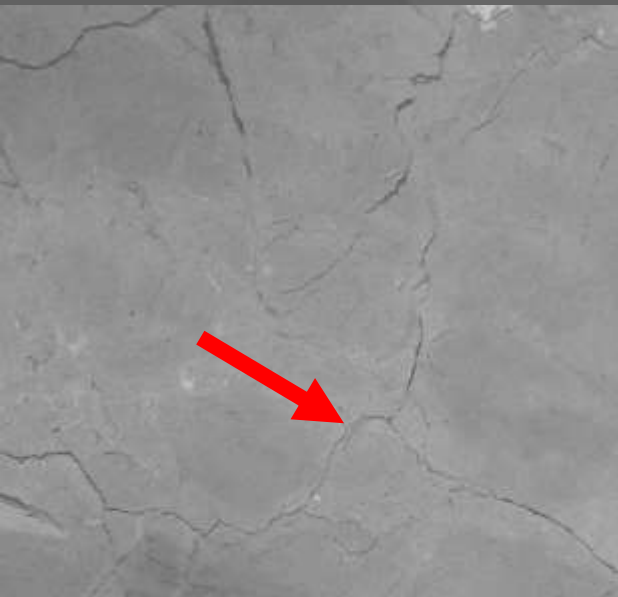
Stone Floors

Tile / Larger or Equal to 12"x 12" / Not Textured

**Does the tile have veins?**

Yes

No



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# 3M FLOOR CARE GUIDE

## Marble

Tile / Larger or Equal to 12"x 12" / Not Textured

[White](#)[Tan/Brown](#)[Red](#)[Black](#)[Green](#)[Maintenance & Troubleshooting](#)

Marble is a very common type of stone used for flooring because of its abundant variety of colors and natural beauty.

Marble is most often made up of limestone/dolostone (carbonate minerals- calcite, dolomite, etc.) that has been subjected to high heat and pressure. This causes physical changes to the crystalline structure (color, fractures) as well as chemical changes (veining).

Physical traits: Because of the minerals that make up marble, it is on the softer side of stones with a Mohs hardness between 3-5. This means that the bare stone may scratch when exposed to foot traffic.

Chemical traits: Acids will cause marble to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)



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# 3M FLOOR CARE GUIDE



Tile / Larger or Equal to 12"x 12" / Not Textured

## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Marble

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

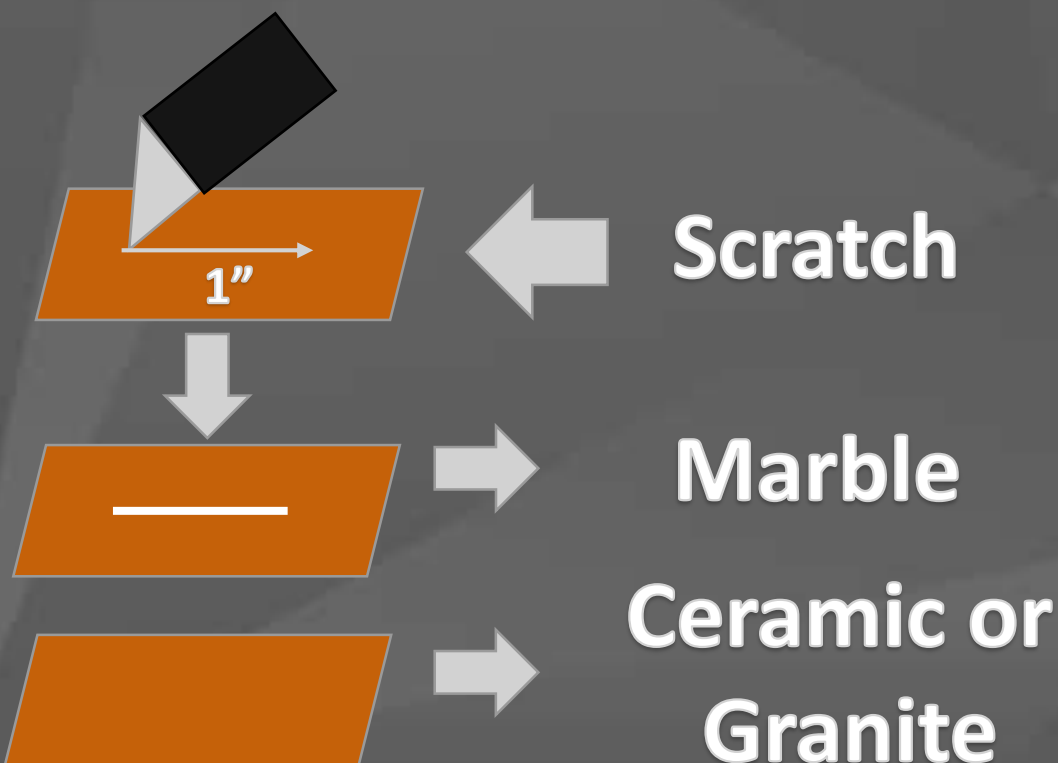
Tile / Larger or Equal to 12"x 12" / Not Textured

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.





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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

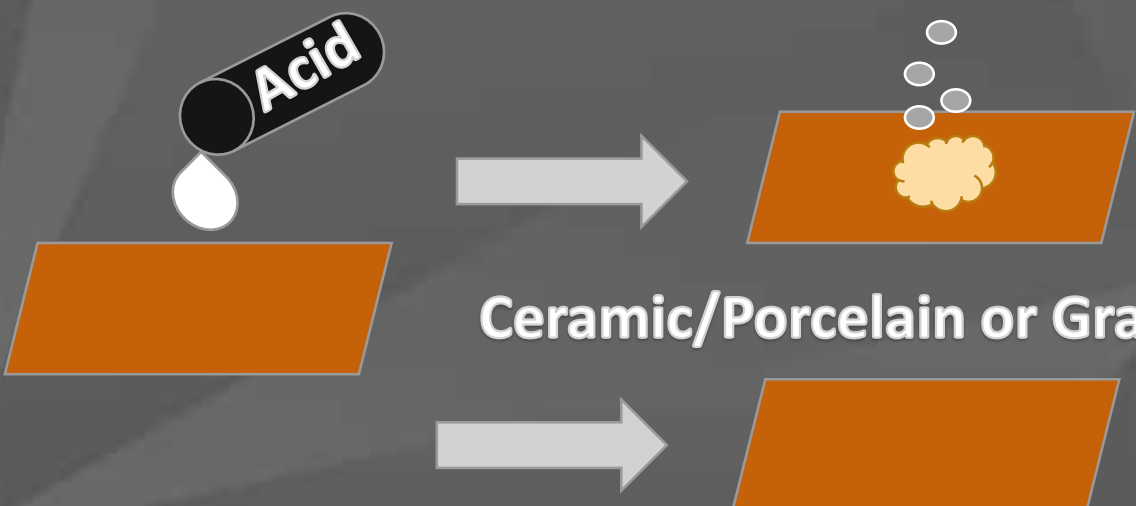
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Marble



Ceramic/Porcelain or Granite



Tile / Larger or Equal to 12”x 12” / Not Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Marble (3-5)

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	Fingernail (2.5)
Fluorite	4	Copper Penny (3.5)
Apatite	5	
Orthoclase	6	Knife (5.5)
Quartz	7	Steel Nail (6.5)
Topaz	8	
Corundum	9	
Diamond	10	

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# Marble

Tile / Larger or Equal to 12"x 12" / Not Textured

White

Tan/Brown

Red

Black

Green

Common white marbles:

Carrara- A white to light gray marble with light gray veining. The veining often has hazy edges, blending into the white matrix causing a mixed looks as opposed to contrasting.

Pictures

Calacatta- Calacutta is a purer white and the veining is a darker gray to black (sometimes may contain gold veining). There is often a very distinct transition from the dark vain to the white matrix, making the veins stand out more than Carrara.

Pictures

Thassos: A pure white marble originating in Greece. May sometimes have slight grey impurities present.

Pictures

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## Carrara Marble





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## Calacatta Marble



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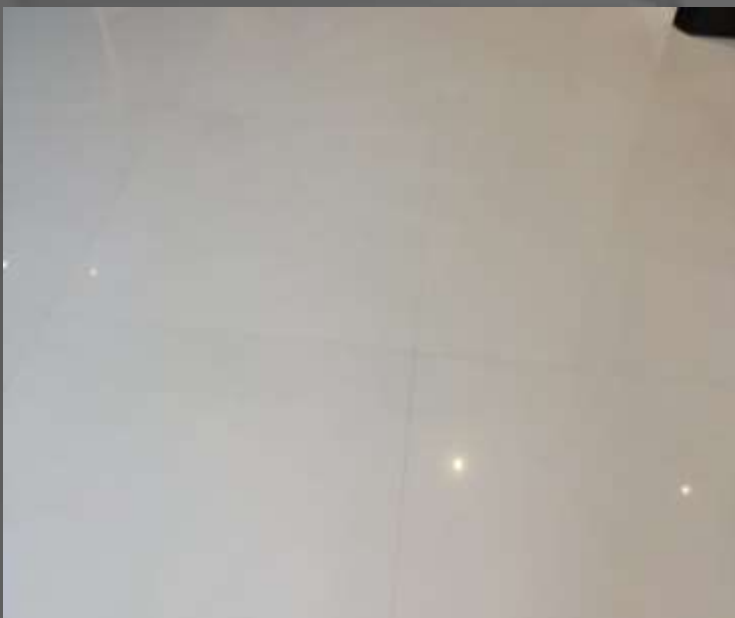
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## Thassos Marble



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# Marble

Tile / Larger or Equal to 12"x 12" / Not Textured

White

Tan/Brown

Red

Black

Green

Common Tan/Brown marbles:

Crema Marfil- Cream/Tan matrix with small amounts of thin light brown veining.

Pictures

Emperador- Most often dark brown matrix but may be light brown or light gray with a large amount of fine tan or white veining. Often has so much veining that it looks like chunks of rock that have fractured apart.

Pictures

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## Crema Marfil Marble





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## Emperador Marble



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# Marble

Tile / Larger or Equal to 12"x 12" / Not Textured

White

Tan/Brown

Red

Black

Green

Common red marble:

Rojo Alicante- Has a red matrix that can be anywhere in the light-medium-dark (red, pink, orange, burgundy) shades with most commonly white veining (sometimes fine black veins).

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## Rojo Alicante Marble





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# Marble

Tile / Larger or Equal to 12"x 12" / Not Textured

White

Tan/Brown

Red

Black

Green

Common black marble:

Negro Marquina-Black matrix with very crisp, contrasting white veins.

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## Black Marble



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# 3M FLOOR CARE GUIDE

## Marble

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Serpentine (Green Marble) - Serpentine is one of the more unknown stone types used in flooring today and is often referred to as green marble. It will visually look very similar to marble, with white/brown veins and a light-dark green bulk color. Serpentine, unlike marble is not made up of calcium based minerals. This confusion is often not an issue, as serpentine can take a polish and has a hardness similar to marble. Another common serpentine is labeled as rainforest marble which is green-brown with brown veins. Mohs' hardness is 3-6 depending on mineral construction.

[Pictures](#)[What's Mohs Hardness?](#)



Tile / Larger or Equal to 12”x 12” / Not Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Serpentine (3-6)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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Tile / Larger or Equal to 12"x 12" / Not Textured

**Serpentine**

**Rainforest**

**Green**





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# Marble

Uncoated/Bare

Crystallization

Coated

Impregnator

Polishing Compound

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## Marble-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Marble-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Marble-Uncoated/Bare

Staining/etching





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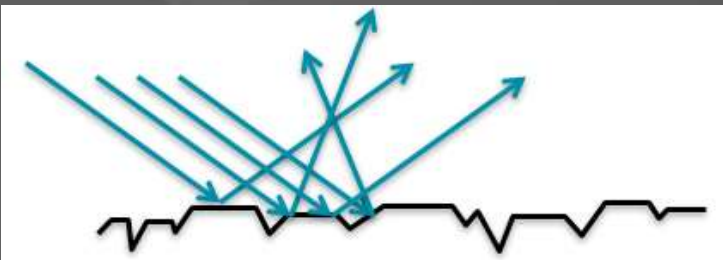


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## Marble-Uncoated/Bare

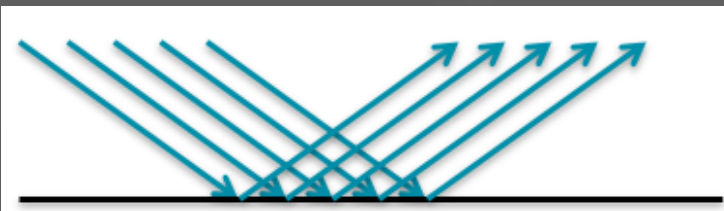
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# 3M FLOOR CARE GUIDE



Tile / Larger or Equal to 12"x 12" / Not Textured

## Marble-Uncoated/Bare

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Marble-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Marble-Uncoated/Bare

Soiling/soil build-up





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Tile / Larger or Equal to 12"x 12" / Not Textured

# Marble-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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Troubleshooting**

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# Marble-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

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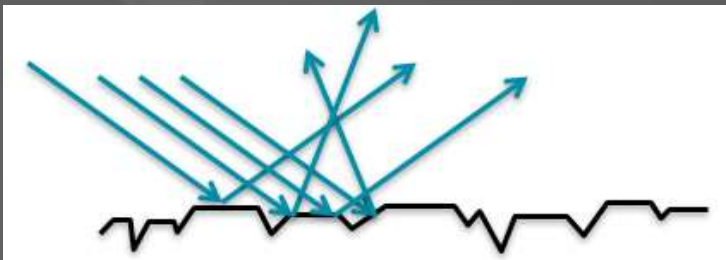


Tile / Larger or Equal to 12"x 12" / Not Textured

## Marble-Crystallization

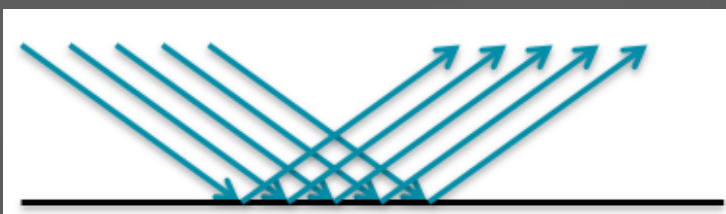
### Dulling

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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Marble-Crystallization

Dulling





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Tile / Larger or Equal to 12"x 12" / Not Textured

## Marble-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.

[Pictures](#)

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# Marble-Crystallization

Spalling



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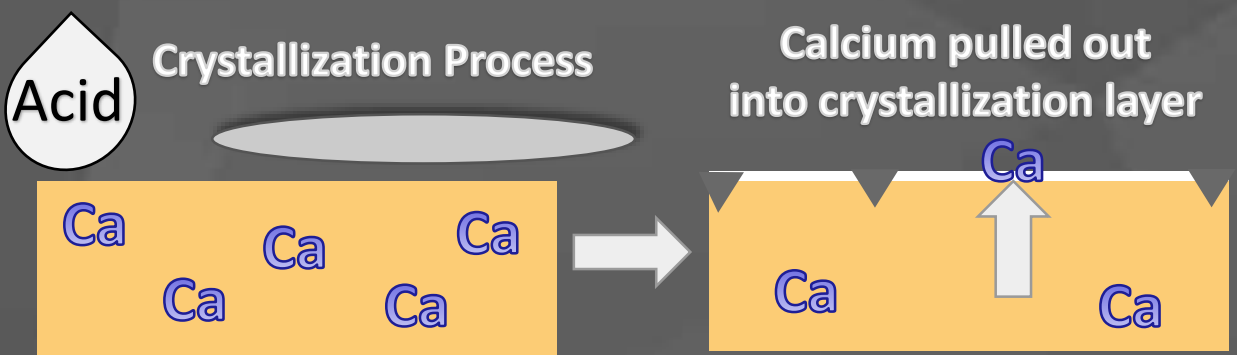


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## Marble-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



[Pictures](#)



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# Marble-Crystallization

Over-Crystallization





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Tile / Larger or Equal to 12"x 12" / Not Textured

## Marble-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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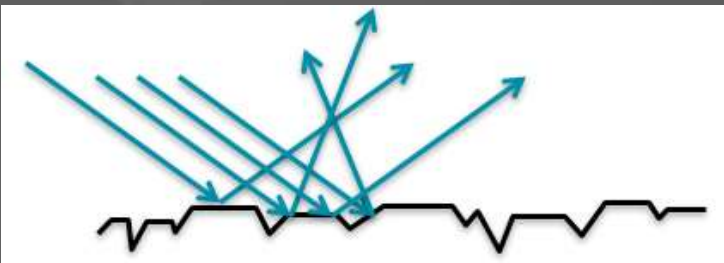


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## Marble-Coated

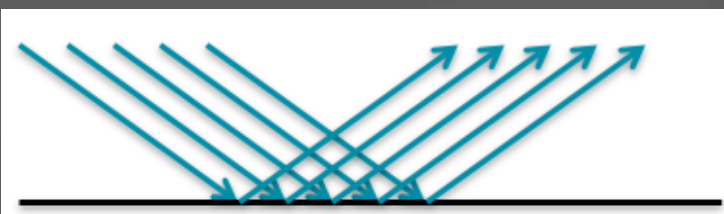
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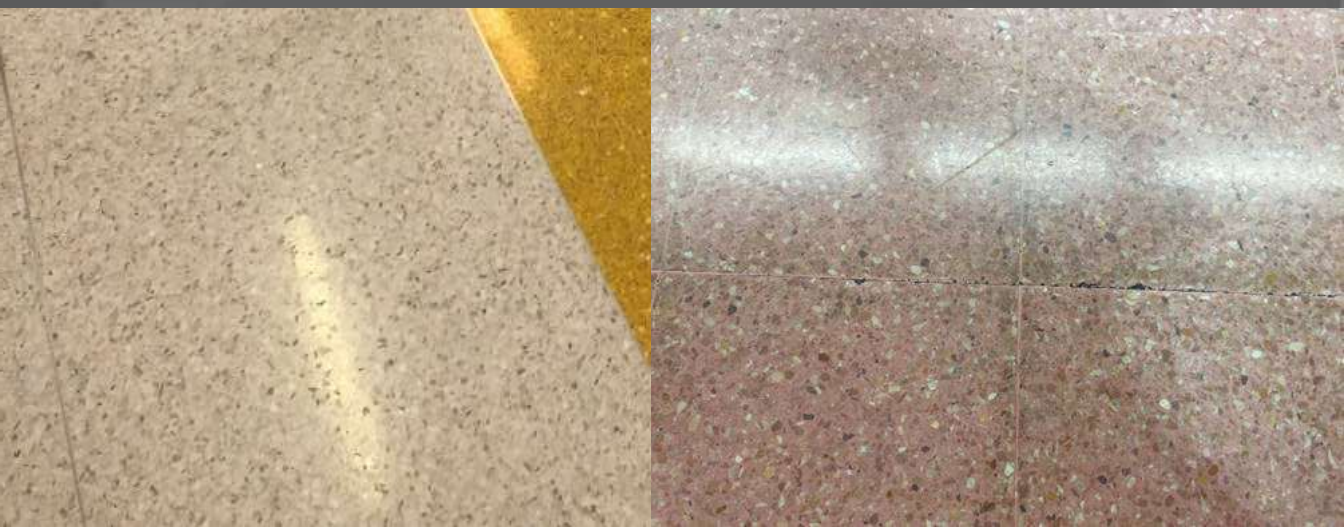
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Tile / Larger or Equal to 12"x 12" / Not Textured

# Marble-Coated

Dulling



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Tile / Larger or Equal to 12"x 12" / Not Textured

## Marble-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Marble-Coated

Soiling



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## Marble

# Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Tile / Larger or Equal to 12”x 12” / Not Textured

# Low Gloss/Poor Gloss

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Finish applied too thick.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats. Switch to flat mop.</li></ul>
<ul style="list-style-type: none"><li>• Not enough top coats applied.</li></ul>	<ul style="list-style-type: none"><li>• Scrub, rinse, recoat.</li></ul>
<ul style="list-style-type: none"><li>• Additional coats applied too soon.</li></ul>	<ul style="list-style-type: none"><li>• Wait for each coat to dry completely.</li></ul>
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>
<ul style="list-style-type: none"><li>• Dirty mop and/or bucket.</li></ul>	<ul style="list-style-type: none"><li>• Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.</li></ul>
<ul style="list-style-type: none"><li>• Ammonia or bleach used in damp mopping.</li></ul>	<ul style="list-style-type: none"><li>• Use only cleaners that are designed for the floor.</li></ul>
<ul style="list-style-type: none"><li>• Fan used to dry finish.</li></ul>	<ul style="list-style-type: none"><li>• Make sure fan is not blowing directly at floor finish.</li></ul>
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity.</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50%RH. Make sure HVAC is on. Use fans carefully.</li></ul>



Tile / Larger or Equal to 12”x 12” / Not Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.

- Damp mopped with dirty water and/or mops.

- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.

- Build up of disinfectant cleaner.

- Extremes in temperature and humidity.

- Additional coats applied too soon.

- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.

- Use only clean mops and buckets. Change water frequently.

- Use only cleaners that are designed for the flooring according to manufacturing specifications.

- Periodically clean floor with neutral cleaner to help remove any buildup.

- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.

- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.

- Reduce number of coats applied

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# Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# Marble-Impregnator

## Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# Marble-Impregnator

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Marble-Impregnator

Staining/etching



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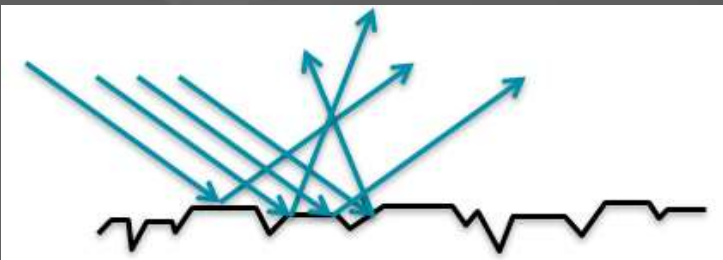


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## Marble-Impregnator

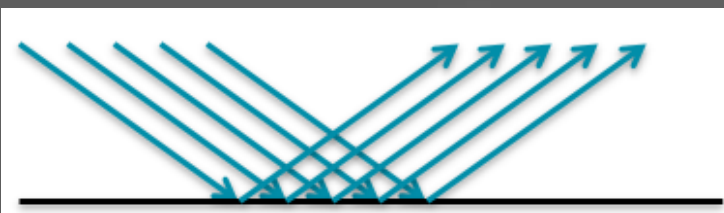
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Marble-Impregnator

Dulling/scratching





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## Marble-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Marble-Impregnator

Soiling/soil build-up



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## Marble-Polishing Compound

- Most marble has been polished in the factories using various grades of abrasives followed by a final step using an abrasive in combination with oxalic acid. This same process can also be done to refresh natural calcareous stone that has dulled over time.
- Most often, polishes are used with a red or natural floor pad. The polishing compound is mixed with water and buffed with 175rpm floor machine. Floors with deeper scratches or other damage typically must be diamond honed prior to using marble polishing products. The calcium oxalate formed in the reaction is washed away with the slurry from the process leaving behind a smoothed and polished stone surface that has not been chemically altered, just highly polished.
- Note that the above does not mean that oxalic acid will not etch stone surfaces. Oxalic acid (and any acid) dropped on a marble surface will etch. Factory polishing and marble restoration are performed under controlled circumstances to reach desired results.

**Maintenance &  
Troubleshooting**



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# Marble-Polishing Compound

## Polishing Compound

The polishing compound process leaves a highly polished surface when finished. There is no protection on the surface, making it susceptible to damage from abrasion and staining or etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be required if the floor is damaged or deeply scratched. The polishing compound process is re-done to bring a polish back to the stone.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# Marble-Polishing Compound

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Marble-Polishing Compound

Staining/etching



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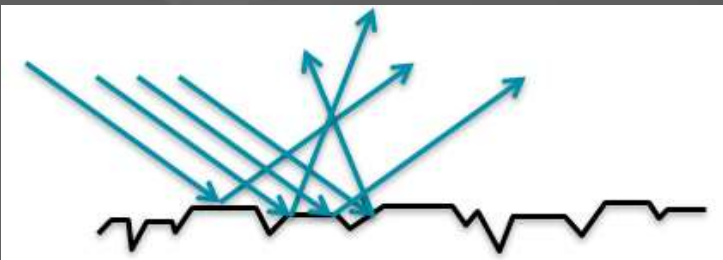


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## Marble-Polishing Compound

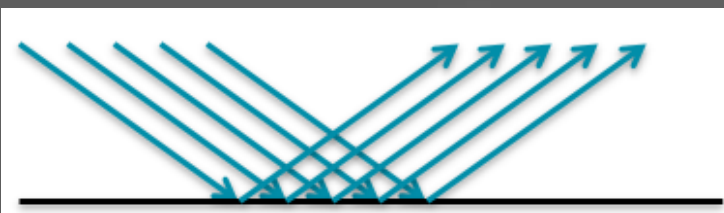
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Marble-Polishing Compound

Dulling/scratching





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## Marble-Polishing Compound

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Marble-Polishing Compound

Soiling/soil build-up



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Travertine

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Does the tile have  
pits/holes or a flowing  
layered pattern?

Yes

No





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# 3M FLOOR CARE GUIDE



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## Travertine

[Possibly Ceramic?](#)

Travertine is a sub-class of limestone that is formed from hot springs or caves near the earth's surface. Travertine is not subjected to the high pressures of most limestone resulting in some physical differences including pitting and void formation. Air or other organic material gets trapped in the formation and over time solidifies the voids into the rock as it hardens. This process also make travertine more porous than other limestone and marble. The pits/voids are often filled with epoxy to create a smooth surface.

Physical traits: Pitted or has off-colored circles from being filled. Tan-cream-light red in color with flowing linear layers. Mohs hardness between 3-4.

Chemical traits: Acids will cause travertine to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





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# Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

Travertine	Ceramic/Porcelain
<ul style="list-style-type: none"><li>• Pattern on each tile will be completely random</li><li>• Tiles are cut and are identically sized, grout lines can be less than 1/8”</li><li>• Bare stone is porous and will absorb liquids</li><li>• Edges are usually 90°</li><li>• Cracks will appear along weak points in tile, usually random or jagged</li><li>• Will scratch from scratch test</li><li>• Will fizz in acid test</li></ul>	<ul style="list-style-type: none"><li>• Pattern will often be repeated and seen in multiple tiles</li><li>• Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8”</li><li>• Non-porous, will not absorb liquids</li><li>• Edges are often rounded</li><li>• Cracks will be strait or rounded, but crack cleanly</li><li>• Will not scratch from scratch test</li><li>• Will not fizz in acid test</li></ul>

Acid Test

Scratch Test

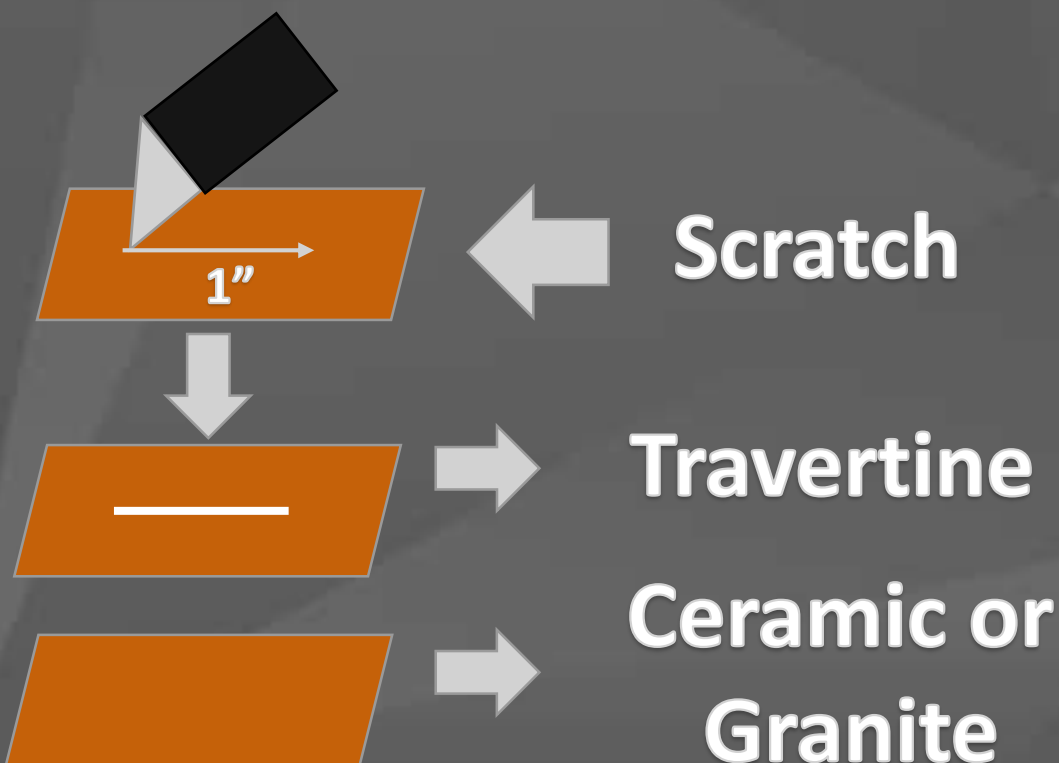
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

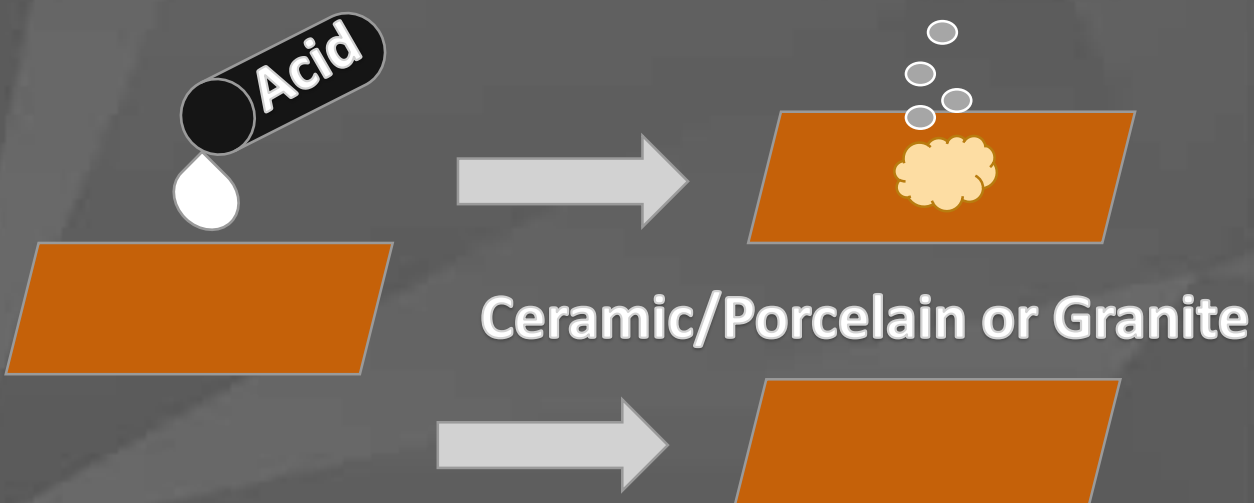
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Travertine





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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Travertine (3-4)

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	← Fingernail (2.5)
Fluorite	4	← Copper Penny (3.5)
Apatite	5	
Orthoclase	6	← Knife (5.5)
Quartz	7	← Steel Nail (6.5)
Topaz	8	
Corundum	9	
Diamond	10	



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## Travertine

Possibly Ceramic?



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# Travertine

Uncoated/Bare

Crystallization

Coated

Impregnator

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## Travertine-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Travertine-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Travertine-Uncoated/Bare

Staining/etching



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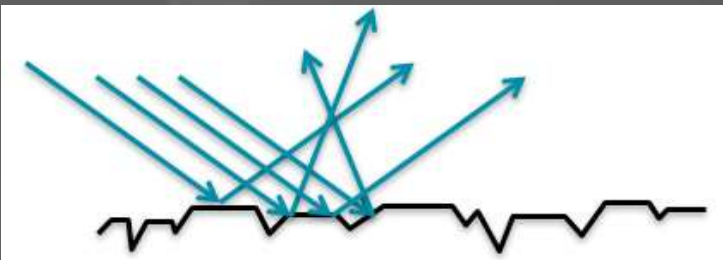


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## Travertine-Uncoated/Bare

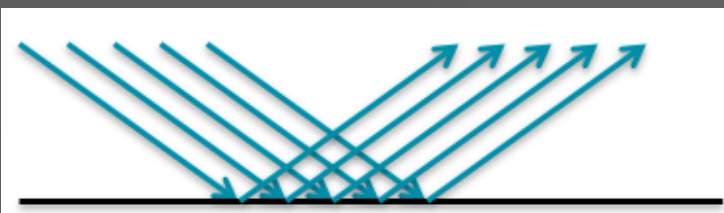
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Travertine-Uncoated/Bare

Dulling/scratching





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## Travertine-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Uncoated/Bare

Soiling/soil build-up



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# Travertine-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Travertine-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization



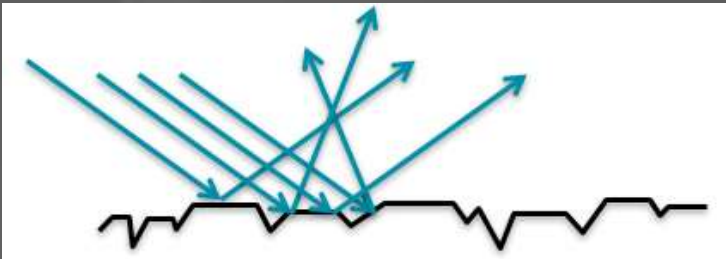
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## Travertine-Crystallization

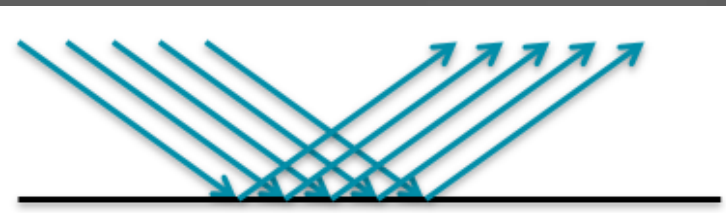
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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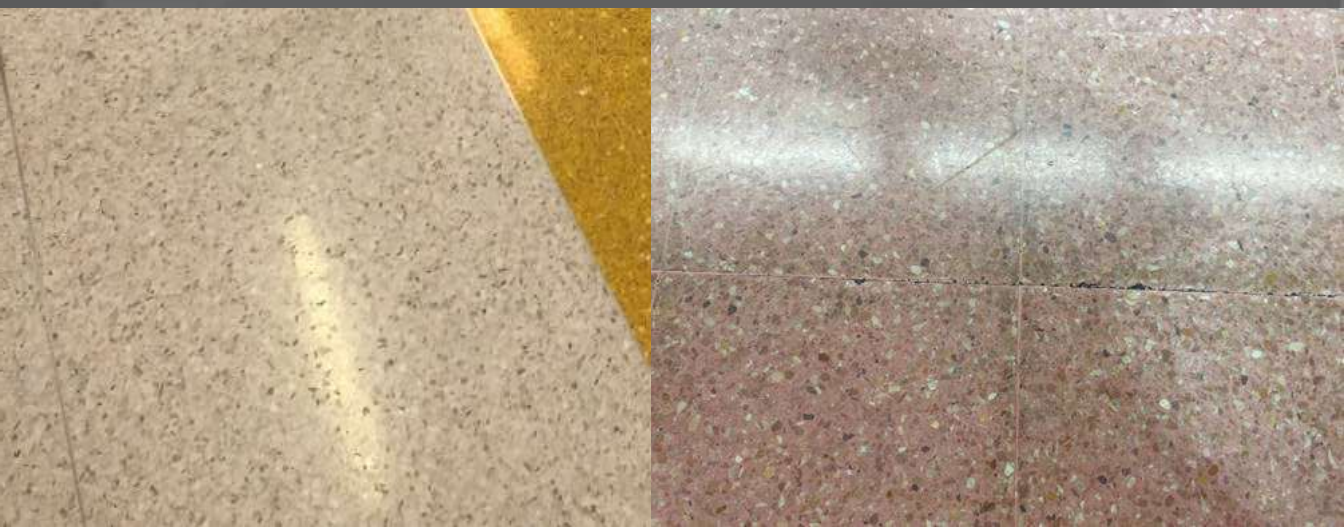
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# Travertine-Crystallization

Dulling



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## Travertine-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



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# Travertine-Crystallization

Spalling





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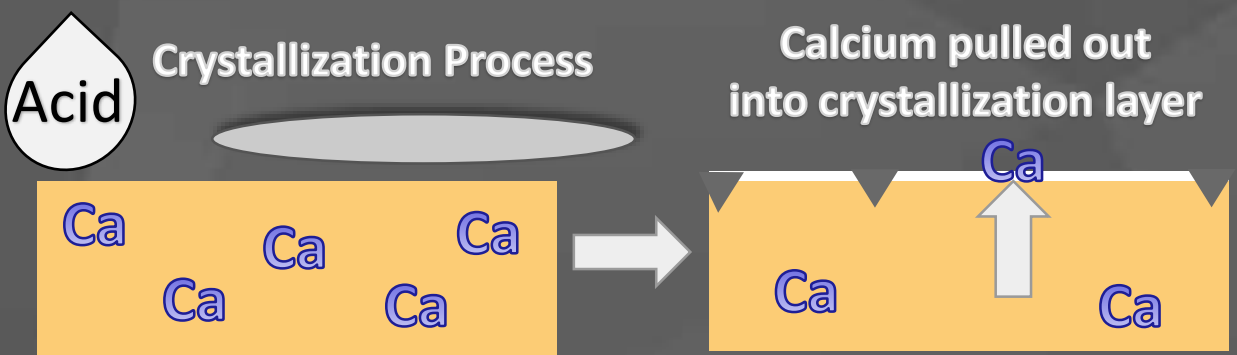


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## Travertine-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



## Pictures



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# Travertine-Crystallization

Over-Crystallization



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## Travertine-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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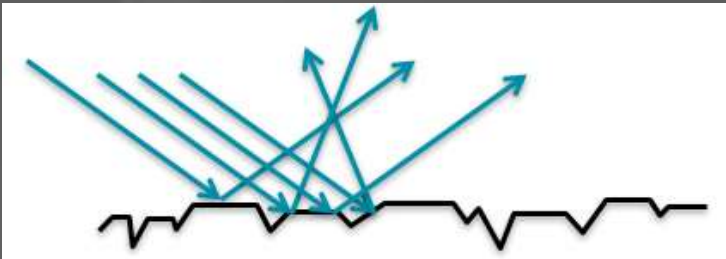


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## Travertine-Coated

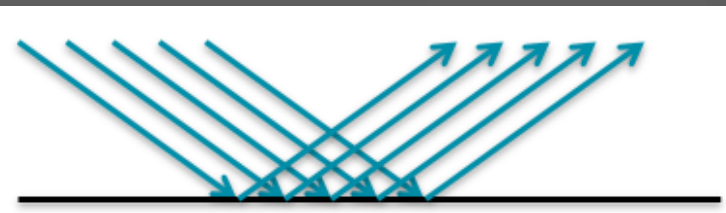
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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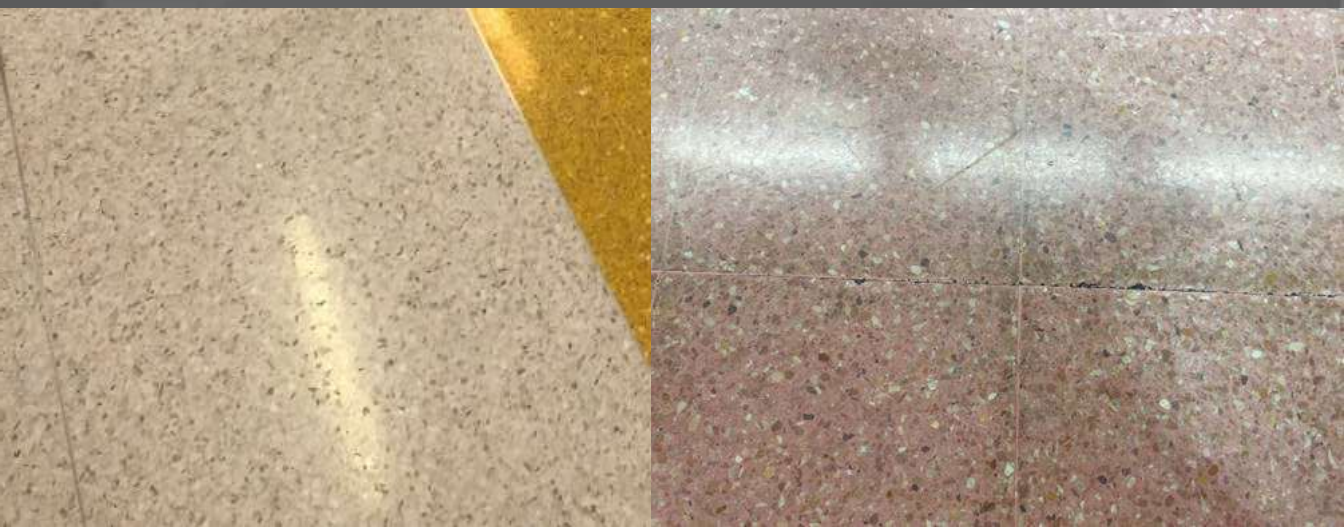
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# Travertine-Coated

Dulling





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## Travertine-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Coated

Soiling



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# Travertine

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Finish applied too thick.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats. Switch to flat mop.</li></ul>
<ul style="list-style-type: none"><li>• Not enough top coats applied.</li></ul>	<ul style="list-style-type: none"><li>• Scrub, rinse, recoat.</li></ul>
<ul style="list-style-type: none"><li>• Additional coats applied too soon.</li></ul>	<ul style="list-style-type: none"><li>• Wait for each coat to dry completely.</li></ul>
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>
<ul style="list-style-type: none"><li>• Dirty mop and/or bucket.</li></ul>	<ul style="list-style-type: none"><li>• Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.</li></ul>
<ul style="list-style-type: none"><li>• Ammonia or bleach used in damp mopping.</li></ul>	<ul style="list-style-type: none"><li>• Use only cleaners that are designed for the floor.</li></ul>
<ul style="list-style-type: none"><li>• Fan used to dry finish.</li></ul>	<ul style="list-style-type: none"><li>• Make sure fan is not blowing directly at floor finish.</li></ul>
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity.</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50%RH. Make sure HVAC is on. Use fans carefully.</li></ul>





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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Solvent based cleaner.</li></ul>	<ul style="list-style-type: none"><li>• Switch to water based neutral cleaner.</li></ul>
<ul style="list-style-type: none"><li>• Damp mopped with dirty water and/or mops.</li></ul>	<ul style="list-style-type: none"><li>• Use only clean mops and buckets. Change water frequently.</li></ul>
<ul style="list-style-type: none"><li>• Wrong cleaner, too much cleaner, or improperly diluted cleaner used.</li></ul>	<ul style="list-style-type: none"><li>• Use only cleaners that are designed for the flooring according to manufacturing specifications.</li></ul>
<ul style="list-style-type: none"><li>• Build up of disinfectant cleaner.</li></ul>	<ul style="list-style-type: none"><li>• Periodically clean floor with neutral cleaner to help remove any buildup.</li></ul>
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity.</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50%RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Additional coats applied too soon.</li></ul>	<ul style="list-style-type: none"><li>• Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Too many coats applied in 24 hours</li></ul>	<ul style="list-style-type: none"><li>• Reduce number of coats applied</li></ul>

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# Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>



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# 3M FLOOR CARE GUIDE

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## Travertine-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# Travertine-Impregnator

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Travertine-Impregnator

Staining/etching





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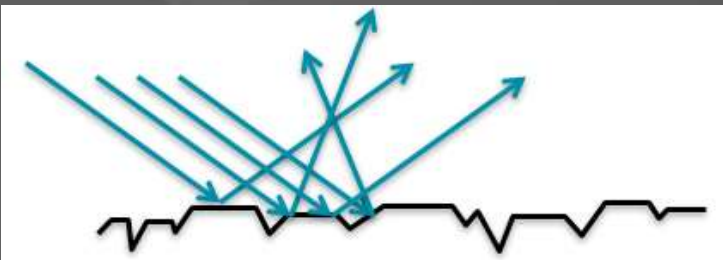


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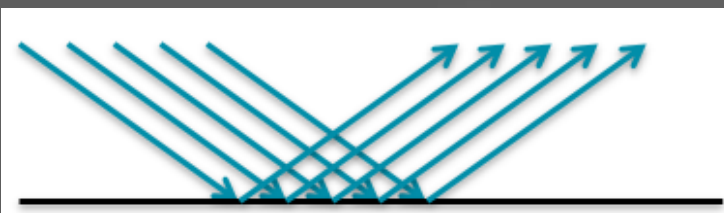
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Travertine-Impregnator

Dulling/scratching



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## Travertine-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

## Pictures



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# Travertine-Impregnator

Soiling/soil build-up



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Limestone

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**Does the tile have  
fossils or dark  
serrated/jagged  
lines?**

Yes

No





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# 3M FLOOR CARE GUIDE



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## Limestone

[Possibly Ceramic?](#)

Limestone is a sedimentary rock that is primarily composed of calcium carbonate. It is formed most often by a layer of coral or sea shells that have settled to the bottom of the sea and then buried. That layer is then subject to pressure from overlaying deposits, causing compaction and creating limestone.

Physical traits: Light tan-dark tan-beige and very often uniform in color. May contain fossils of sea shells, ammonites, or tubes. Will often have Stylolites which are dark jagged/serrated lines in the stone which form perpendicular to the direction or pressure. Mohs hardness between 3-4.

Chemical Traits: Limestone will chemically react with acid to produce carbon dioxide gas (fizz and possibly etch surface)

[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



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# Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

Limestone	Ceramic/Porcelain
<ul style="list-style-type: none"><li>• Pattern on each tile will be completely random</li><li>• Tiles are cut and are identically sized, grout lines can be less than 1/8”</li><li>• Bare stone is porous and will absorb liquids</li><li>• Edges are usually 90°</li><li>• Cracks will appear along weak points in tile, usually random or jagged.</li><li>• Will scratch from scratch test</li><li>• Will fizz in acid test</li></ul>	<ul style="list-style-type: none"><li>• Pattern will often be repeated and seen in multiple tiles</li><li>• Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8”</li><li>• Non-porous, will not absorb liquids</li><li>• Edges are often rounded</li><li>• Cracks will be strait or rounded, but crack cleanly</li><li>• Will not scratch from scratch test</li><li>• Will not fizz in acid test</li></ul>

Acid Test

Scratch Test

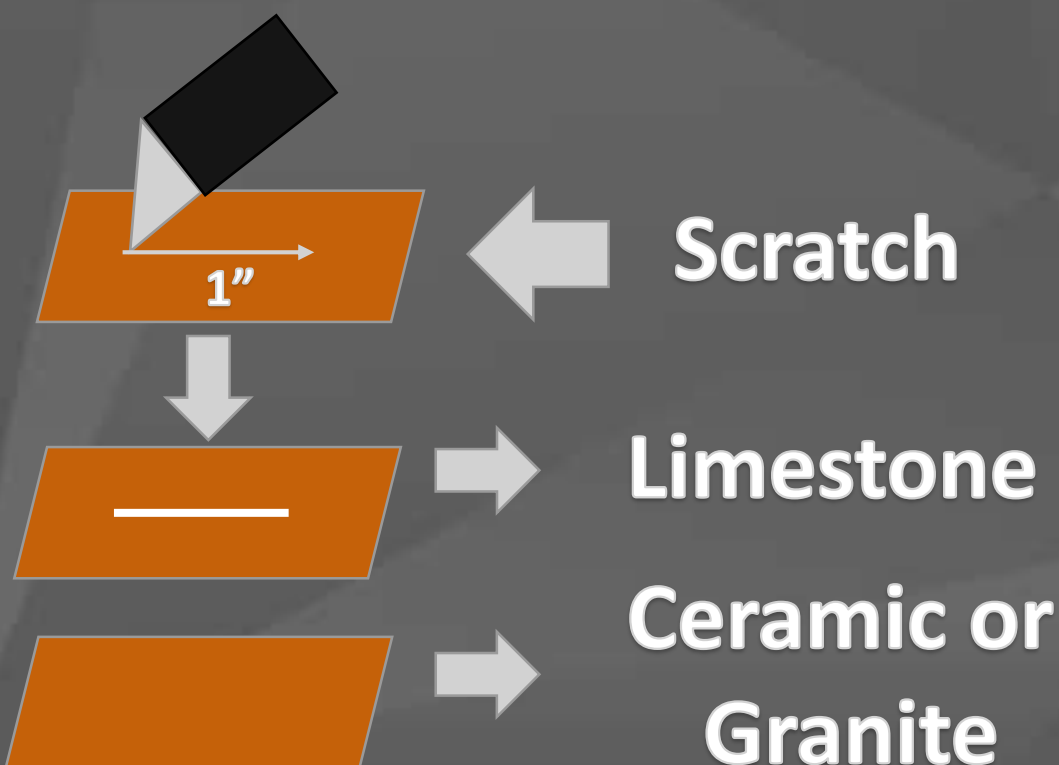
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

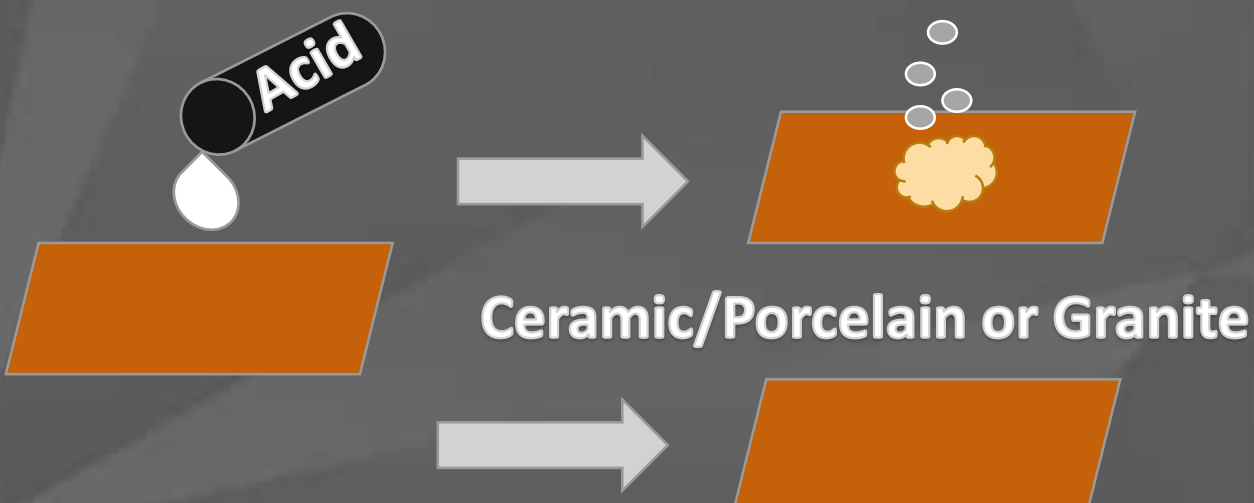
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Limestone







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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Limestone (3-4)

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	← Fingernail (2.5)
Fluorite	4	← Copper Penny (3.5)
Apatite	5	
Orthoclase	6	← Knife (5.5)
Quartz	7	← Steel Nail (6.5)
Topaz	8	
Corundum	9	
Diamond	10	

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## Limestone



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## Limestone

Uncoated/Bare

Crystallization

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Polishing Compound

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## Limestone-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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## Limestone-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Limestone-Uncoated/Bare

Staining/etching



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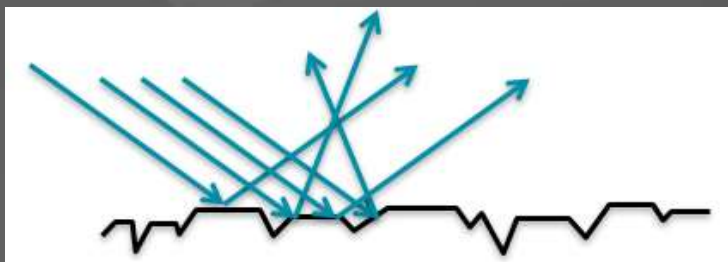


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## Limestone-Uncoated/Bare

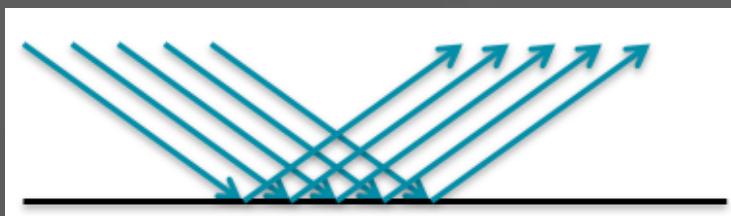
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## **Limestone-Uncoated/Bare**

Dulling/scratching





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## Limestone-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
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- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Limestone-Uncoated/Bare

Soiling/soil build-up



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# Limestone-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Limestone-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization



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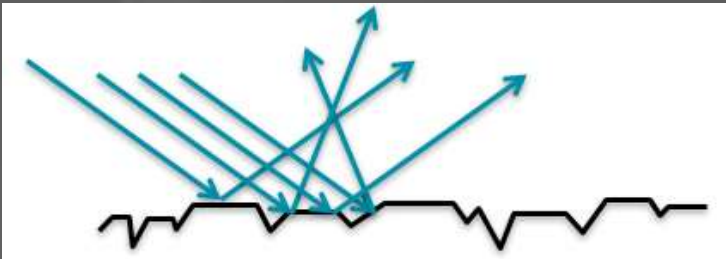


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## Limestone-Crystallization

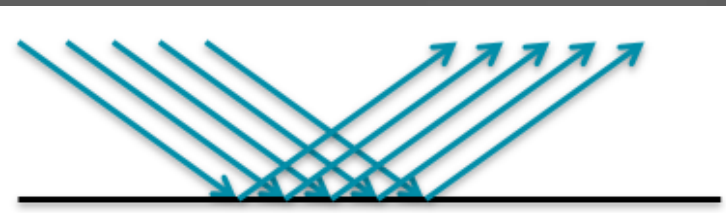
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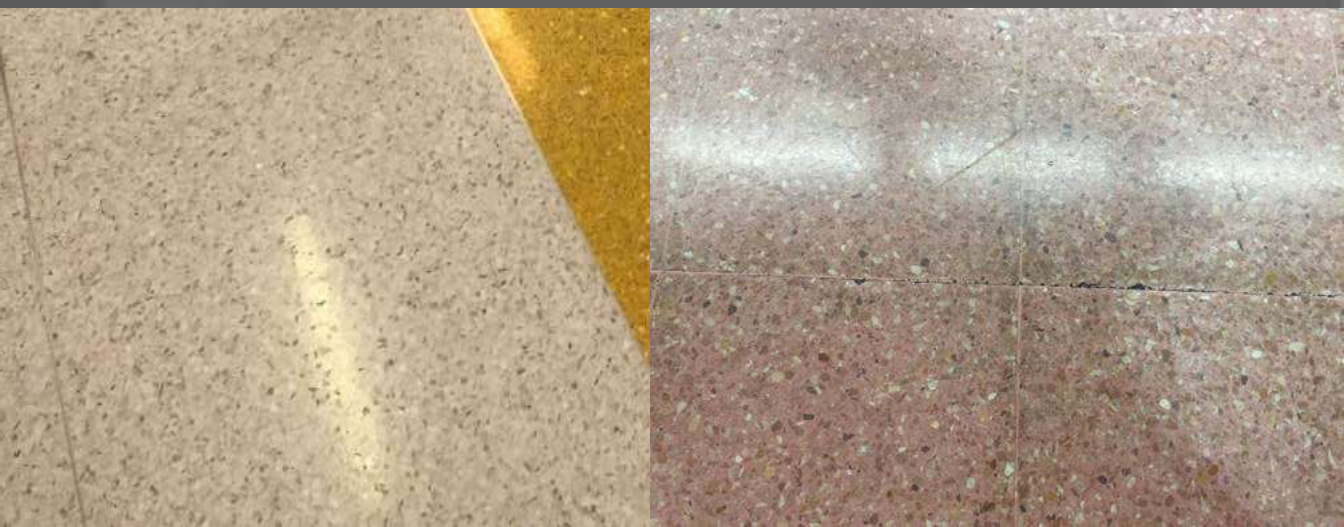
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# Limestone-Crystallization

Dulling



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## Limestone-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



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## Limestone-Crystallization

Spalling





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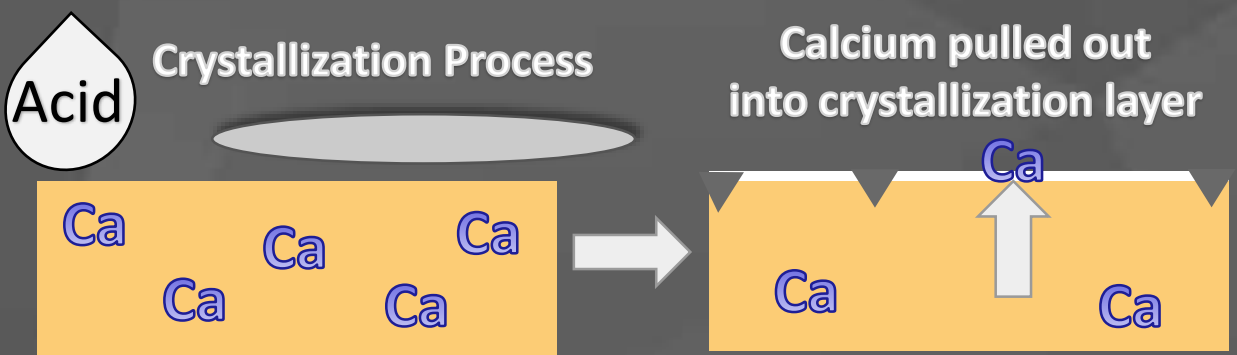


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## Limestone-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



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# Limestone-Crystallization

Over-Crystallization



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## Limestone-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

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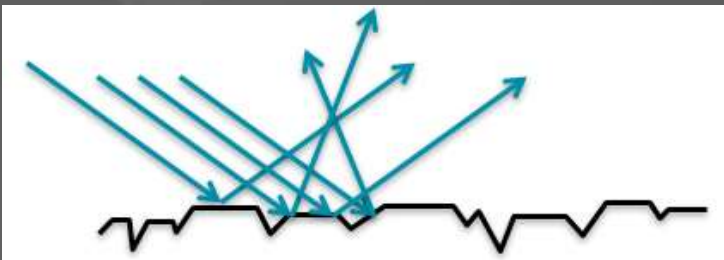


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## Limestone-Coated

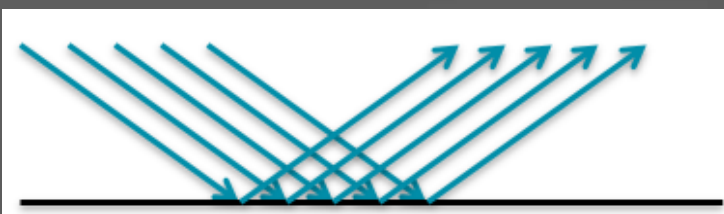
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# Limestone-Coated

Dulling



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## Limestone-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
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# Limestone-Coated

Soiling





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# Limestone

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes





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# Low Gloss/Poor Gloss

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Finish applied too thick.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats. Switch to flat mop.</li></ul>
<ul style="list-style-type: none"><li>• Not enough top coats applied.</li></ul>	<ul style="list-style-type: none"><li>• Scrub, rinse, recoat.</li></ul>
<ul style="list-style-type: none"><li>• Additional coats applied too soon.</li></ul>	<ul style="list-style-type: none"><li>• Wait for each coat to dry completely.</li></ul>
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>
<ul style="list-style-type: none"><li>• Dirty mop and/or bucket.</li></ul>	<ul style="list-style-type: none"><li>• Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.</li></ul>
<ul style="list-style-type: none"><li>• Ammonia or bleach used in damp mopping.</li></ul>	<ul style="list-style-type: none"><li>• Use only cleaners that are designed for the floor.</li></ul>
<ul style="list-style-type: none"><li>• Fan used to dry finish.</li></ul>	<ul style="list-style-type: none"><li>• Make sure fan is not blowing directly at floor finish.</li></ul>
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity.</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50%RH. Make sure HVAC is on. Use fans carefully.</li></ul>



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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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# Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>



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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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## Limestone-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Limestone-Impregnator

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- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
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**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Limestone-Impregnator

Staining/etching





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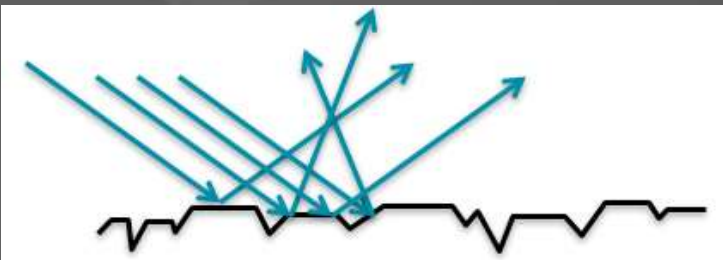


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## Limestone-Impregnator

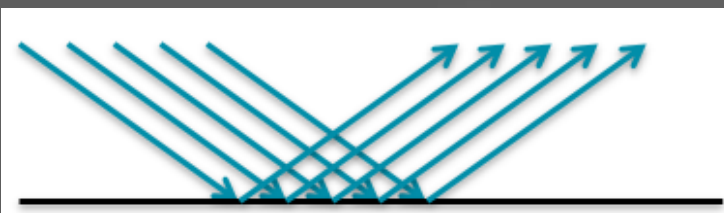
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# Limestone-Impregnator

Dulling/scratching



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## Limestone-Impregnator

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## Limestone-Impregnator

Soiling/soil build-up





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## Limestone-Polishing Compound

- Most marble has been polished in the factories using various grades of abrasives followed by a final step using an abrasive in combination with oxalic acid. This same process can also be done to refresh natural calcareous stone that has dulled over time.
- Most often, polishes are used with a red or natural floor pad. The polishing compound is mixed with water and buffed with 175rpm floor machine. Floors with deeper scratches or other damage typically must be diamond honed prior to using marble polishing products. The calcium oxalate formed in the reaction is washed away with the slurry from the process leaving behind a smoothed and polished stone surface that has not been chemically altered, just highly polished.
- Note that the above does not mean that oxalic acid will not etch stone surfaces. Oxalic acid (and any acid) dropped on a marble surface will etch. Factory polishing and marble restoration are performed under controlled circumstances to reach desired results.

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# Limestone-Polishing Compound

## Polishing Compound

The polishing compound process leaves a highly polished surface when finished. There is no protection on the surface, making it susceptible to damage from abrasion and staining or etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be required if the floor is damaged or deeply scratched. The polishing compound process is re-done to bring a polish back to the stone.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# Limestone-Polishing Compound

Staining/etching





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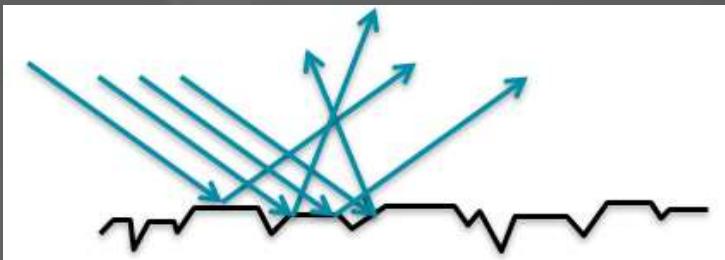


Tile / Larger or Equal to 12"x 12" / Not Textured

## Limestone-Polishing Compound

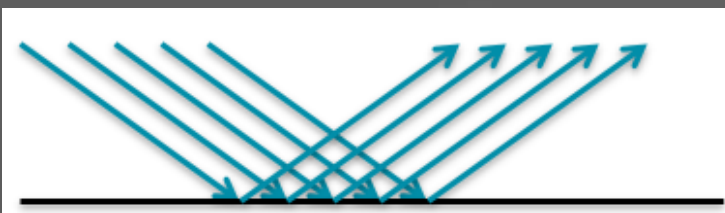
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Limestone-Polishing Compound

Dulling/scratching



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## Limestone-Polishing Compound

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Limestone-Polishing Compound

Soiling/soil build-up





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**Are there visible grains  
or lineations?**

**Yes**

**No**

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## Sandstone

[Possibly Ceramic?](#)

Sandstone is a sedimentary rock formed from sand-sized grains of mineral, rock or organic material which have been cemented together to make a solid stone. Sandstone may have many distinct visible layers due to its varied composition.

Physical traits: Light tan-brown-red in color and will often have different shaded layers throughout. Will often have a smooth/matte look but can also be seen polished. Can sometimes see individual grains of sand. Very porous and will readily absorb water and stains very quickly. Because sandstone is made up of sand grains held together by a binder, it is only as strong as the binder. This results in a relatively soft rock that has a general Mohs hardness between 3-5.

Chemical traits: Acids can sometimes cause the binder in sandstone to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium carbonate.

[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Sandstone (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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# Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

## Sandstone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8”
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- May fizz in acid test

Acid Test

## Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8”
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

Scratch Test



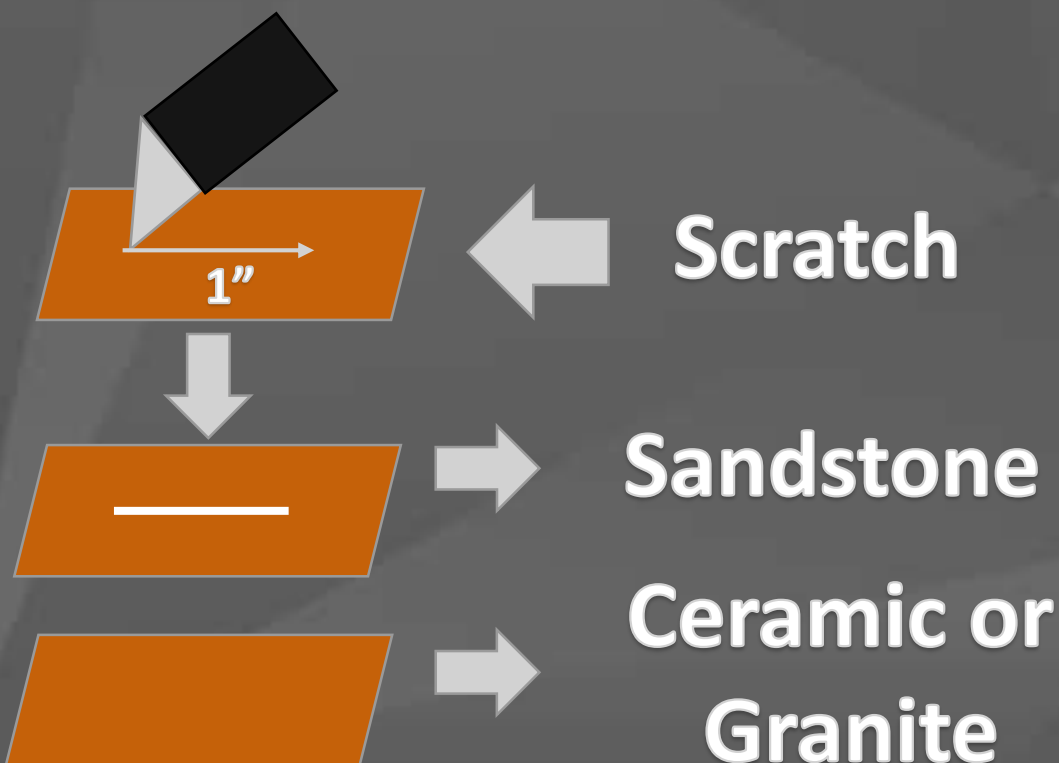
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

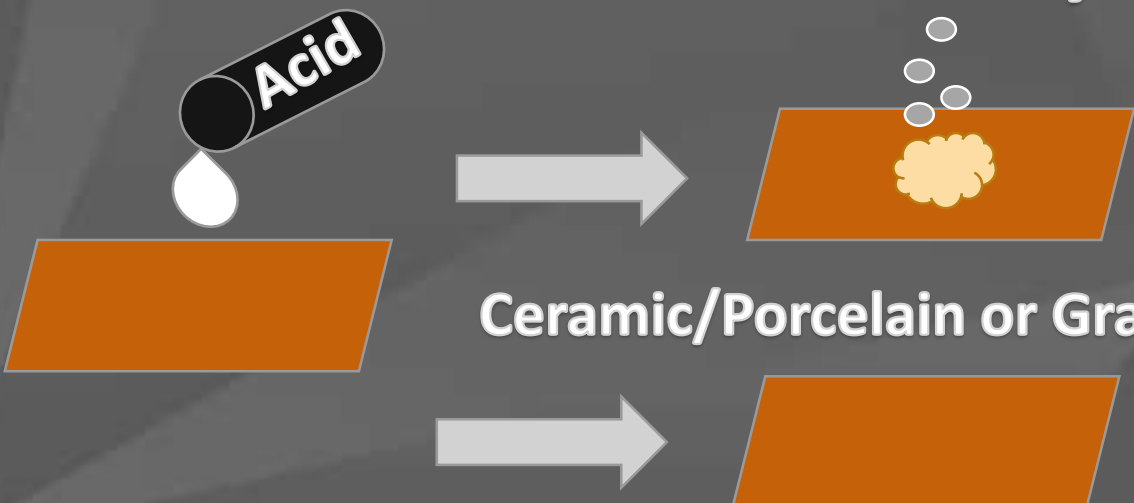
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Sandstone may fizz**



**Ceramic/Porcelain or Granite**

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## Sandstone



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## Sandstone

Uncoated/Bare

Coated

Impregnator



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## Sandstone-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Sandstone-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Sandstone-Uncoated/Bare

Staining/etching





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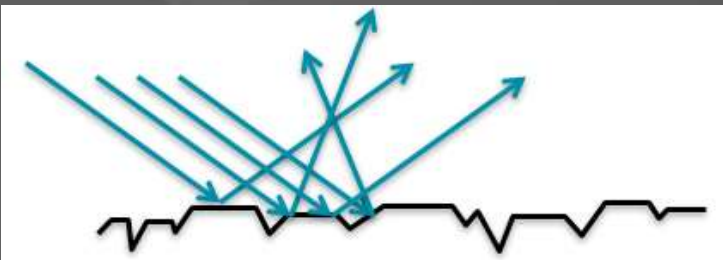


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## Sandstone-Uncoated/Bare

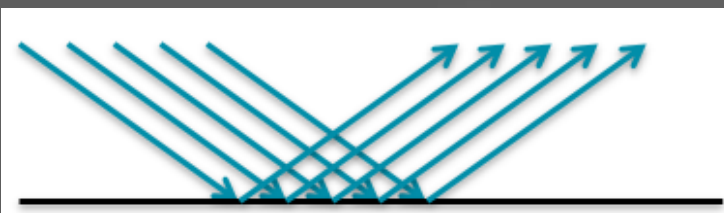
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## Sandstone-Uncoated/Bare

Dulling/scratching



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## Sandstone-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
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Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

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## Sandstone-Uncoated/Bare

Soiling/soil build-up



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## Sandstone-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems



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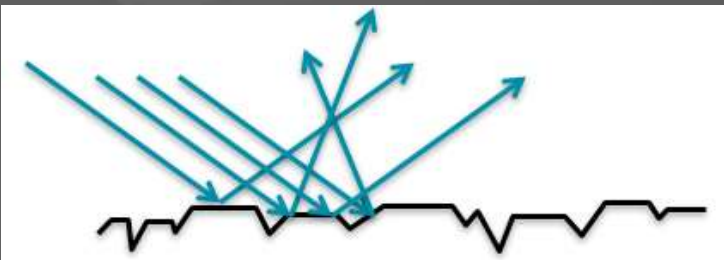


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## Sandstone-Coated

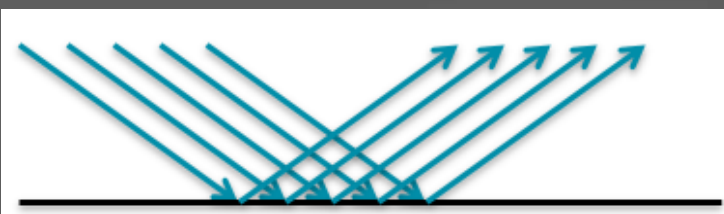
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## Sandstone-Coated

Dulling



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## Sandstone-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

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## Sandstone-Coated

Soiling





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# Sandstone

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Finish applied too thick.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats. Switch to flat mop.</li></ul>
<ul style="list-style-type: none"><li>• Not enough top coats applied.</li></ul>	<ul style="list-style-type: none"><li>• Scrub, rinse, recoat.</li></ul>
<ul style="list-style-type: none"><li>• Additional coats applied too soon.</li></ul>	<ul style="list-style-type: none"><li>• Wait for each coat to dry completely.</li></ul>
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>
<ul style="list-style-type: none"><li>• Dirty mop and/or bucket.</li></ul>	<ul style="list-style-type: none"><li>• Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.</li></ul>
<ul style="list-style-type: none"><li>• Ammonia or bleach used in damp mopping.</li></ul>	<ul style="list-style-type: none"><li>• Use only cleaners that are designed for the floor.</li></ul>
<ul style="list-style-type: none"><li>• Fan used to dry finish.</li></ul>	<ul style="list-style-type: none"><li>• Make sure fan is not blowing directly at floor finish.</li></ul>
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity.</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50%RH. Make sure HVAC is on. Use fans carefully.</li></ul>



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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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## Sandstone-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Sandstone-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Sandstone-Impregnator

Staining/etching



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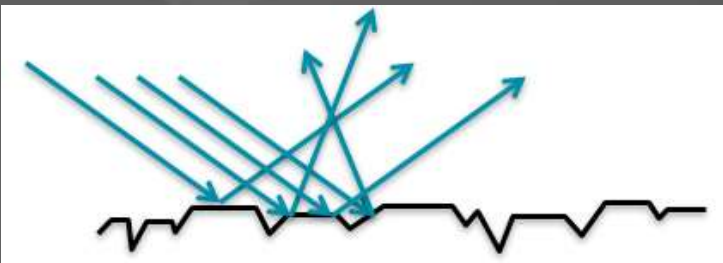


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## Sandstone-Impregnator

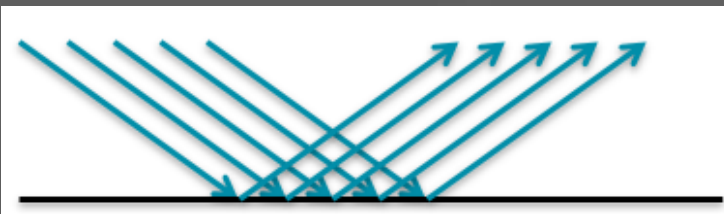
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## Sandstone-Impregnator

Dulling/scratching





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## Sandstone-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
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- Aggressiveness of the pad:
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## Sandstone-Impregnator

Soiling/soil build-up



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# **3M** FLOOR CARE GUIDE



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Granite

Terrazzo

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# 3M FLOOR CARE GUIDE



Tile / Larger or Equal to 12"x 12" / Not Textured

## Granite

## Terrazzo

Granite is an igneous rock that is formed from cooling magma below the Earth's surface. Because of the long time that it takes for the granite to cool, medium to large crystals can form in the granite that are visible to the human eye.

Physical traits: Most common colors fall into a few different categories; Salt & Pepper, pink-red & black/white, mostly white, and mostly black. Will have a smooth polished surface. Usually will have visible crystalline grains growing into others or overlapping other grains. Mohs hardness between 6-7.

Chemical traits: Because of granites crystalline structure and hardness, it is much less porous than other natural stones. It will however still absorb liquids and is susceptible to staining. Granite will not fizz under the presence of acid, but can still be damaged/etched by acid (especially more aggressive acids).

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Granite (6-7)

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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# 3M FLOOR CARE GUIDE



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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Granite

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will not scratch from scratch test
- May fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

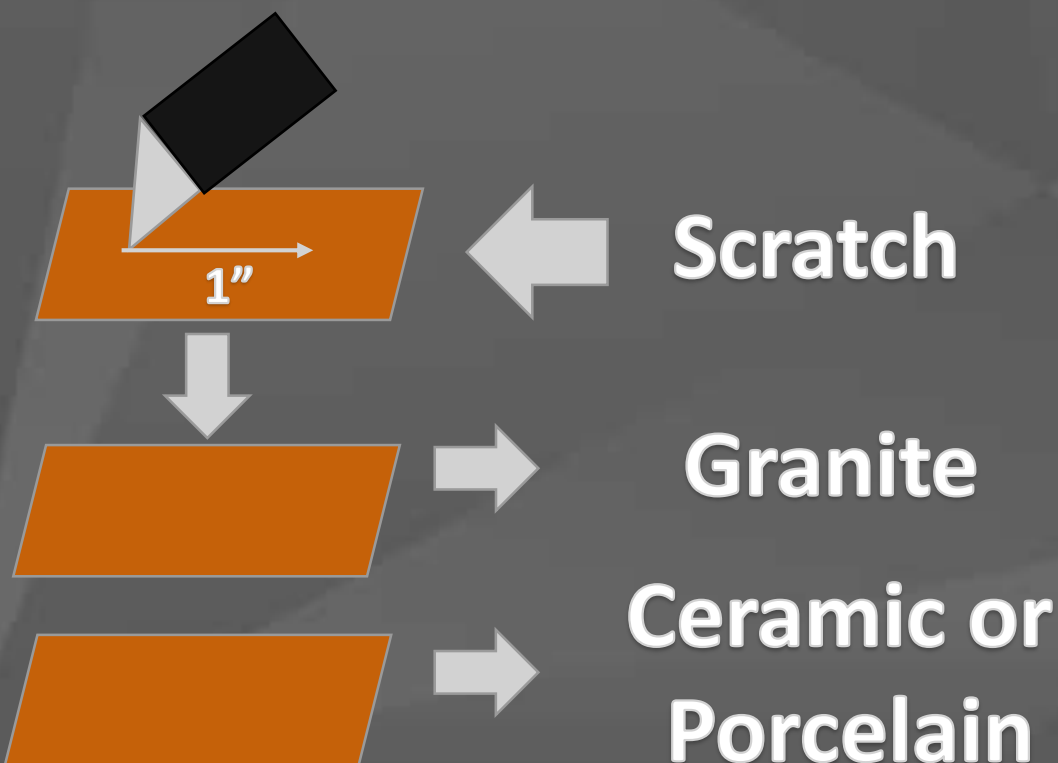
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Granite may fizz**





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Granite





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## Granite

Uncoated/Bare

Coated

Impregnator

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## Granite-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. Can be finished using a polishing compound to leave a high shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Granite-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Granite-Uncoated/Bare

Staining/etching





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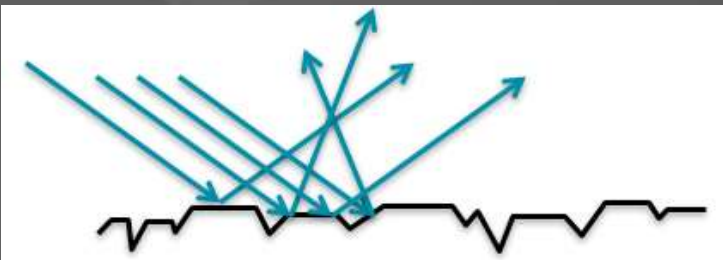


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## Granite-Uncoated/Bare

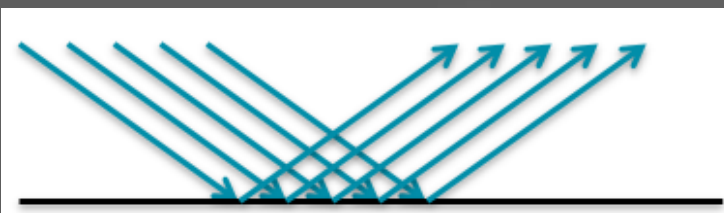
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Granite-Uncoated/Bare

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Granite-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Granite-Uncoated/Bare

Soiling/soil build-up





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## Granite-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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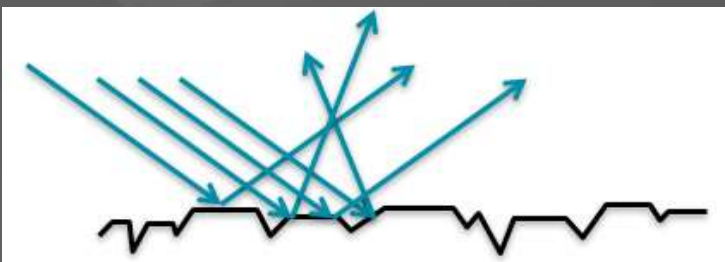


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## Granite-Coated

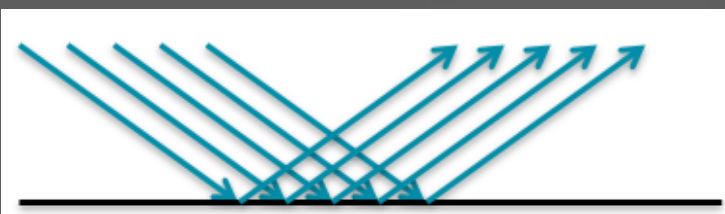
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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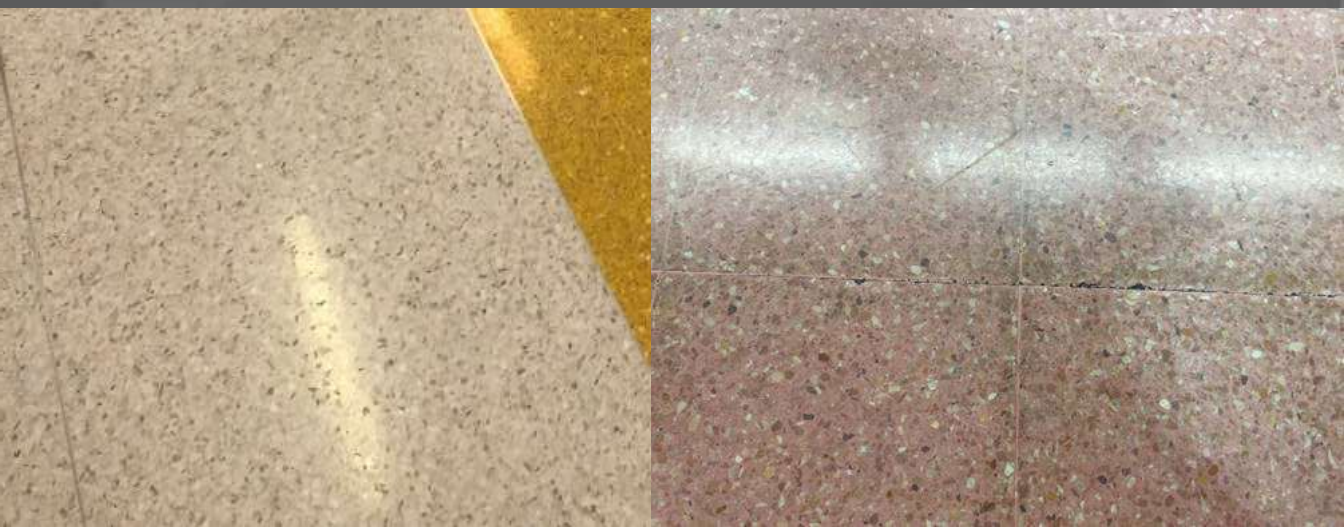
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## Granite-Coated

Dulling



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# 3M FLOOR CARE GUIDE



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## Granite-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Granite-Coated

Soiling



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# Granite

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Finish applied too thick.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats. Switch to flat mop.</li></ul>
<ul style="list-style-type: none"><li>• Not enough top coats applied.</li></ul>	<ul style="list-style-type: none"><li>• Scrub, rinse, recoat.</li></ul>
<ul style="list-style-type: none"><li>• Additional coats applied too soon.</li></ul>	<ul style="list-style-type: none"><li>• Wait for each coat to dry completely.</li></ul>
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>
<ul style="list-style-type: none"><li>• Dirty mop and/or bucket.</li></ul>	<ul style="list-style-type: none"><li>• Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.</li></ul>
<ul style="list-style-type: none"><li>• Ammonia or bleach used in damp mopping.</li></ul>	<ul style="list-style-type: none"><li>• Use only cleaners that are designed for the floor.</li></ul>
<ul style="list-style-type: none"><li>• Fan used to dry finish.</li></ul>	<ul style="list-style-type: none"><li>• Make sure fan is not blowing directly at floor finish.</li></ul>
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity.</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50%RH. Make sure HVAC is on. Use fans carefully.</li></ul>



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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.

- Damp mopped with dirty water and/or mops.

- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.

- Build up of disinfectant cleaner.

- Extremes in temperature and humidity.

- Additional coats applied too soon.

- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.

- Use only clean mops and buckets. Change water frequently.

- Use only cleaners that are designed for the flooring according to manufacturing specifications.

- Periodically clean floor with neutral cleaner to help remove any buildup.

- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.

- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.

- Reduce number of coats applied

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# Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# Granite-Impregnator

## Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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## Granite-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Granite-Impregnator

Staining/etching



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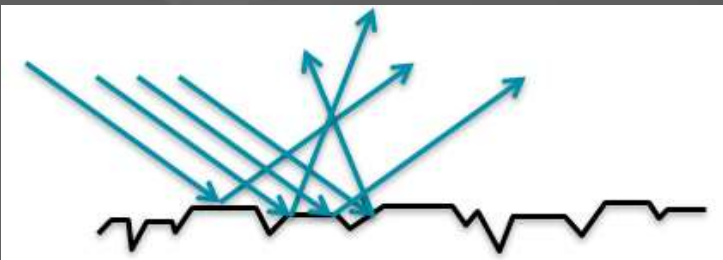


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## Granite-Impregnator

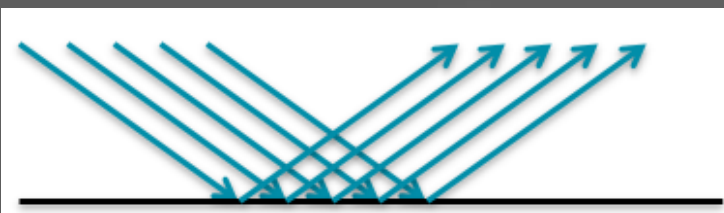
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Granite-Impregnator

Dulling/scratching





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## Granite-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Granite-Impregnator

Soiling/soil build-up



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Granite

Terrazzo

Terrazzo can be classified into two main types: cement terrazzo and resin (often epoxy) terrazzo:

**Cement Terrazzo** – Made of 70% crushed stone chips (most often marble) and 30% cement. The stone chips and cement are mixed together and formed into precast tiles, polished, and packaged into sets. The tiles are then installed like other natural stone tiles, usually with a  $\frac{1}{4}$  -  $\frac{1}{2}$  grout line. Common sizes include 12"x 12", 24"x 24", 24"x 48"

**Resin (Epoxy) Terrazzo**- Made of 70% crushed aggregate (marble, granite, glass, sea shells) and 30% resin matrix. The stone chips and epoxy are mixed together and formed into precast tiles, polished, and packaged into sets. The tiles are then installed like other natural stone tiles, usually with a  $\frac{1}{4}$  -  $\frac{1}{2}$  grout line. Common sizes include 12"x 12", 24"x 24", 24"x 48"

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Maintenance & Troubleshooting



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# 3M FLOOR CARE GUIDE

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**Terrazzo**





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# Terrazzo

Uncoated/Bare

Crystallization

Coated

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## Terrazzo-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Terrazzo-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Terrazzo-Uncoated/Bare

Staining/etching





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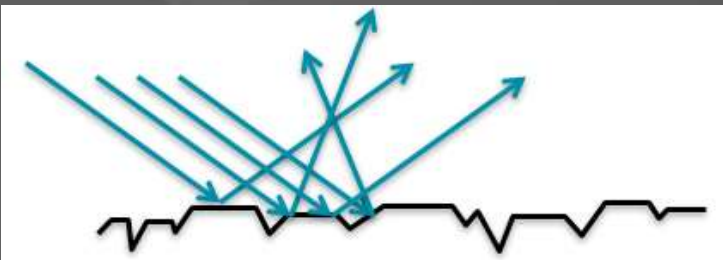


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## Terrazzo-Uncoated/Bare

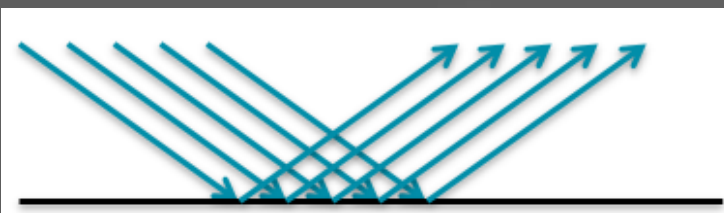
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Terrazzo-Uncoated/Bare

Dulling/scratching



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## Terrazzo-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Terrazzo-Uncoated/Bare

Soiling/soil build-up





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# Terrazzo-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Terrazzo-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

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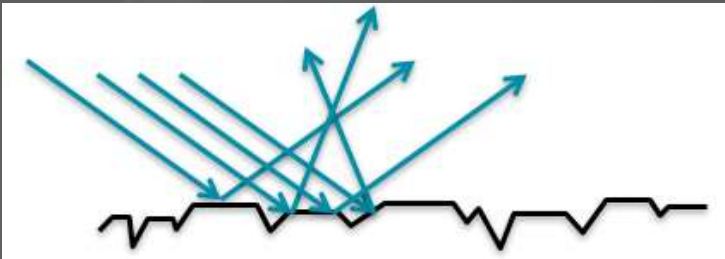


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## Terrazzo-Crystallization

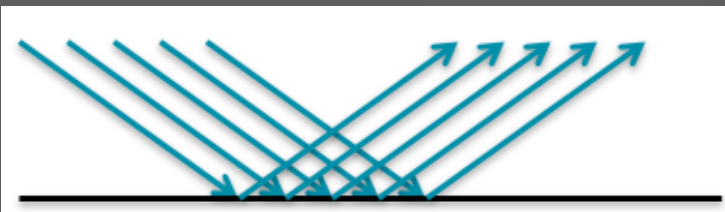
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Terrazzo-Crystallization

Dulling





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## Terrazzo-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.

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# Terrazzo-Crystallization

Spalling



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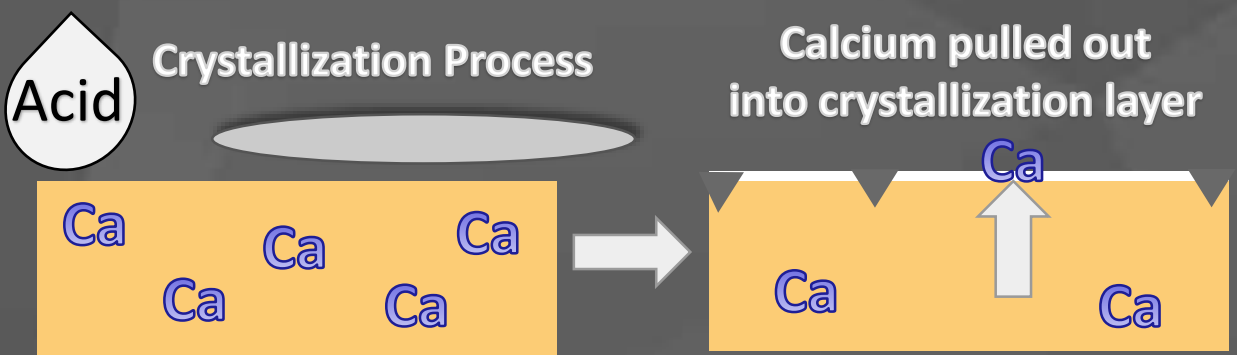


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## Terrazzo-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.

[Pictures](#)



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# Terrazzo-Crystallization

Over-Crystallization





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## Terrazzo-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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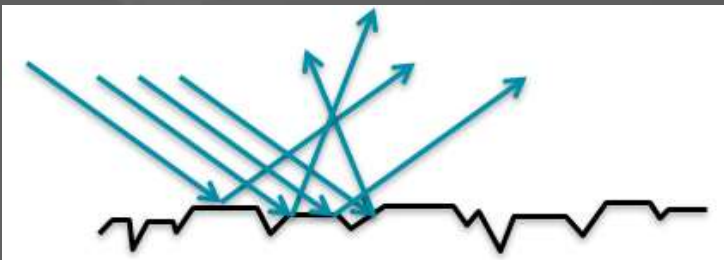


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## Terrazzo-Coated

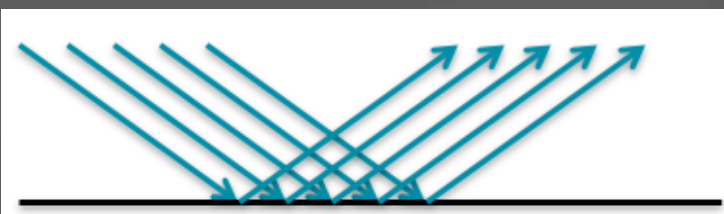
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- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
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# Terrazzo-Coated

Dulling



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## Terrazzo-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Terrazzo-Coated

Soiling



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# Terrazzo

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Finish applied too thick.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats. Switch to flat mop.</li></ul>
<ul style="list-style-type: none"><li>• Not enough top coats applied.</li></ul>	<ul style="list-style-type: none"><li>• Scrub, rinse, recoat.</li></ul>
<ul style="list-style-type: none"><li>• Additional coats applied too soon.</li></ul>	<ul style="list-style-type: none"><li>• Wait for each coat to dry completely.</li></ul>
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>
<ul style="list-style-type: none"><li>• Dirty mop and/or bucket.</li></ul>	<ul style="list-style-type: none"><li>• Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.</li></ul>
<ul style="list-style-type: none"><li>• Ammonia or bleach used in damp mopping.</li></ul>	<ul style="list-style-type: none"><li>• Use only cleaners that are designed for the floor.</li></ul>
<ul style="list-style-type: none"><li>• Fan used to dry finish.</li></ul>	<ul style="list-style-type: none"><li>• Make sure fan is not blowing directly at floor finish.</li></ul>
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity.</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50%RH. Make sure HVAC is on. Use fans carefully.</li></ul>



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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





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# Finish Discolored/Yellowing/ Sticky Floors

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Solvent based cleaner.</li></ul>	<ul style="list-style-type: none"><li>• Switch to water based neutral cleaner.</li></ul>
<ul style="list-style-type: none"><li>• Damp mopped with dirty water and/or mops.</li></ul>	<ul style="list-style-type: none"><li>• Use only clean mops and buckets. Change water frequently.</li></ul>
<ul style="list-style-type: none"><li>• Wrong cleaner, too much cleaner, or improperly diluted cleaner used.</li></ul>	<ul style="list-style-type: none"><li>• Use only cleaners that are designed for the flooring according to manufacturing specifications.</li></ul>
<ul style="list-style-type: none"><li>• Build up of disinfectant cleaner.</li></ul>	<ul style="list-style-type: none"><li>• Periodically clean floor with neutral cleaner to help remove any buildup.</li></ul>
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity.</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50%RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Additional coats applied too soon.</li></ul>	<ul style="list-style-type: none"><li>• Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Too many coats applied in 24 hours</li></ul>	<ul style="list-style-type: none"><li>• Reduce number of coats applied</li></ul>

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# Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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Slate

Granite

Sandstone

Travertine



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**Slate**

**Granite**

**Sandstone**

**Travertine**

Slate is a metamorphic stone that is made of layered shale subjected to high heat and pressure. One drawback to this layered composition is that slate may break or flake at the surface. However, the bulk material is very durable with low water absorption, so it is commonly used in roofing tiles as well as indoor and outdoor flooring.

Physical traits: Color can vary from black-gray-green-purple-rust. Can have a rough/gritty texture or can be smooth with partial sheets exposed. Mohs hardness between 3-5.

Chemical traits: Relatively good moisture resistance compared to other stones but may still require an impregnator. Avoid highly acidic or alkaline cleaners.

**Possibly Ceramic?**

**What's Mohs Hardness?**

**Pictures**

**Maintenance & Troubleshooting**



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Slate (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Slate

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- May fizz in acid test.

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

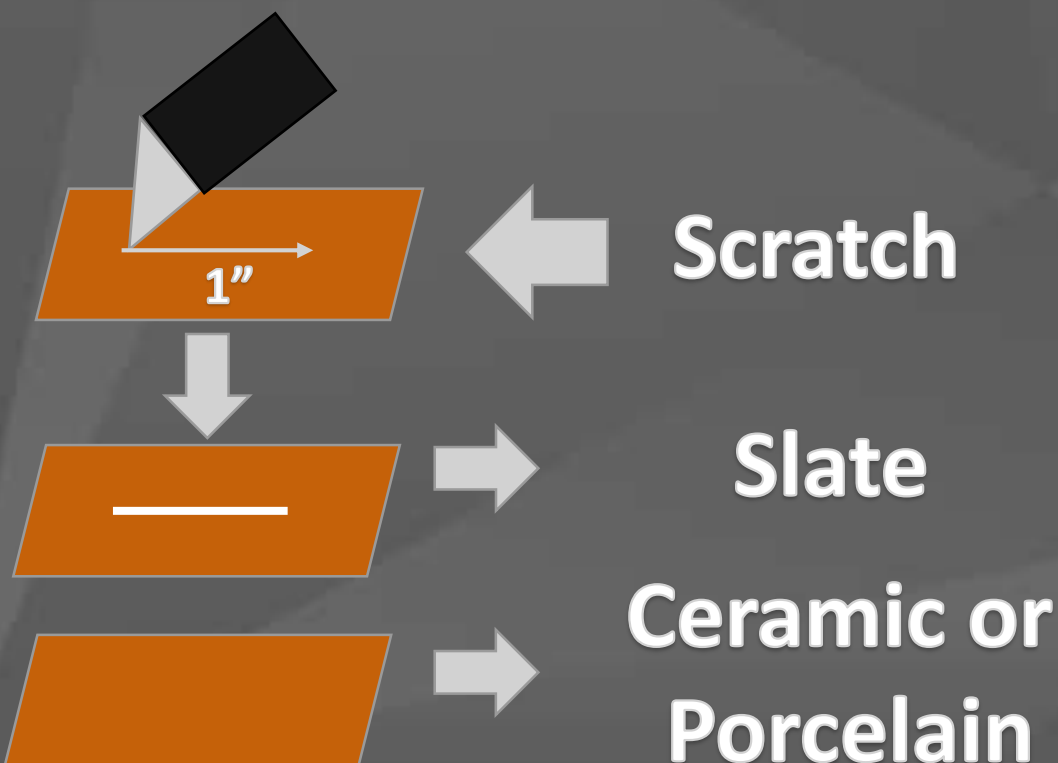
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.





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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

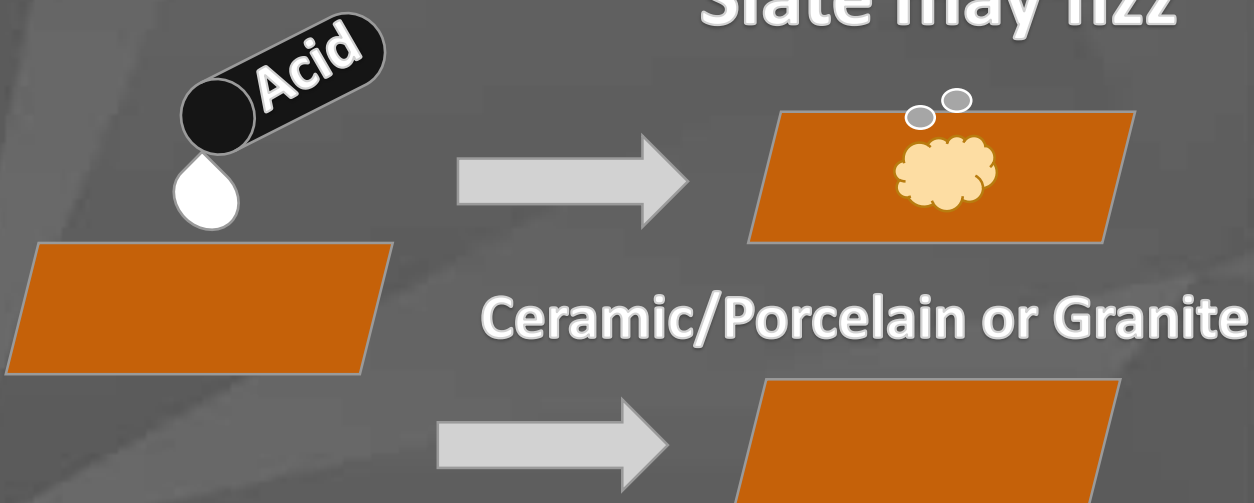
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Slate may fizz**



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Slate



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## **Slate**

Uncoated/Bare

Coated

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## Slate-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Issues:

Dulling/scratching

Soiling/soil build-up



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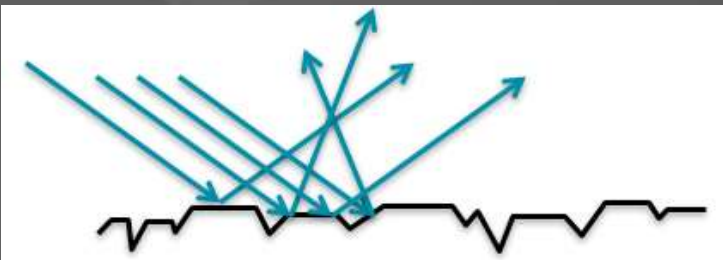


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## Slate-Uncoated/Bare

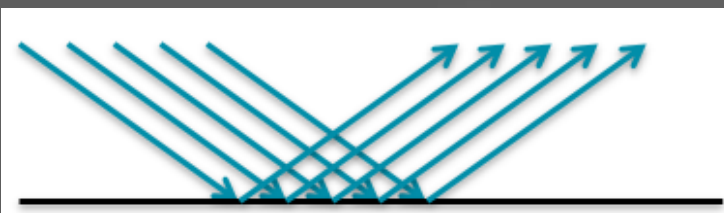
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
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## Slate-Uncoated/Bare

Dulling/scratching



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## Slate-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Slate-Uncoated/Bare

Soiling/soil build-up





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# 3M FLOOR CARE GUIDE



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## Slate-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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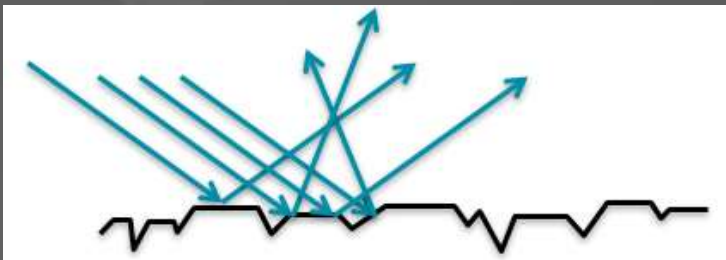


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## Slate-Coated

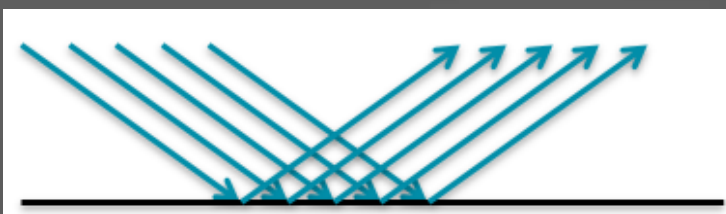
### Dulling

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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
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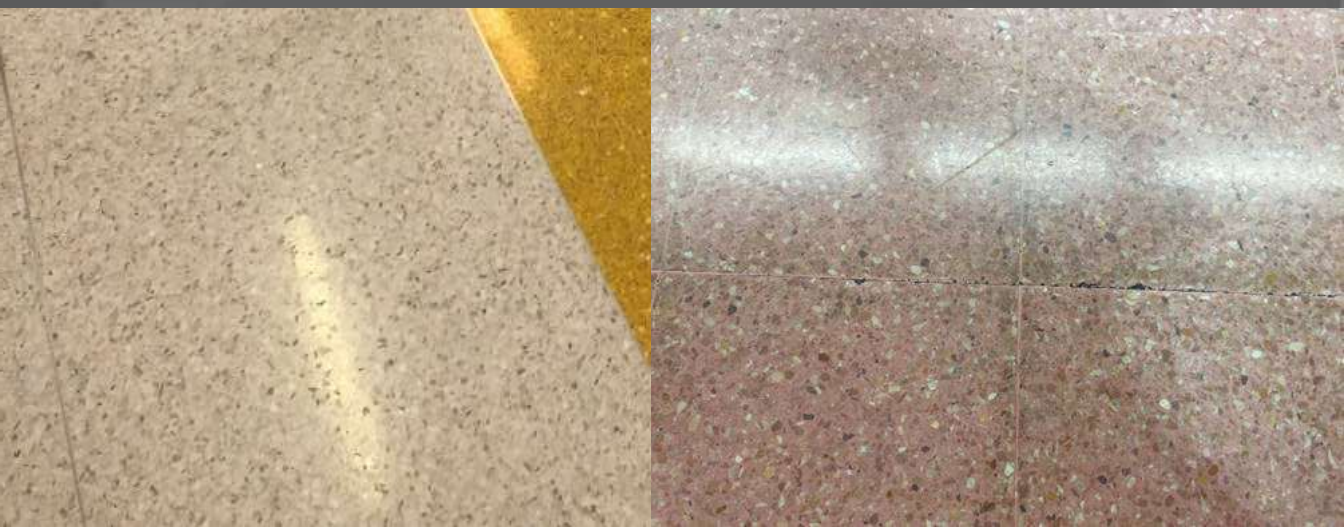
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**Slate-Coated**

Dulling



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# 3M FLOOR CARE GUIDE



Tile / Larger or Equal to 12"x 12" / Textured

## Slate-Coated

### Soiling

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## Slate-Coated

Soiling



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# Slate

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Tile / Larger or Equal to 12”x 12” / Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Tile / Larger or Equal to 12”x 12” / Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# 3M FLOOR CARE GUIDE



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Slate

Granite

Sandstone

Travertine

Granite is an igneous rock that is formed from cooling magma below the Earth's surface. Because of the long time that it takes for the granite to cool, medium to large crystals can form in the granite that are visible to the human eye.

Physical traits: Most common colors fall into a few different categories; Salt & Pepper, pink-red & black/white, mostly white, and mostly black. Will have a rough, flamed or honed surface. Usually will have visible crystalline grains growing into others or overlapping other grains. Mohs hardness between 6-7.

Chemical traits: Because of granites crystalline structure and hardness, it is much less porous than other natural stones. It will however still absorb liquids and is susceptible to staining. Granite will not fizz under the presence of acid, but can still be damaged/etched by acid (especially more aggressive acids).

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

Granite (6-7)

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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Granite

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will not scratch from scratch test
- May fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

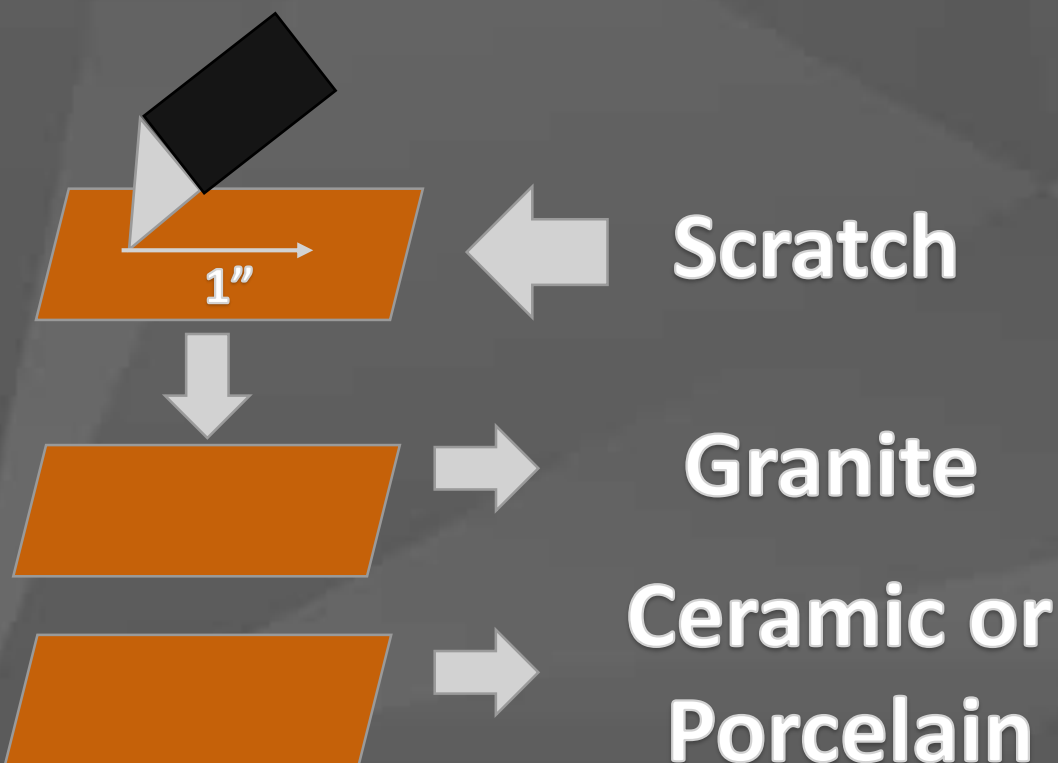
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Granite may fizz**





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Granite



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## Granite

Uncoated/Bare

Coated

Impregnator



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## Granite-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. Can be finished using a polishing compound to leave a high shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Granite-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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**Granite-Uncoated/Bare**

Staining/etching



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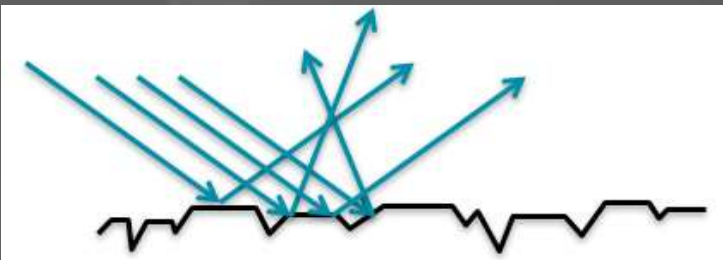


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## Granite-Uncoated/Bare

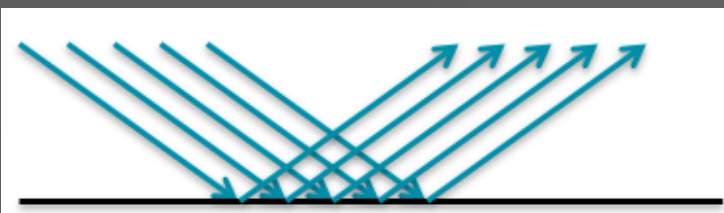
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Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## **Granite-Uncoated/Bare**

Dulling/scratching





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# 3M FLOOR CARE GUIDE



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## Granite-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
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**Granite-Uncoated/Bare**

Soiling/soil build-up



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## Granite-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

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- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

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- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

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Dulling

Soiling

Common Coating Problems

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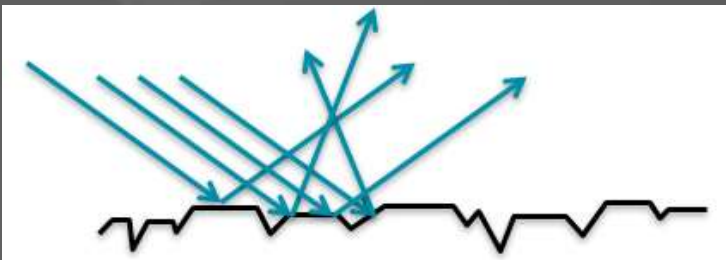


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## Granite-Coated

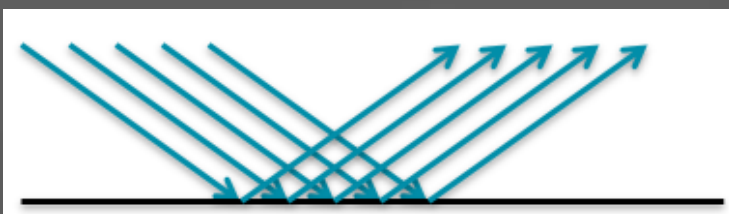
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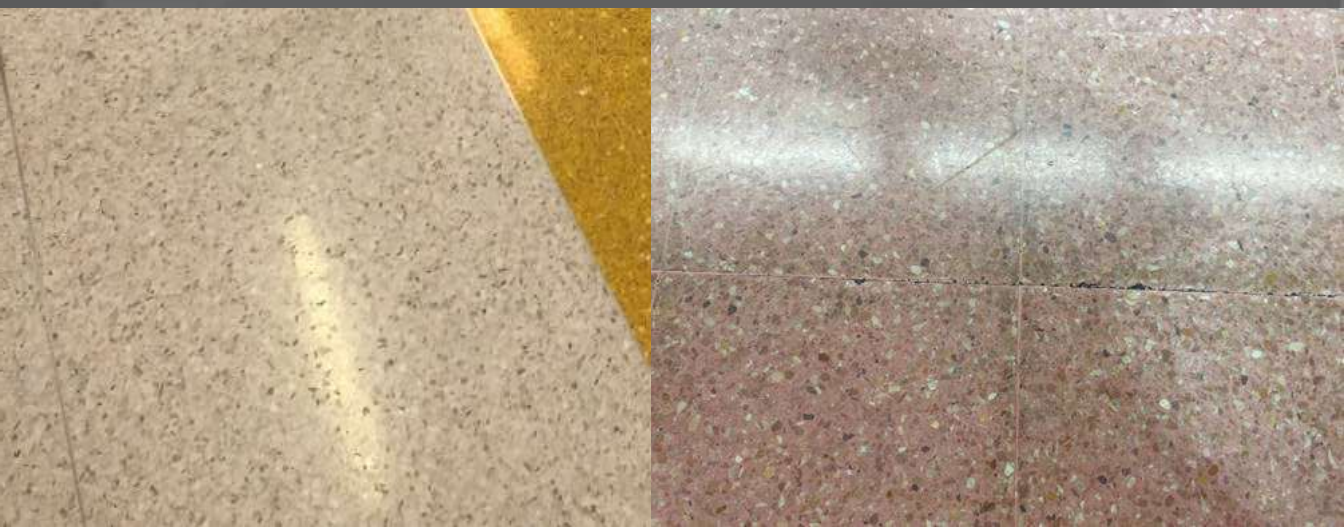
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## Granite-Coated

Dulling





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# 3M FLOOR CARE GUIDE



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## Granite-Coated

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- Aggressiveness of the pad:
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**Granite-Coated**

Soiling



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## Granite

# Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Tile / Larger or Equal to 12”x 12” / Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.





Tile / Larger or Equal to 12”x 12” / Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
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## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>



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# 3M FLOOR CARE GUIDE



Tile / Larger or Equal to 12"x 12" / Textured

## Granite-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Granite-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Granite-Impregnator

Staining/etching





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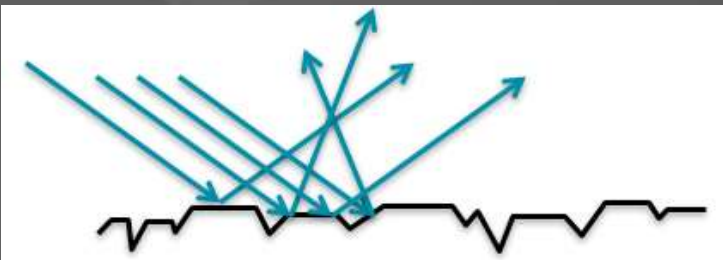


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## Granite-Impregnator

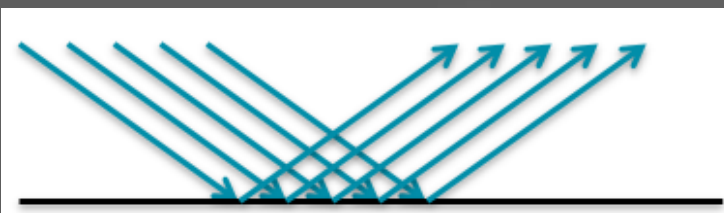
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Granite-Impregnator

Dulling/scratching



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## Granite-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Granite-Impregnator

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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[Slate](#)[Granite](#)[Sandstone](#)[Travertine](#)

Sandstone is a sedimentary rock formed from sand-sized grains of mineral, rock or organic material which have been cemented together to make a solid stone. Sandstone may have many distinct visible layers due to its varied composition.

Physical traits: Light tan-brown-red in color and will often have different shaded layers throughout. Will look rough or gritty like a natural stone surface. Can sometimes see individual grains of sand. Very porous and will readily absorb water and stains very quickly. Because sandstone is made up of sand grains held together by a binder, it is only as strong as the binder. This results in a relatively soft rock that has a general Mohs hardness between 3-5.

Chemical traits: Acids can sometimes cause the binder in sandstone to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Sandstone (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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# Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

## Sandstone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8”
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- May fizz in acid test

Acid Test

## Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8”
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

Scratch Test

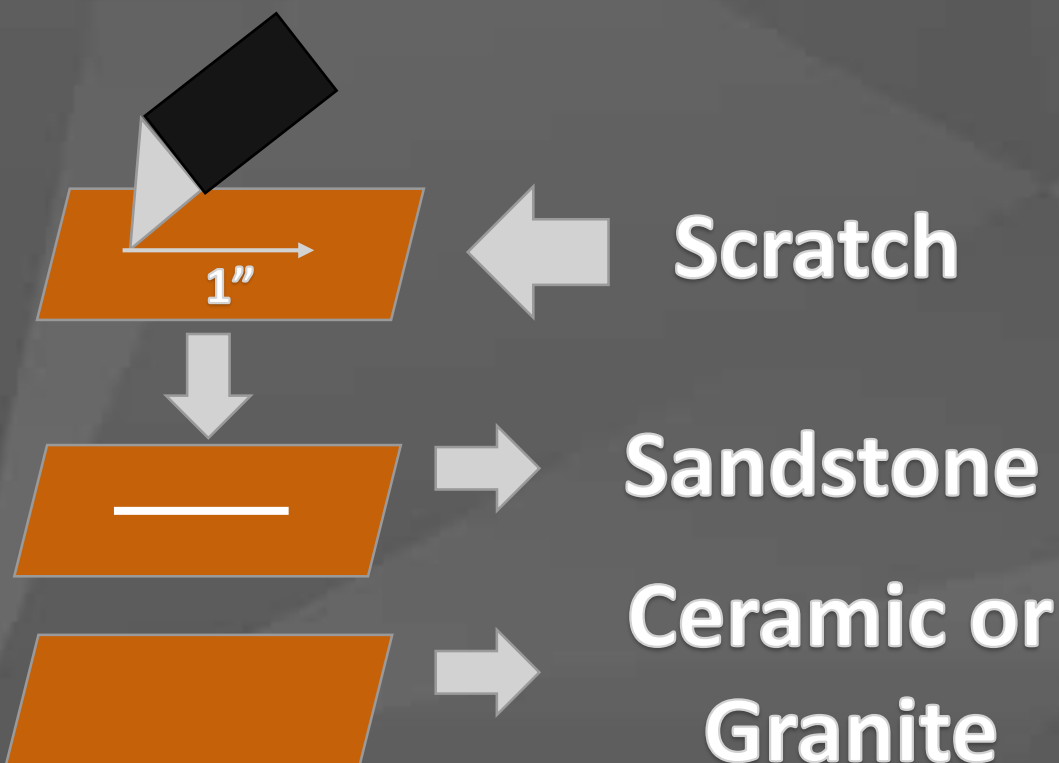
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

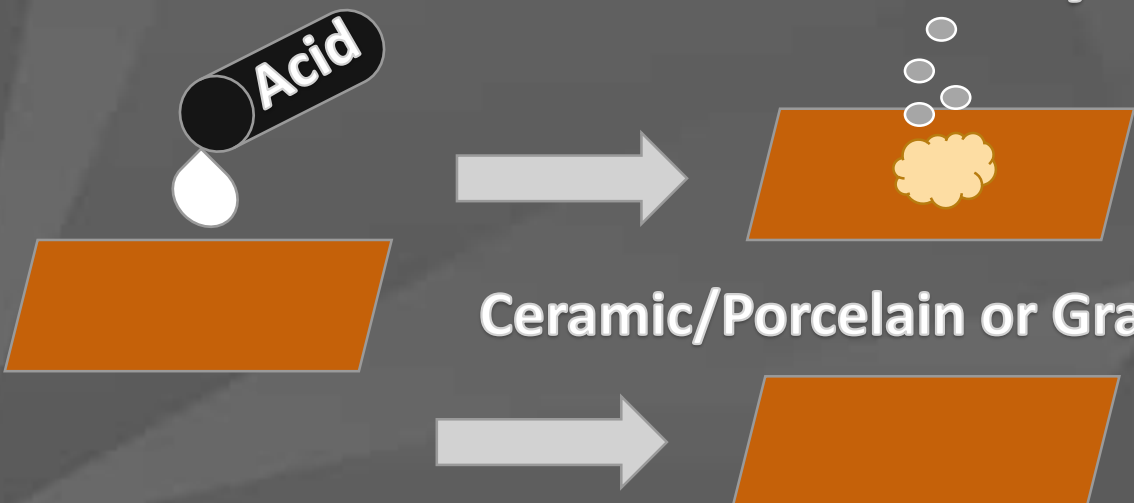
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Sandstone may fizz**



**Ceramic/Porcelain or Granite**



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**Sandstone**



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## Sandstone

Uncoated/Bare

Coated

Impregnator

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## Sandstone-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Sandstone-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
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## Sandstone-Uncoated/Bare

Staining/etching



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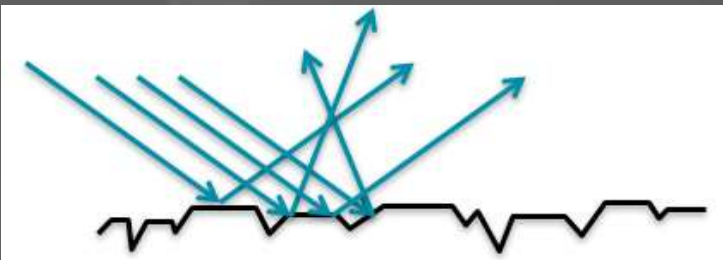


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## Sandstone-Uncoated/Bare

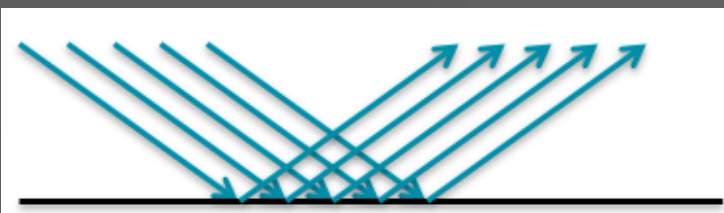
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## **Sandstone-Uncoated/Bare**

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Sandstone-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Sandstone-Uncoated/Bare

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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## Sandstone-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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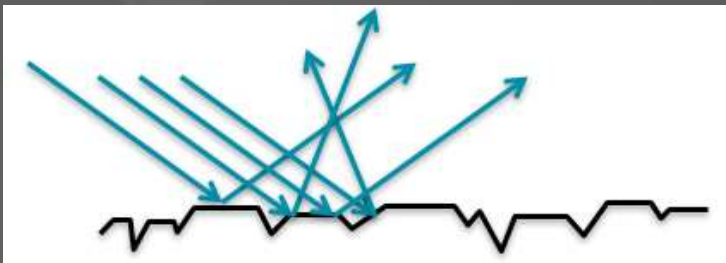


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## Sandstone-Coated

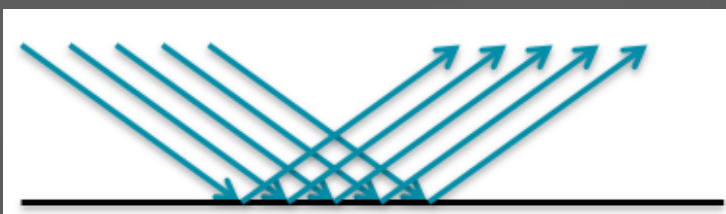
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# Sandstone-Coated

Dulling





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# 3M FLOOR CARE GUIDE



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## Sandstone-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
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**Sandstone-Coated**

Soiling



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# Sandstone

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.





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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
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<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>



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# 3M FLOOR CARE GUIDE



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## Sandstone-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Sandstone-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Sandstone-Impregnator

Staining/etching





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# 3M FLOOR CARE GUIDE

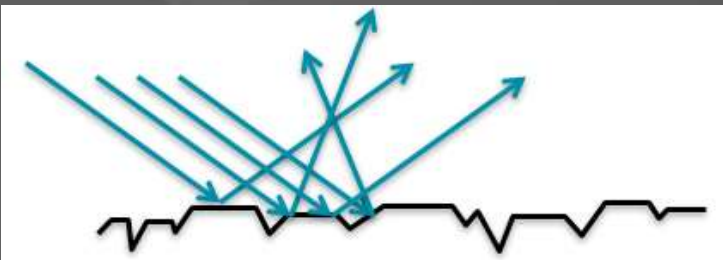


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## Sandstone-Impregnator

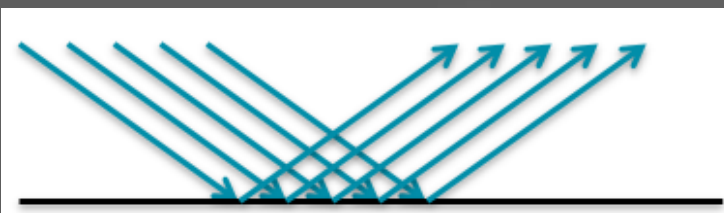
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Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## **Sandstone-Impregnator**

Dulling/scratching



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## Sandstone-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Sandstone-Impregnator

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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[Slate](#)[Granite](#)[Sandstone](#)[Travertine](#)

Travertine is a sub-class of limestone that is formed from hot springs or caves near the earth's surface. Travertine is not subjected to the high pressures of most limestone resulting in some physical differences including pitting and void formation. Air or other organic material gets trapped in the formation and over time solidifies the voids into the rock as it hardens. This process also make travertine more porous than other limestone and marble. The pits/voids are often filled with epoxy to create a smooth surface.

Physical traits: Pitted or has off-colored circles from being filled. Tan-cream-light red in color with flowing linear layers. Mohs hardness between 3-4.

Chemical traits: Acids will cause travertine to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Travertine (3-4)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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# Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

Travertine	Ceramic/Porcelain
<ul style="list-style-type: none"><li>• Pattern on each tile will be completely random</li><li>• Tiles are cut and are identically sized, grout lines can be less than 1/8”</li><li>• Bare stone is porous and will absorb liquids</li><li>• Edges are usually 90°</li><li>• Cracks will appear along weak points in tile, usually random or jagged</li><li>• Will scratch from scratch test</li><li>• Will fizz in acid test</li></ul>	<ul style="list-style-type: none"><li>• Pattern will often be repeated and seen in multiple tiles</li><li>• Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8”</li><li>• Non-porous, will not absorb liquids</li><li>• Edges are often rounded</li><li>• Cracks will be strait or rounded, but crack cleanly</li><li>• Will not scratch from scratch test</li><li>• Will not fizz in acid test</li></ul>

Acid Test

Scratch Test

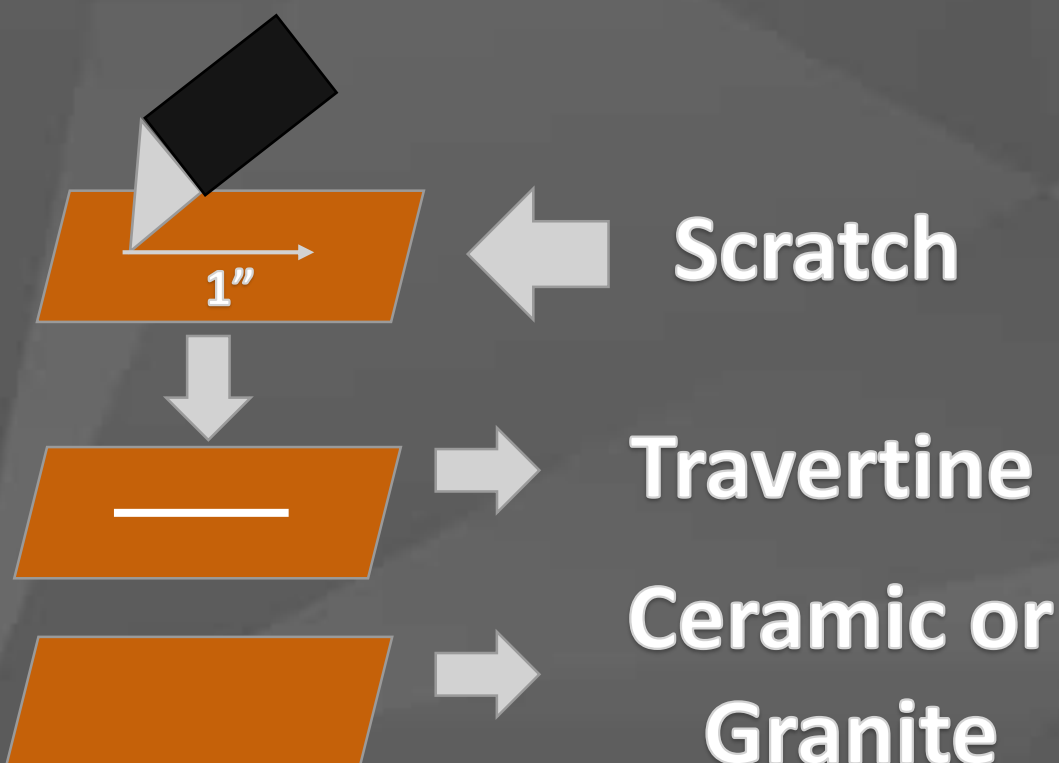
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

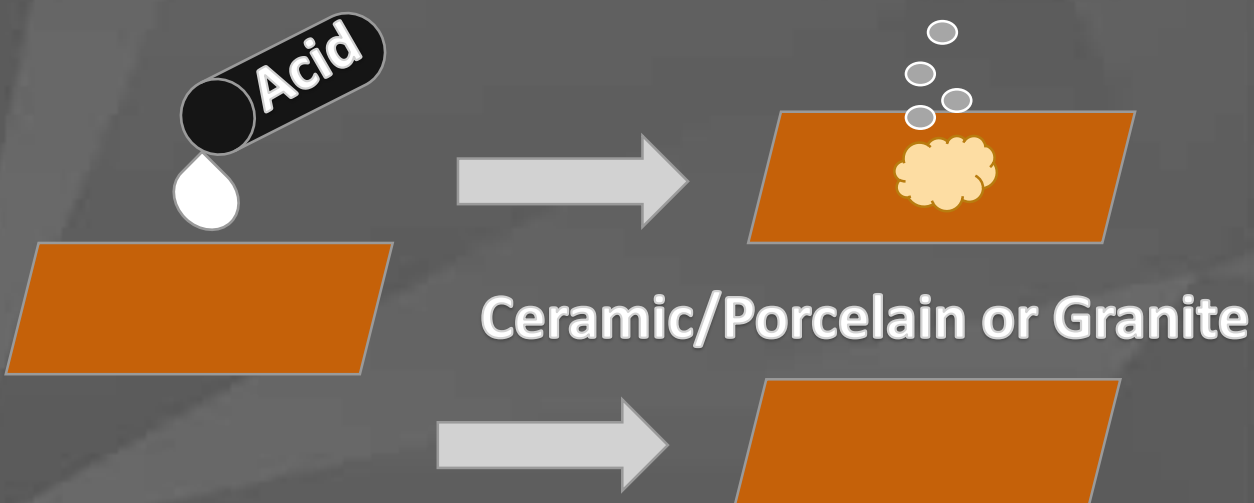
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Travertine





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## Travertine



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## Travertine

Uncoated/Bare

Crystallization

Coated

Impregnator

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## Travertine-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Travertine-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Travertine-Uncoated/Bare

Staining/etching



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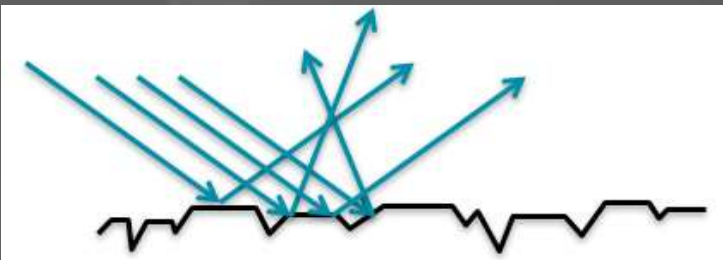


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## Travertine-Uncoated/Bare

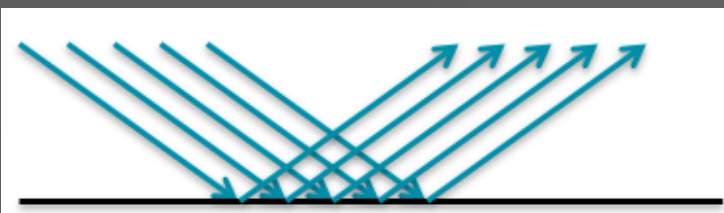
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# Travertine-Uncoated/Bare

Dulling/scratching





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## Travertine-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Uncoated/Bare

Soiling/soil build-up



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# Travertine-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Travertine-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

Periodic Maintenance:

- Re-crystallize

Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization



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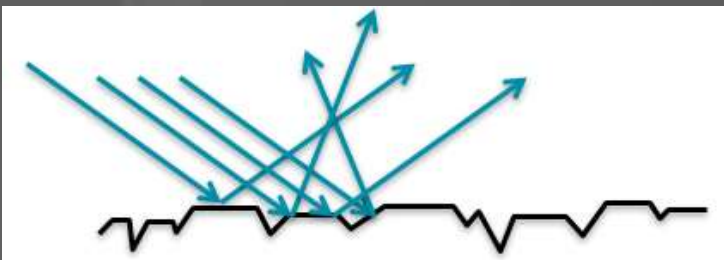


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## Travertine-Crystallization

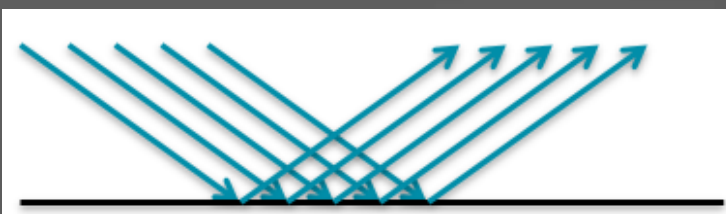
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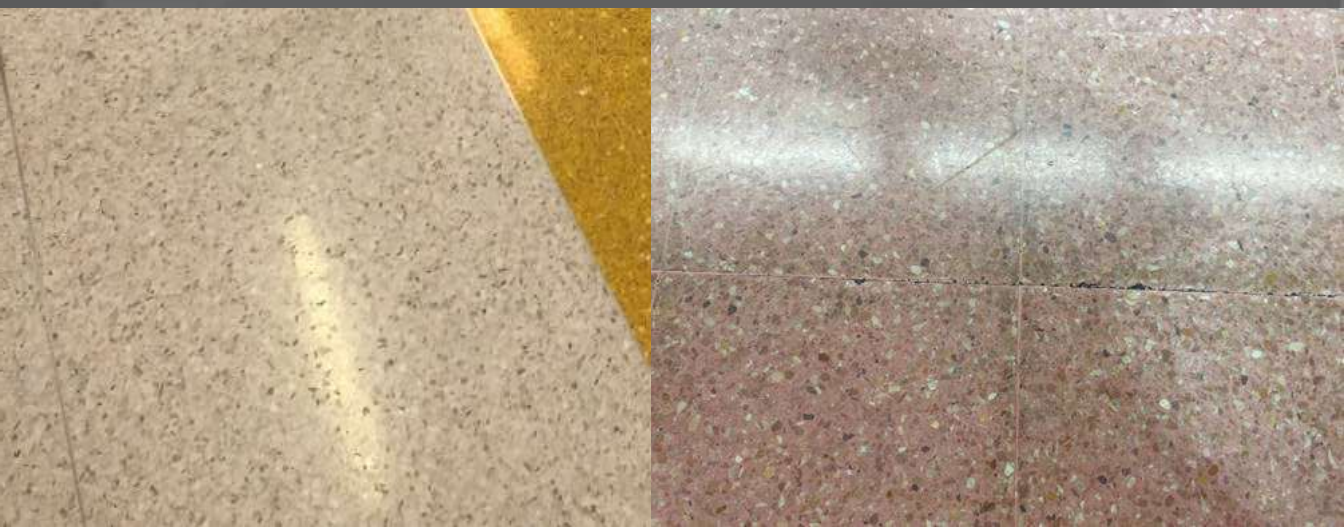
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# Travertine-Crystallization

Dulling



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## Travertine-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.

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# Travertine-Crystallization

Spalling





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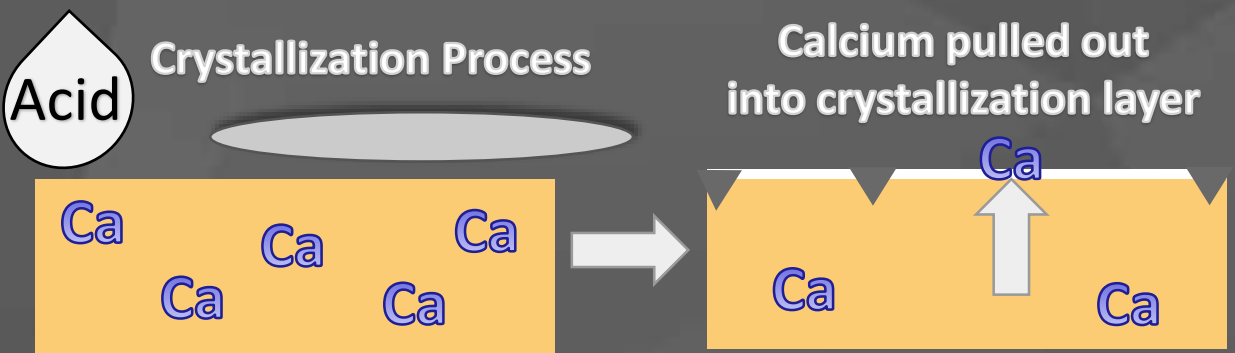


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## Travertine-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



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# Travertine-Crystallization

Over-Crystallization



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## Travertine-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

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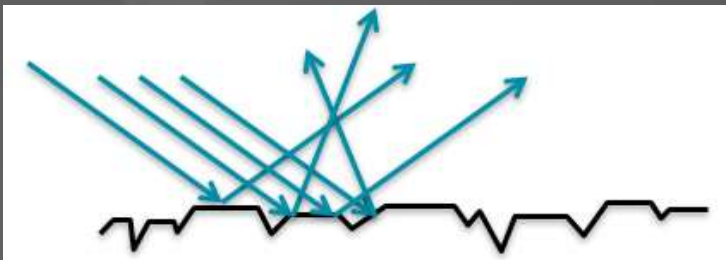


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## Travertine-Coated

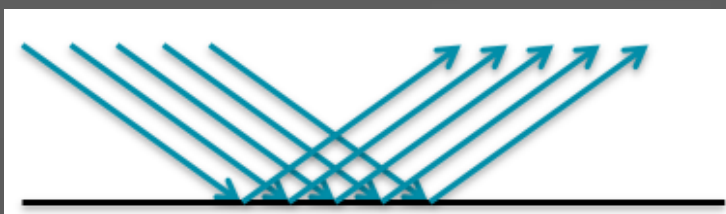
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# Travertine-Coated

Dulling





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## Travertine-Coated

### Soiling

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Common identifiers:

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## Travertine-Coated

Soiling



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# Travertine

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.





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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>



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## Travertine-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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Tile / Larger or Equal to 12"x 12" / Textured

## Travertine-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Travertine-Impregnator

Staining/etching





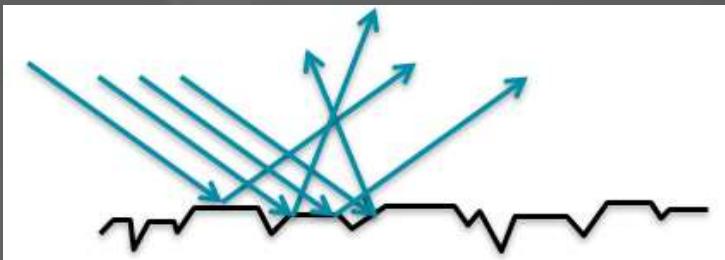
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## Travertine-Impregnator

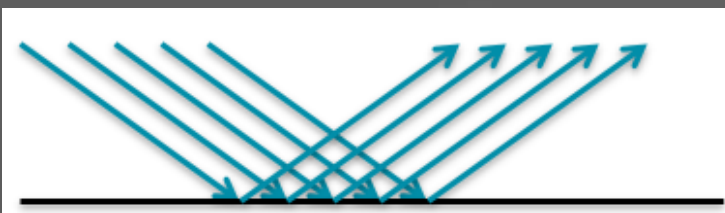
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



## Pictures



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## **Travertine-Impregnator**

Dulling/scratching



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Tile / Larger or Equal to 12"x 12" / Textured

## Travertine-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Impregnator

Soiling/soil build-up



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# **3M** FLOOR CARE GUIDE



Stone Floors

Tile / Smaller than 12"x 12"

**Textured  
(Rough Sawn,  
Natural)**

**Not Textured  
(Honed,  
Polished)**



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# **3M** FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

Quarry

Ceramic

Marble

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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

**Quarry**

**Ceramic**

**Marble**

Quarry tile is made of clay or shales that have been fired at high temperatures. It is usually manufactured as 6"x6" tiles and is predominantly seen in food service environments or areas that have a lot of water present because of their low water absorption. They are very durable and can have additives incorporated which make them slip resistant

Physical traits: Will have a smooth and unglazed surface. Dark red-gray-tan-brown in color. Mohs hardness usually between 7-8.

Chemical traits: Are resistant to most chemicals and greases. Some quarry tile may stain, so sealing is often a good option. Grout can be damaged by acids if cementitious.

[Verify Ceramic](#)[What's Mohs Hardness?](#)

**Pictures**

**Maintenance & Troubleshooting**

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# 3M FLOOR CARE GUIDE



Tile / Larger or Equal to 12"x 12" / Not Textured

## Verify Ceramic-Quarry Tile

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Natural Stone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

### Ceramic/Quarry

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Acid Test](#)[Scratch Test](#)

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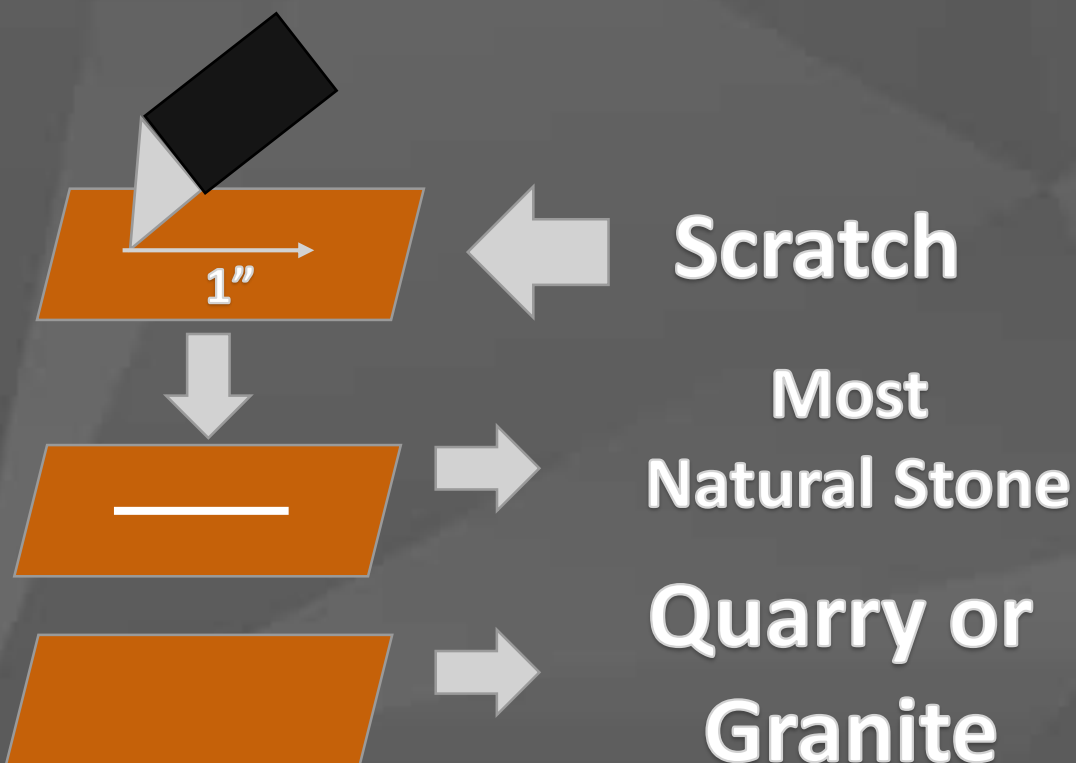
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.





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# 3M FLOOR CARE GUIDE

Tile / Larger or Equal to 12"x 12" / Not Textured

## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

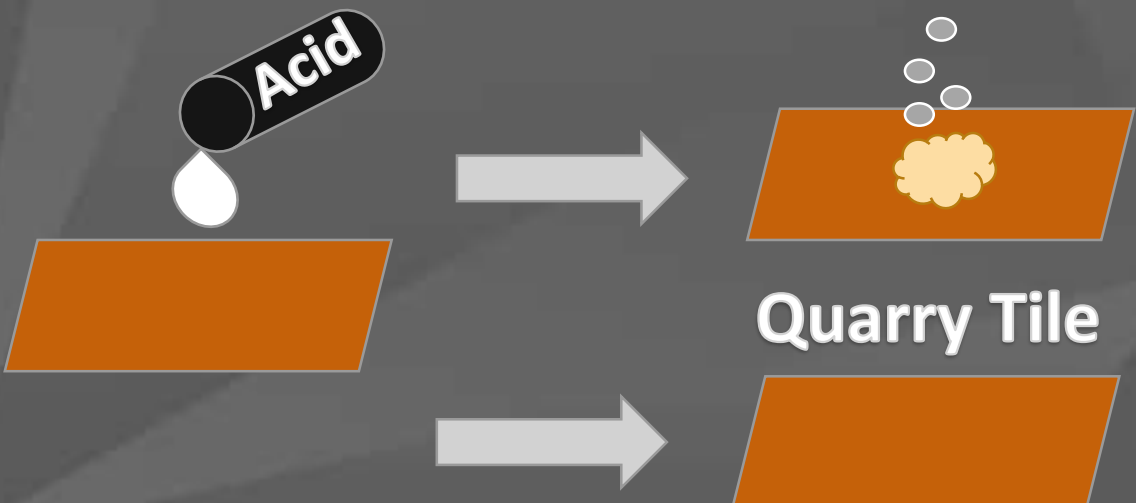
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Most Natural Stone**





Tile / Smaller than 12”x 12” / Not Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

Quarry (7-8)

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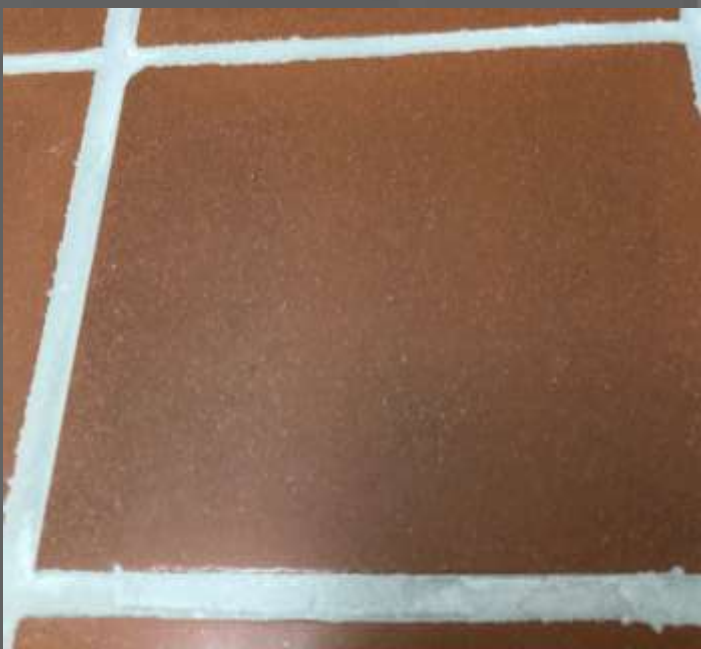
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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

Quarry



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Tile / Smaller than 12"x 12" / Not Textured

## Quarry Tile

Uncoated/Bare

Coated



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Tile / Smaller than 12"x 12" / Not Textured

## Quarry Tile-Uncoated/Bare

### Uncoated/Bare

A proper matting system is important to keep as much possible sand/grit off the tile to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily.
- Damp mop or autoscrub with neutral cleaner/peroxide cleaner, or degreaser if in a food soil environment.

Clean up any spill as soon as possible, especially acids which may etch the grout lines.

### Issues:

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

## Quarry Tile-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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Tile / Smaller than 12"x 12" / Not Textured

## Quarry Tile-Uncoated/Bare

Soiling/soil build-up





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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

## Quarry Tile-Coated

Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems



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# 3M FLOOR CARE GUIDE

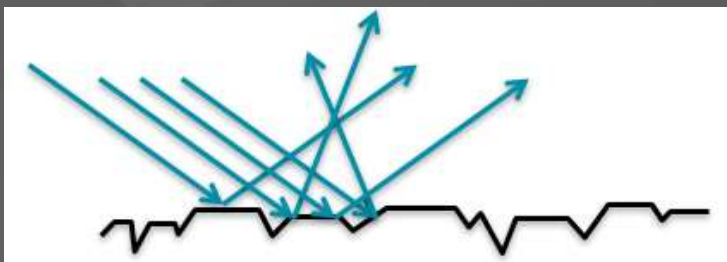


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## Quarry Tile-Coated

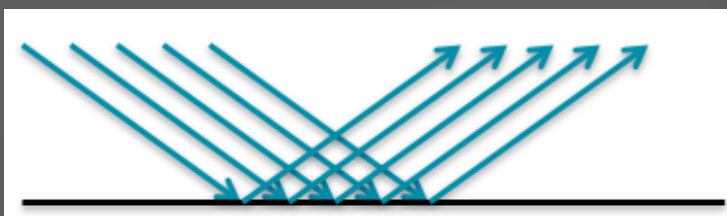
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Quarry Tile-Coated

Dulling



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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

## Quarry Tile-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

### Pictures



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## Quarry Tile-Coated

Soiling





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# Quarry Tile

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Tile / Smaller than 12”x 12” / Not Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Tile / Smaller than 12”x 12” / Not Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



Tile / Smaller than 12”x 12” / Not Textured

# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

Quarry

Ceramic

Marble

Ceramic tile is made of clay that is fired at high temperatures to create a durable/rigid tile. As this tile is man-made, it may come in many different sizes and shapes.

Physical traits: Will have either a glazed surface (smooth and reflective) or an unglazed surface (rough and matte). The surface can have a broad amount of colors/patterns. Mohs hardness usually between 6-8.

Chemical traits: Resistant to most chemicals but the grout is susceptible to damage from acids if cementitious.

[Verify Ceramic](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



Tile / Smaller than 12”x 12” / Not Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

Ceramic (6-8)



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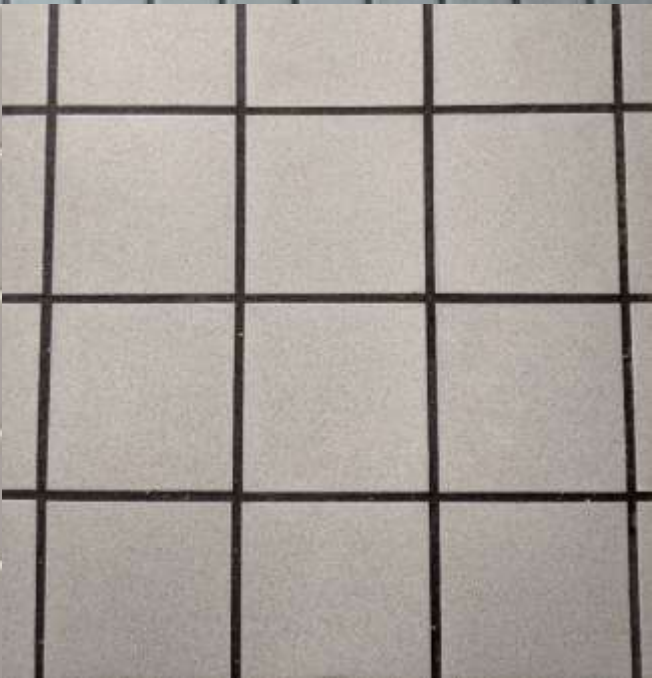
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Ceramic



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# 3M FLOOR CARE GUIDE



Tile / Larger or Equal to 12"x 12" / Not Textured

## Verify Ceramic

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Natural Stone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Acid Test](#)[Scratch Test](#)

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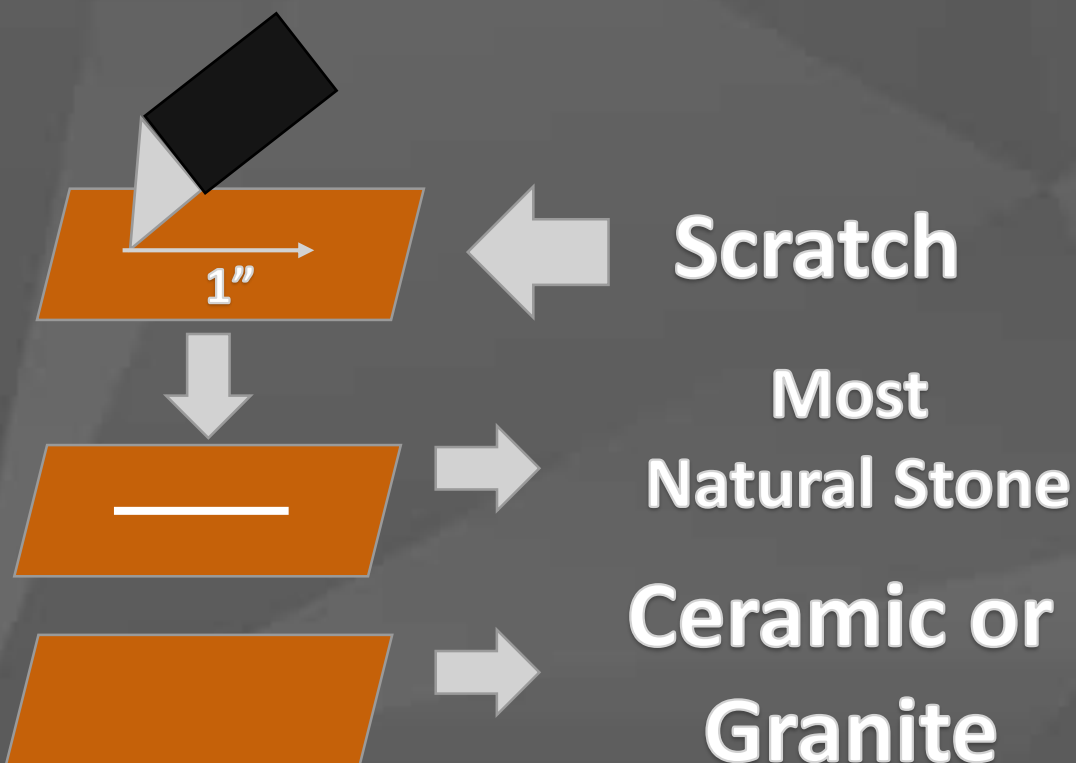
Tile / Larger or Equal to 12"x 12" / Not Textured

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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Tile / Larger or Equal to 12"x 12" / Not Textured

## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

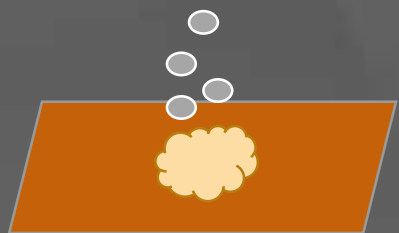
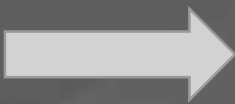
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Most Natural Stone**



**Ceramic or Porcelain**





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## Ceramic Tile

Uncoated/Bare

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Tile / Smaller than 12"x 12" / Not Textured

## Ceramic Tile-Uncoated/Bare

### Uncoated/Bare

A proper matting system is important to keep as much possible sand/grit off the tile to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily.
- Damp mop or autoscrub with neutral cleaner/peroxide cleaner, or degreaser if in a food soil environment.

Clean up any spill as soon as possible, especially acids which may etch the grout lines.

### Issues:

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Ceramic Tile-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

## Pictures

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## Ceramic Tile-Uncoated/Bare

Soiling/soil build-up





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# 3M FLOOR CARE GUIDE



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Quarry

Ceramic

Marble

Marble is a very common type of stone used for flooring because of its abundant variety of colors and natural beauty.

Marble is most often made up of limestone/dolostone (carbonate minerals- calcite, dolomite, etc.) that has been subjected to high heat and pressure. This causes physical changes to the crystalline structure (color, fractures) as well as chemical changes (veining).

Physical traits: Because of the minerals that make up marble, it is on the softer side of stones with a Mohs hardness between 3-5. This means that the bare stone may scratch when exposed to foot traffic.

Chemical traits: Acids will cause marble to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

Possibly Ceramic?

What's Mohs Hardness?

Colors

Maintenance & Troubleshooting



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Marble (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

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# 3M FLOOR CARE GUIDE



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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Marble

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

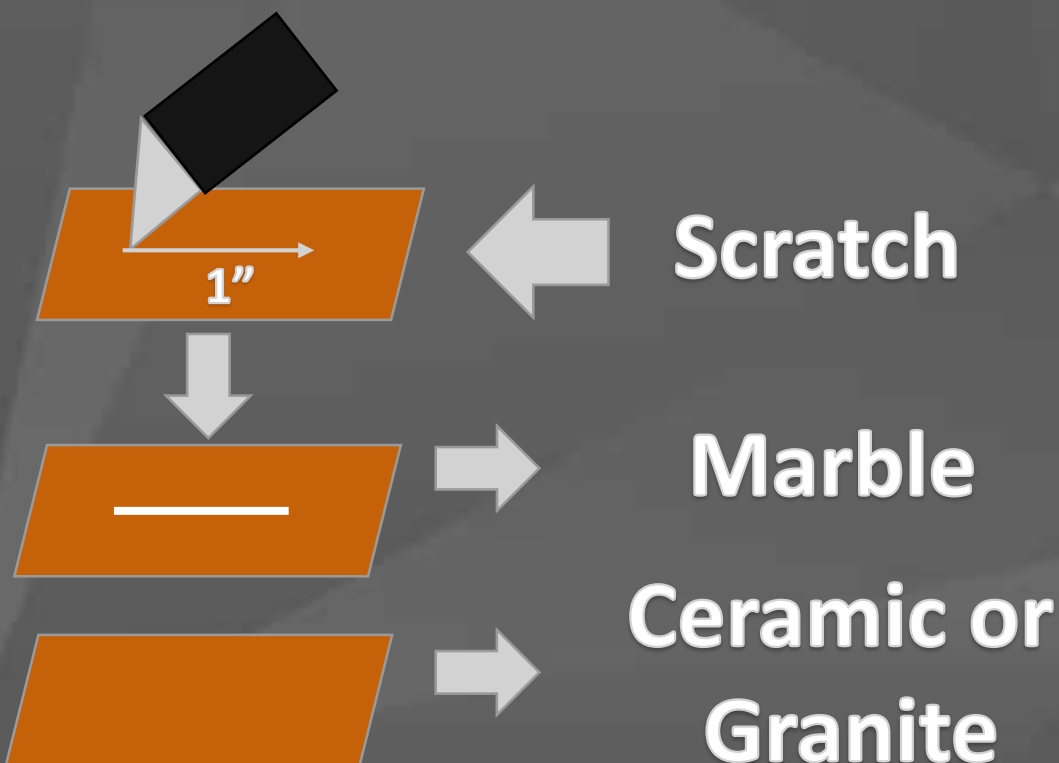
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.





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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

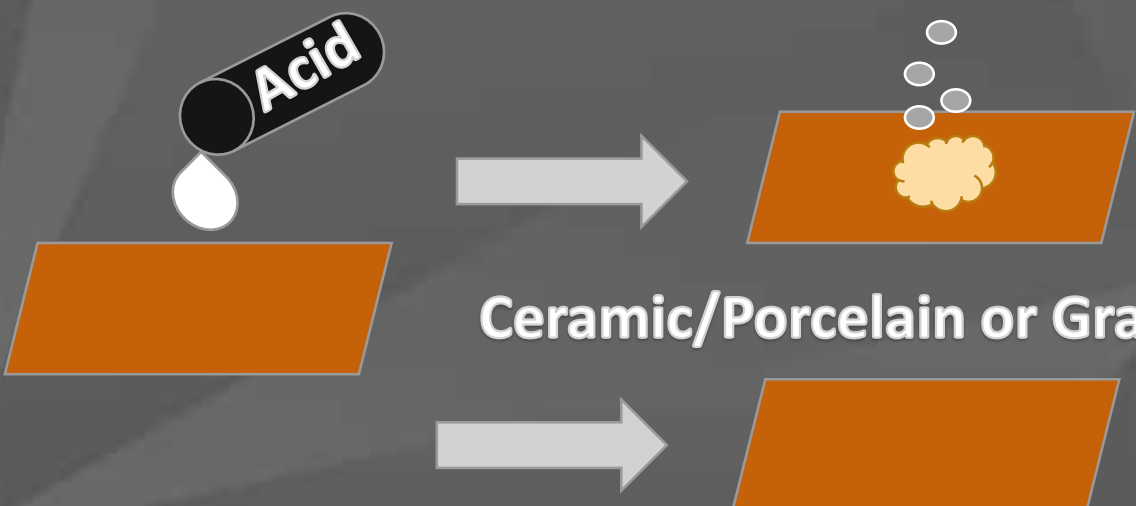
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Marble



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# **3M** FLOOR CARE GUIDE

## Marble

Tile / Smaller than 12"x 12" / Not Textured

White

Tan/Brown

Red

Black

Green

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# Marble

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White

Tan/Brown

Red

Black

Green

Common white marbles:

Carrara- A white to light gray marble with light gray veining. The veining often has hazy edges, blending into the white matrix causing a mixed looks as opposed to contrasting.

Pictures

Calacatta- Calacutta is a purer white and the veining is a darker gray to black (sometimes may contain gold veining). There is often a very distinct transition from the dark vain to the white matrix, making the veins stand out more than Carrara.

Pictures

Thassos: A pure white marble originating in Greece. May sometimes have slight grey impurities present.

Pictures

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## Carrara Marble





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## Calacatta Marble



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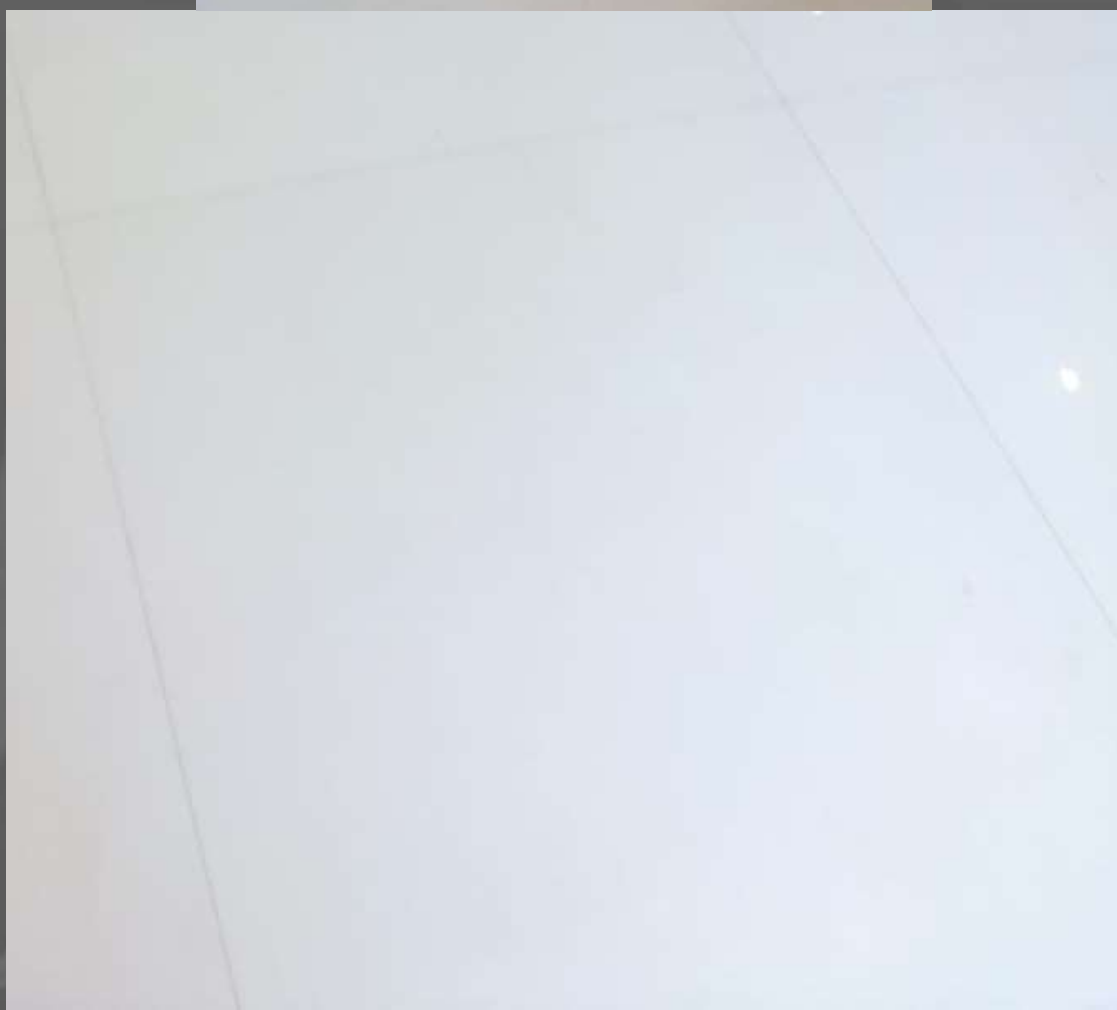
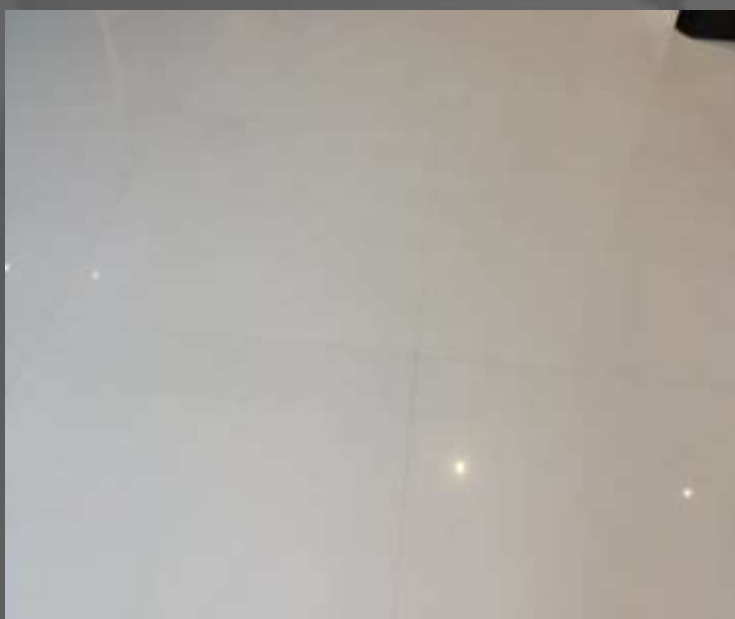
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## Thassos Marble



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## Marble

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White

Tan/Brown

Red

Black

Green

Common Tan/Brown marbles:

Crema Marfil- Cream/Tan matrix with small amounts of thin light brown veining.

Pictures

Emperador- Most often dark brown matrix but may be light brown or light gray with a large amount of fine tan or white veining. Often has so much veining that it looks like chunks of rock that have fractured apart.

Pictures

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## Crema Marfil Marble





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# Emperador Marble



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# Marble

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White

Tan/Brown

Red

Black

Green

Common red marble:

Rojo Alicante- Has a red matrix that can be anywhere in the light-medium-dark (red, pink, orange, burgundy) shades with most commonly white veining (sometimes fine black veins).

Pictures

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## Rojo Alicante Marble





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# Marble

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White

Tan/Brown

Red

Black

Green

Common black marble:

Negro Marquina-Black matrix with very crisp, contrasting white veins.

Pictures



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## Black Marble



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# 3M FLOOR CARE GUIDE

## Marble

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[White](#)[Tan/Brown](#)[Red](#)[Black](#)[Green](#)

Serpentine (Green Marble) - Serpentine is one of the more unknown stone types used in flooring today and is often referred to as green marble. It will visually look very similar to marble, with white/brown veins and a light-dark green bulk color. Serpentine, unlike marble is not made up of calcium based minerals. This confusion is often not an issue, as serpentine can take a polish and has a hardness similar to marble. Another common serpentine is labeled as rainforest marble which is green-brown with brown veins. Mohs' hardness is 3-6 depending on mineral construction.

[Pictures](#)[What's Mohs Hardness?](#)



Tile / Smaller than 12”x 12” / Not Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Serpentine (3-6)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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## Serpentine

Rainforest

Green





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## Marble

Uncoated/Bare

Crystallization

Coated

Impregnator

Polishing Compound

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## Marble-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Marble-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Marble-Uncoated/Bare

Staining/etching





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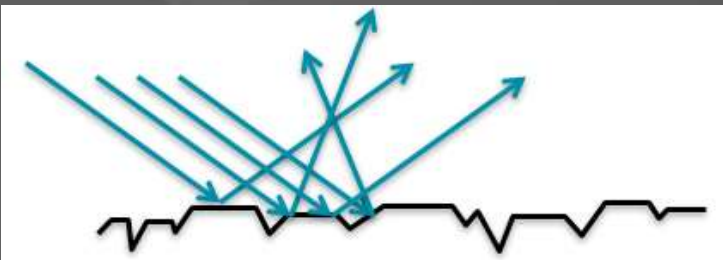


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## Marble-Uncoated/Bare

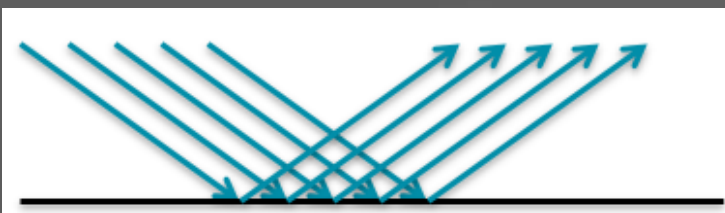
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Marble-Uncoated/Bare

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Marble-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Marble-Uncoated/Bare

Soiling/soil build-up





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# Marble-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Marble-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

Periodic Maintenance:

- Re-crystallize

Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

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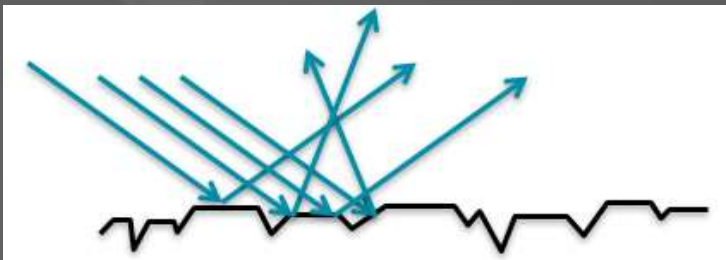


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## Marble-Crystallization

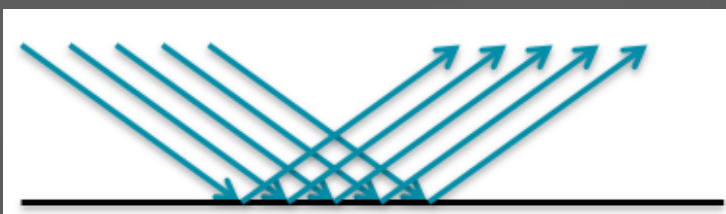
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Marble-Crystallization

Dulling





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## Marble-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



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## Marble-Crystallization

Spalling



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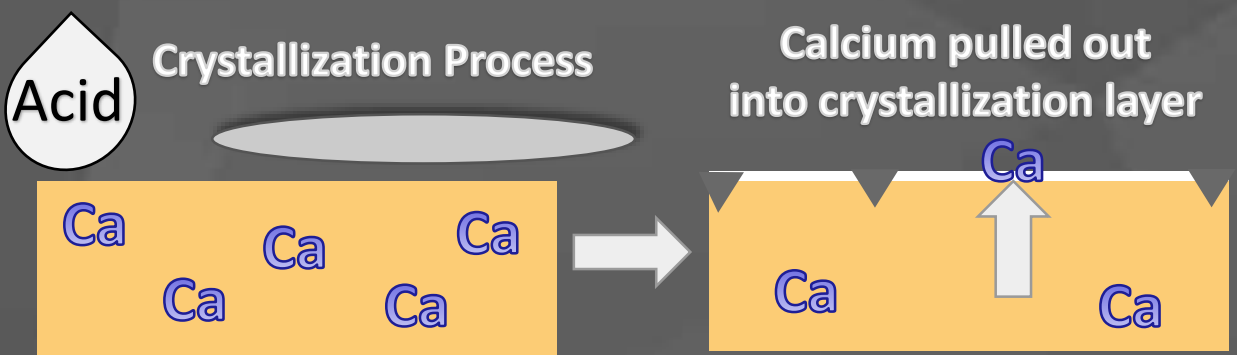


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## Marble-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



[Pictures](#)



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# Marble-Crystallization

Over-Crystallization





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## Marble-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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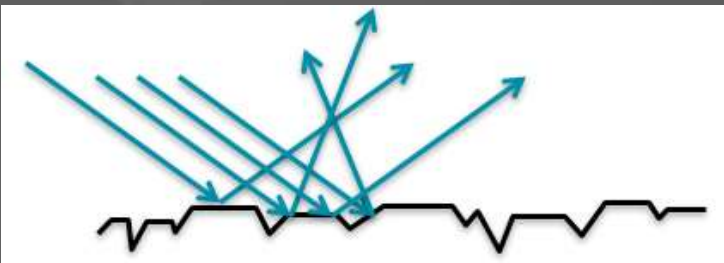


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## Marble-Coated

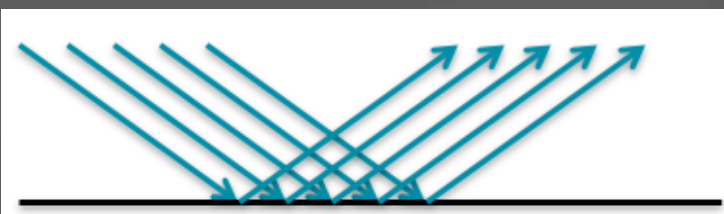
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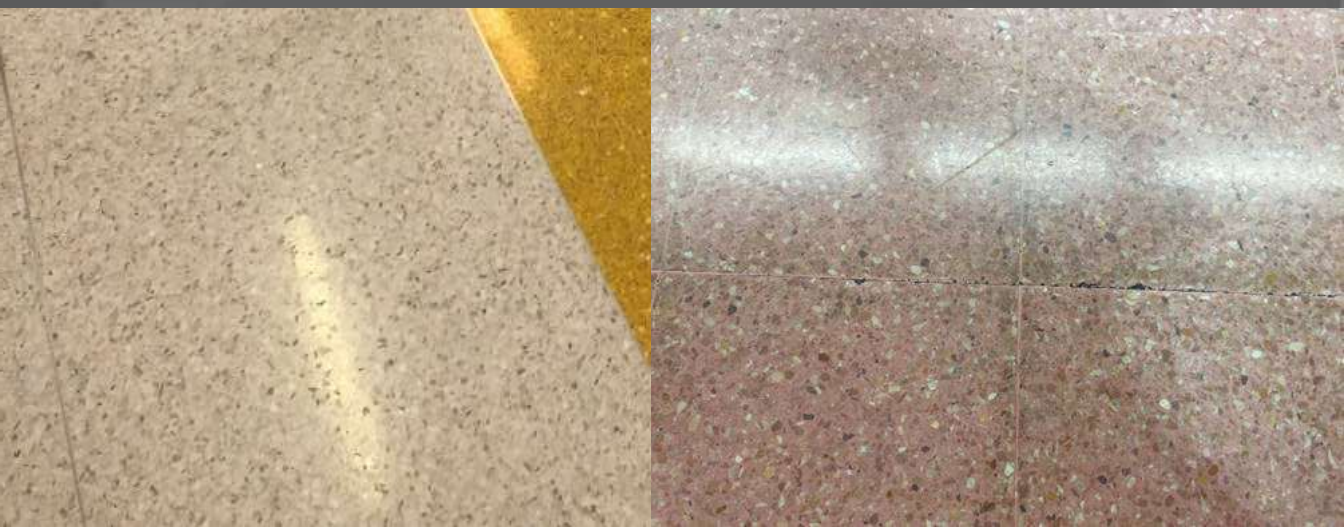
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## Marble-Coated

Dulling



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# 3M FLOOR CARE GUIDE



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## Marble-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
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## Marble-Coated

Soiling



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## Marble

# Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Tile / Smaller than 12”x 12” / Not Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Tile / Smaller than 12”x 12” / Not Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





Tile / Smaller than 12”x 12” / Not Textured

# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



Tile / Smaller than 12”x 12” / Not Textured

# Powdering

## Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

## Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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Tile / Smaller than 12"x 12" / Not Textured

## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

## Marble-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Not Textured

## Marble-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Marble-Impregnator

Staining/etching



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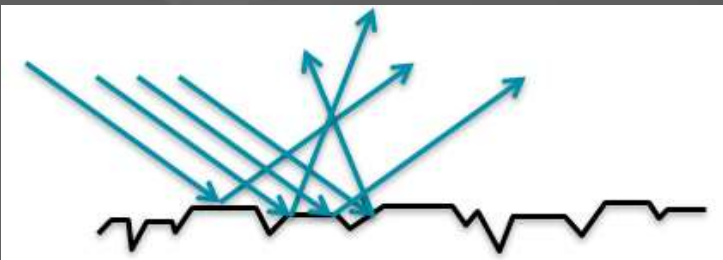


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## Marble-Impregnator

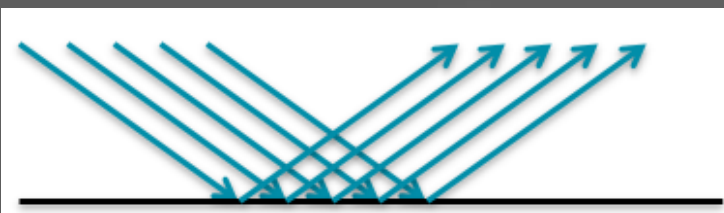
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Marble-Impregnator

Dulling/scratching





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## Marble-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Marble-Impregnator

Soiling/soil build-up



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## Marble-Polishing Compound

- Most marble has been polished in the factories using various grades of abrasives followed by a final step using an abrasive in combination with oxalic acid. This same process can also be done to refresh natural calcareous stone that has dulled over time.
- Most often, polishes are used with a red or natural floor pad. The polishing compound is mixed with water and buffed with 175rpm floor machine. Floors with deeper scratches or other damage typically must be diamond honed prior to using marble polishing products. The calcium oxalate formed in the reaction is washed away with the slurry from the process leaving behind a smoothed and polished stone surface that has not been chemically altered, just highly polished.
- Note that the above does not mean that oxalic acid will not etch stone surfaces. Oxalic acid (and any acid) dropped on a marble surface will etch. Factory polishing and marble restoration are performed under controlled circumstances to reach desired results.

**Maintenance &  
Troubleshooting**



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# Marble-Polishing Compound

## Polishing Compound

The polishing compound process leaves a highly polished surface when finished. There is no protection on the surface, making it susceptible to damage from abrasion and staining or etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be required if the floor is damaged or deeply scratched. The polishing compound process is re-done to bring a polish back to the stone.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# Marble-Polishing Compound

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Marble-Polishing Compound

Staining/etching



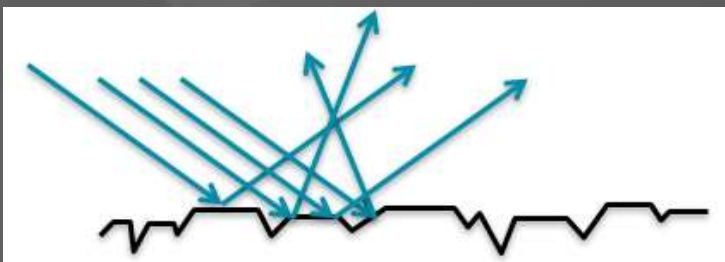
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## Marble-Polishing Compound

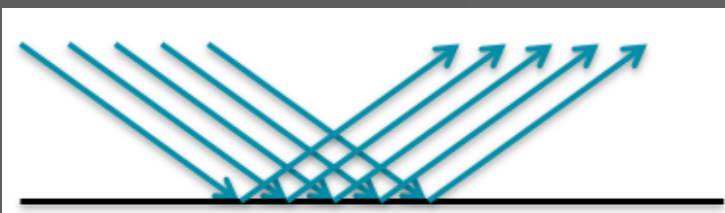
### Dulling/scratching

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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Marble-Polishing Compound

Dulling/scratching





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# 3M FLOOR CARE GUIDE



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## Marble-Polishing Compound

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Marble-Polishing Compound

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Textured

## Quarry

Quarry tile is made of clay or shales that have been fired at high temperatures. It is usually manufactured as 6"x6" tiles and is predominantly seen in food service environments or areas that have a lot of water present because of their low water absorption. They are very durable and can have additives incorporated which make them slip resistant

Physical traits: Will have a rough looking-lightly textured and unglazed surface. Dark red-gray-tan-brown in color. Mohs hardness usually between 7-8.

Chemical traits: Are resistant to most chemicals and greases. Some quarry tile may stain, so sealing is often a good option. Grout can be damaged by acids if cementitious.

[Ceramic Test](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





Tile / Smaller than 12”x 12” / Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

Quarry Tile (7-8)



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# 3M FLOOR CARE GUIDE



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## Ceramic Test-Quarry Tile

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Natural Stone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

### Ceramic/Quarry

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Acid Test](#)[Scratch Test](#)

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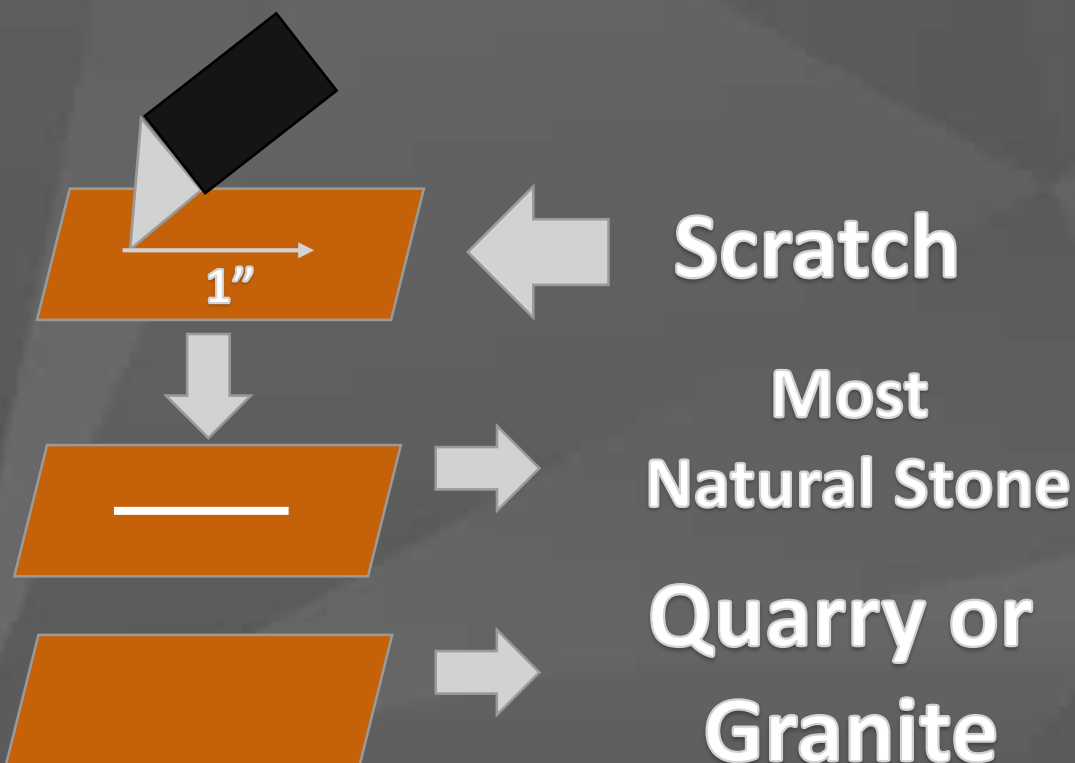
Tile / Larger or Equal to 12"x 12" / Not Textured

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

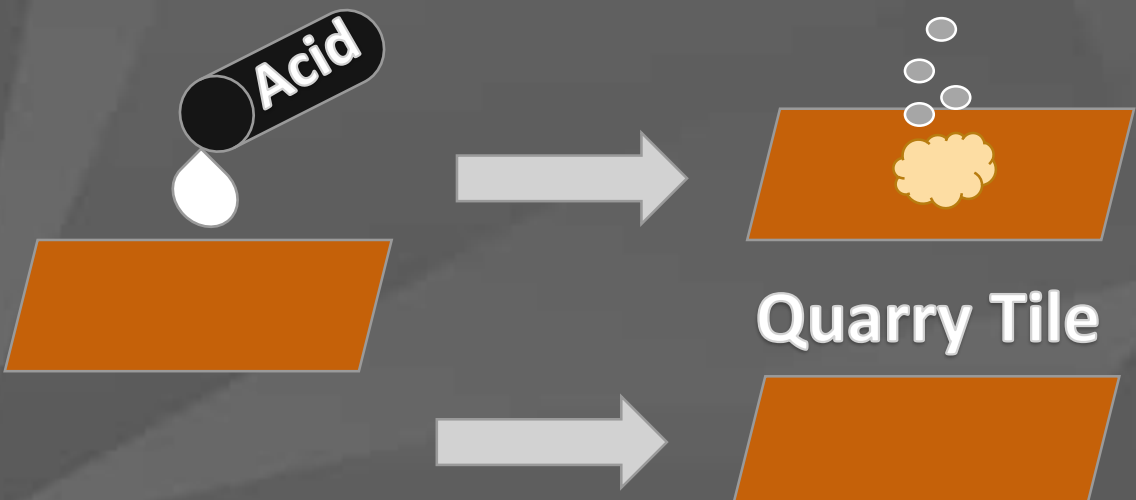
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Most Natural Stone**



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Quarry





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## Quarry Tile

Uncoated/Bare

Coated

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Tile / Smaller than 12"x 12" / Textured

## Quarry Tile-Uncoated/Bare

### Uncoated/Bare

A proper matting system is important to keep as much possible sand/grit off the tile to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily.
- Damp mop or autoscrub with neutral cleaner/peroxide cleaner, or degreaser if in a food soil environment.

Clean up any spill as soon as possible, especially acids which may etch the grout lines.

### Issues:

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Textured

## Quarry Tile-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Quarry Tile-Uncoated/Bare

Soiling/soil build-up





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Tile / Smaller than 12"x 12" / Textured

## Quarry Tile-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

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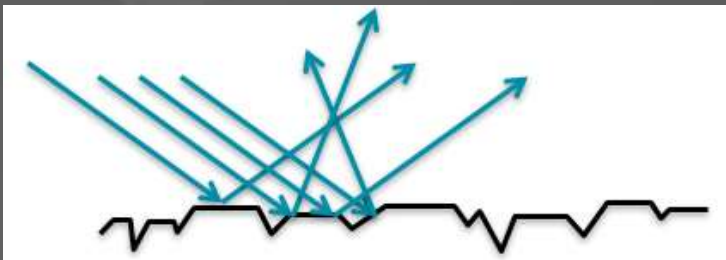


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## Quarry Tile-Coated

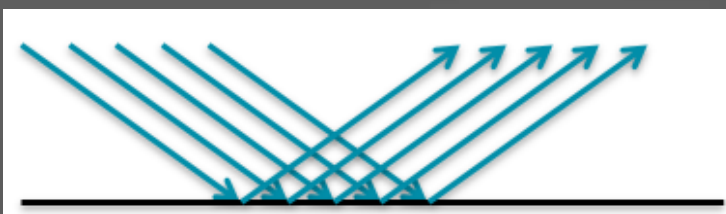
### Dulling

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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Quarry Tile-Coated

Dulling



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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Textured

## Quarry Tile-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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Tile / Smaller than 12"x 12" / Textured

## Quarry Tile-Coated

Soiling



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# Quarry Tile

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Tile / Smaller than 12”x 12” / Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Tile / Smaller than 12”x 12” / Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





Tile / Smaller than 12”x 12” / Textured

# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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# 3M FLOOR CARE GUIDE



Tile / Smaller than 12"x 12" / Textured

## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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**3M** FLOOR  
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Tile / Smaller than 12"x 12" / Textured

## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# **3M** FLOOR CARE GUIDE



Stone Floors

Rectangle

Smaller than  
12"x 24"

Larger or  
Equal to  
12"x 14"



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# **3M** FLOOR CARE GUIDE



**Stone Floors**

**Rectangle / Smaller than 12"x 24"**

**Textured  
(Rough Sawn,  
Natural)**

**Not Textured  
(Honed,  
Polished)**

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# **3M** FLOOR CARE GUIDE



Rectangle / Smaller than 12"x 24" / Textured

**Brick**

**Slate**

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# 3M FLOOR CARE GUIDE



Rectangle / Smaller than 12"x 24" / Textured

**Brick**

**Slate**

Brick tile is man-made clay tile which is fired to remove all of the moisture. They are most commonly 3"x 6" and can be anywhere from ½"-2" thick. It is relatively porous and often requires a coating or sealer.

Physical traits: Will have a rough looking-lightly textured and unglazed surface. Dark red-red-tan-brown in color. Brick can vary in hardness depending on its construction.

Chemical traits: Is very porous compared to other tiles. Almost always will have a penetrating sealer or topical coating applied to prevent staining.

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**Maintenance & Troubleshooting**

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# 3M FLOOR CARE GUIDE



Rectangle / Smaller than 12"x 24" / Textured

Brick





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Rectangle / Smaller than 12"x 24" / Textured

**Brick**

Uncoated/Bare

Coated

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# 3M FLOOR CARE GUIDE



Rectangle / Smaller than 12"x 24" / Textured

## Brick-Uncoated/Bare

### Uncoated/Bare

A proper matting system is important to keep as much possible sand/grit off the tile to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily.
- Damp mop or autoscrub with neutral cleaner/peroxide cleaner, or degreaser if in a food soil environment.

Clean up any spill as soon as possible, especially acids which may etch the grout lines.

### Issues:

Soiling/soil build-up



Rectangle / Smaller than 12"x 24" / Textured

## Brick-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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Rectangle / Smaller than 12"x 24" / Textured

## Brick-Uncoated/Bare

Soiling/soil build-up





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# 3M FLOOR CARE GUIDE



Rectangle / Smaller than 12"x 24" / Textured

## Brick-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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# 3M FLOOR CARE GUIDE

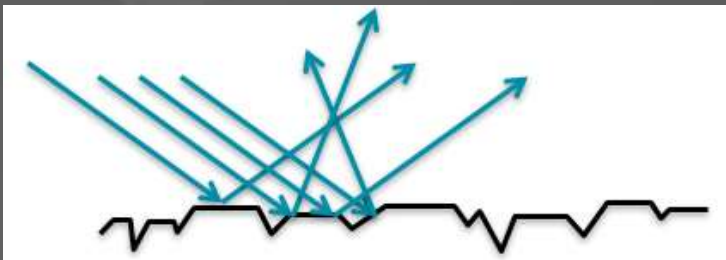


Rectangle / Smaller than 12"x 24" / Textured

## Brick-Coated

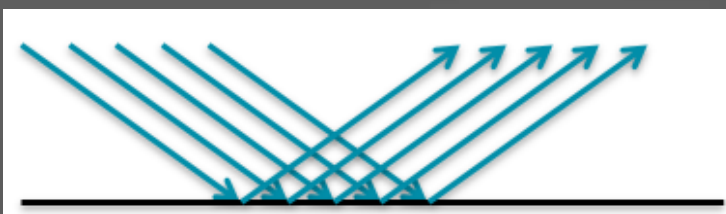
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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Rectangle / Smaller than 12"x 24" / Textured

## Brick-Coated

Dulling



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# 3M FLOOR CARE GUIDE



Rectangle / Smaller than 12"x 24" / Textured

## Brick-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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**Brick-Coated**

Soiling



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Rectangle / Smaller than 12"x 24" / Textured

# Brick

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Rectangle / Smaller than 12”x 24” / Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Rectangle / Smaller than 12”x 24” / Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





Rectangle / Smaller than 12”x 24” / Textured

# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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# 3M FLOOR CARE GUIDE



Rectangle / Smaller than 12”x 24” / Textured

## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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Rectangle / Smaller than 12"x 24" / Textured

## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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# 3M FLOOR CARE GUIDE



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Brick

Slate

Slate is a metamorphic stone that is made of layered shale subjected to high heat and pressure. One drawback to this layered composition is that slate may break or flake at the surface. However, the bulk material is very durable with low water absorption, so it is commonly used in roofing tiles as well as indoor and outdoor flooring.

Physical traits: Color can vary from black-gray-green-purple-rust. Can have a rough/gritty texture or can be smooth with partial sheets exposed. Mohs hardness between 3-5.

Chemical traits: Relatively good moisture resistance compared to other stones but may still require an impregnator. Avoid highly acidic or alkaline cleaners.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





Rectangle / Smaller than 12”x 24” / Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Slate (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



Tile / Larger or Equal to 12”x 12” / Not Textured

# Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

Slate	Ceramic/Porcelain
<ul style="list-style-type: none"><li>• Pattern on each tile will be completely random</li><li>• Tiles are cut and are identically sized, grout lines can be less than 1/8”</li><li>• Bare stone is porous and will absorb liquids</li><li>• Edges are usually 90°</li><li>• Cracks will appear along weak points in tile, usually random or jagged</li><li>• Will scratch from scratch test</li><li>• May fizz in acid test</li></ul>	<ul style="list-style-type: none"><li>• Pattern will often be repeated and seen in multiple tiles</li><li>• Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8”</li><li>• Non-porous, will not absorb liquids</li><li>• Edges are often rounded</li><li>• Cracks will be strait or rounded, but crack cleanly</li><li>• Will not scratch from scratch test</li><li>• Will not fizz in acid test</li></ul>

Acid Test

Scratch Test

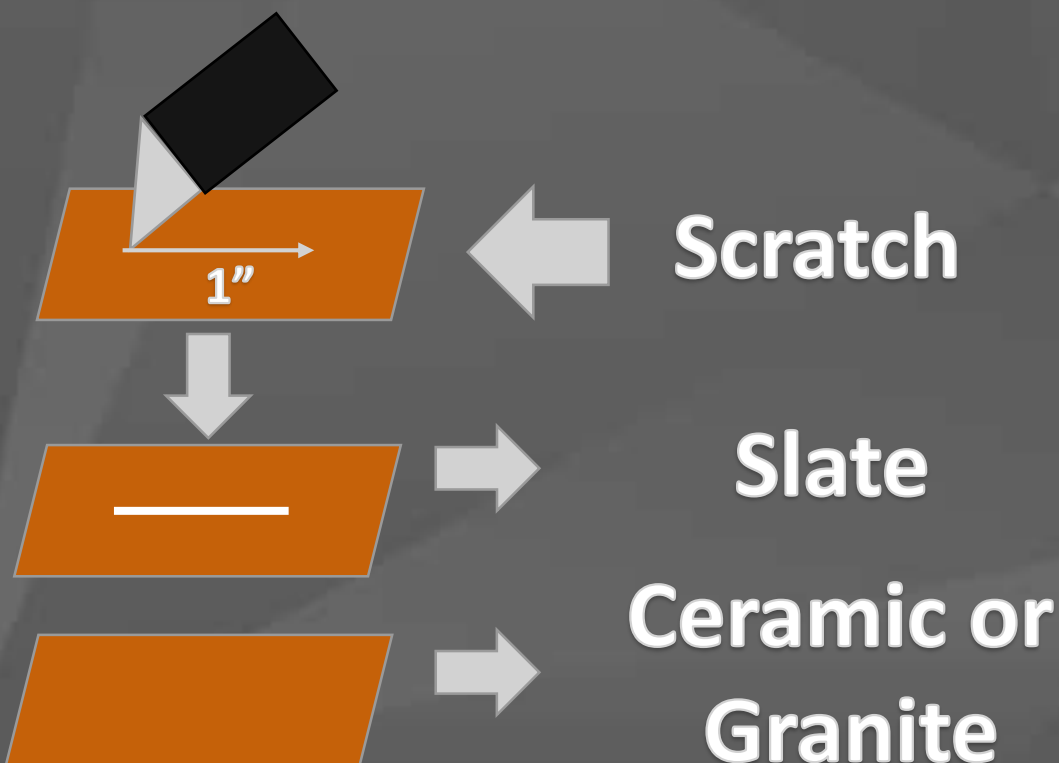
Tile / Larger or Equal to 12"x 12" / Not Textured

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

Tile / Larger or Equal to 12"x 12" / Not Textured

## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

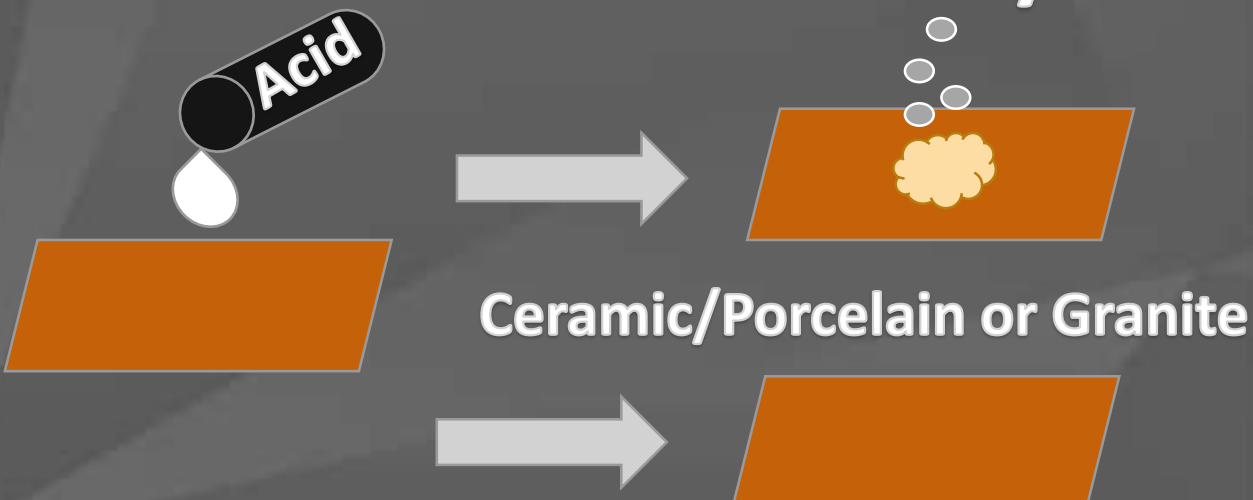
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Slate may fizz





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Slate



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Rectangle / Smaller than 12"x 24" / Textured

**Slate**

Uncoated/Bare

Coated

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Rectangle / Smaller than 12"x 24" / Textured

## Slate-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Issues:

Dulling/scratching

Soiling/soil build-up

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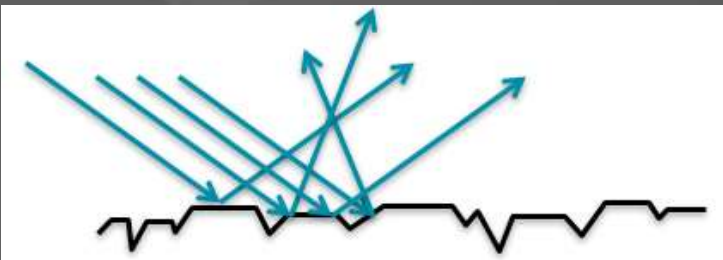


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## Slate-Uncoated/Bare

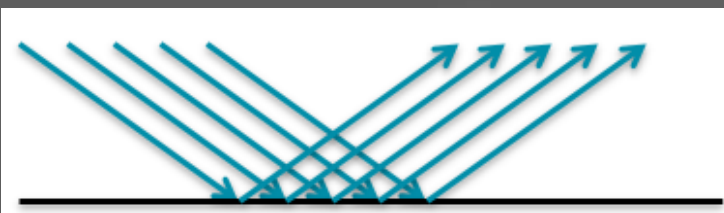
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Slate-Uncoated/Bare

Dulling/scratching



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# 3M FLOOR CARE GUIDE



Rectangle / Smaller than 12"x 24" / Textured

## Slate-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Slate-Uncoated/Bare

Soiling/soil build-up



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## Slate-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems



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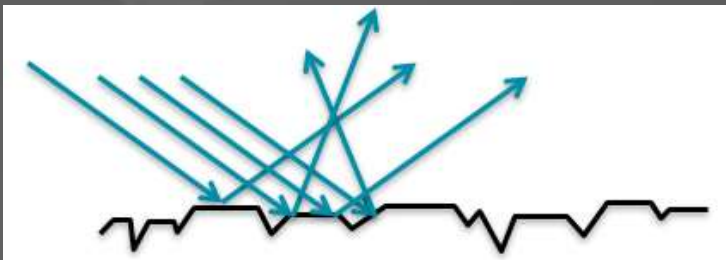


Rectangle / Smaller than 12"x 24" / Textured

## Slate-Coated

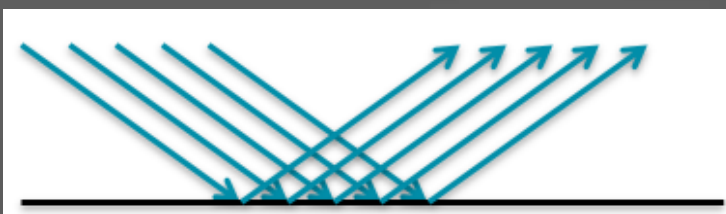
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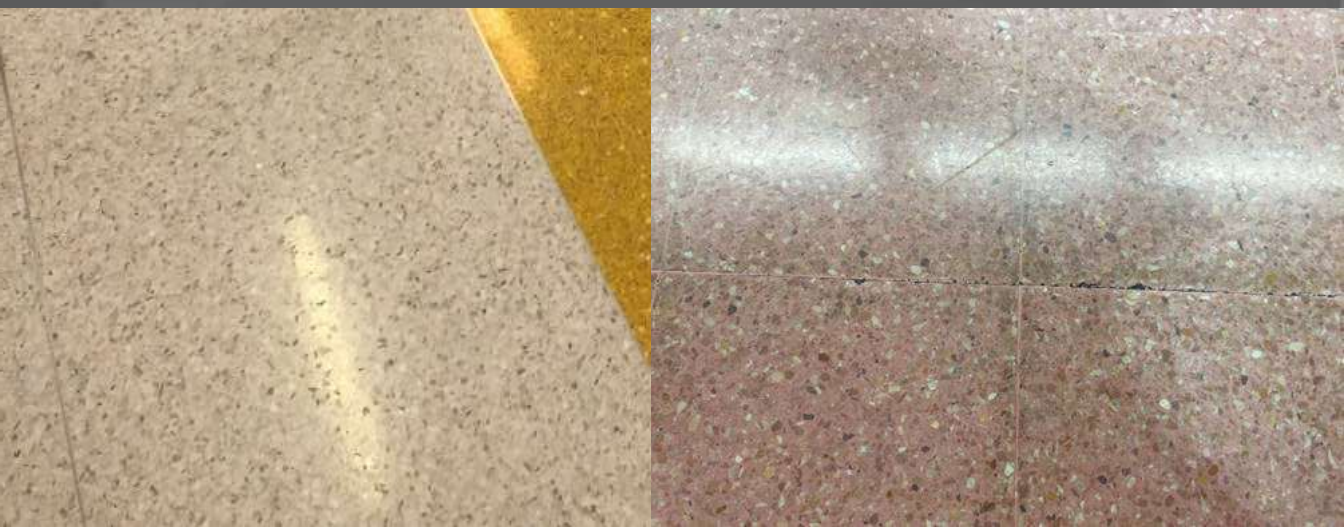
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**Slate-Coated**

Dulling



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# 3M FLOOR CARE GUIDE



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## Slate-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

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**Slate-Coated**

Soiling





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# Slate

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Rectangle / Smaller than 12”x 24” / Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Rectangle / Smaller than 12”x 24” / Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



Rectangle / Smaller than 12”x 24” / Textured

# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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# **3M** FLOOR CARE GUIDE



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Ceramic

Marble

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# 3M FLOOR CARE GUIDE



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**Ceramic**

**Marble**

Ceramic tile is made of clay that is fired at high temperatures to create a durable/rigid tile. As this tile is man-made, it may come in many different sizes and shapes.

Physical traits: Will have either a glazed surface (smooth and reflective) or an unglazed surface (rough and matte). The surface can have a broad amount of colors/patterns. Mohs hardness usually between 6-8.

Chemical traits: Resistant to most chemicals but the grout is susceptible to damage from acids if cementitious.

[Ceramic Test](#)[What's Mohs Hardness?](#)

**Pictures**

[Maintenance & Troubleshooting](#)





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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

Ceramic (6-8)

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# 3M FLOOR CARE GUIDE



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## Ceramic Test

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Natural Stone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

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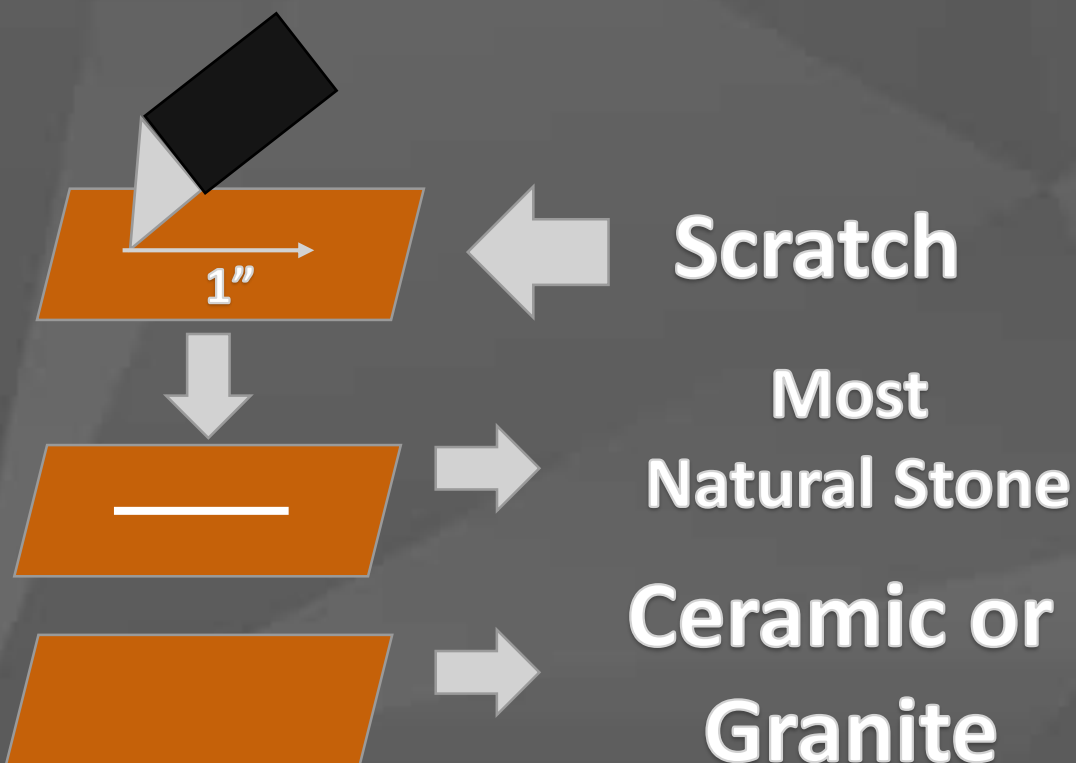
Tile / Larger or Equal to 12"x 12" / Not Textured

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

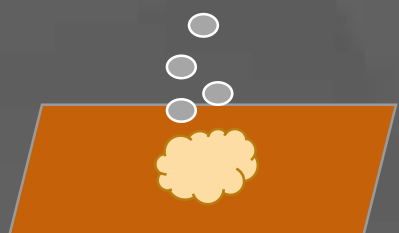
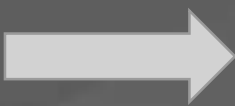
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Most Natural Stone**



**Ceramic or Porcelain**





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Ceramic



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## Ceramic Tile

Uncoated/Bare

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## Ceramic Tile-Uncoated/Bare

### Uncoated/Bare

A proper matting system is important to keep as much possible sand/grit off the tile to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily.
- Damp mop or autoscrub with neutral cleaner/peroxide cleaner, or degreaser if in a food soil environment.

Clean up any spill as soon as possible, especially acids which may etch the grout lines.

### Issues:

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Ceramic Tile-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

## Pictures



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## Ceramic Tile-Uncoated/Bare

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE

## Marble

Rectangle / Smaller than 12"x 24" / Not Textured

[White](#)[Tan/Brown](#)[Red](#)[Black](#)[Green](#)[Maintenance & Troubleshooting](#)

Marble is a very common type of stone used for flooring because of its abundant variety of colors and natural beauty.

Marble is most often made up of limestone/dolostone (carbonate minerals- calcite, dolomite, etc.) that has been subjected to high heat and pressure. This causes physical changes to the crystalline structure (color, fractures) as well as chemical changes (veining).

Physical traits: Because of the minerals that make up marble, it is on the softer side of stones with a Mohs hardness between 3-5. This means that the bare stone may scratch when exposed to foot traffic.

Chemical traits: Acids will cause marble to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)



Rectangle / Smaller than 12”x 24” / Not Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Marble (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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# 3M FLOOR CARE GUIDE



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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Marble

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)



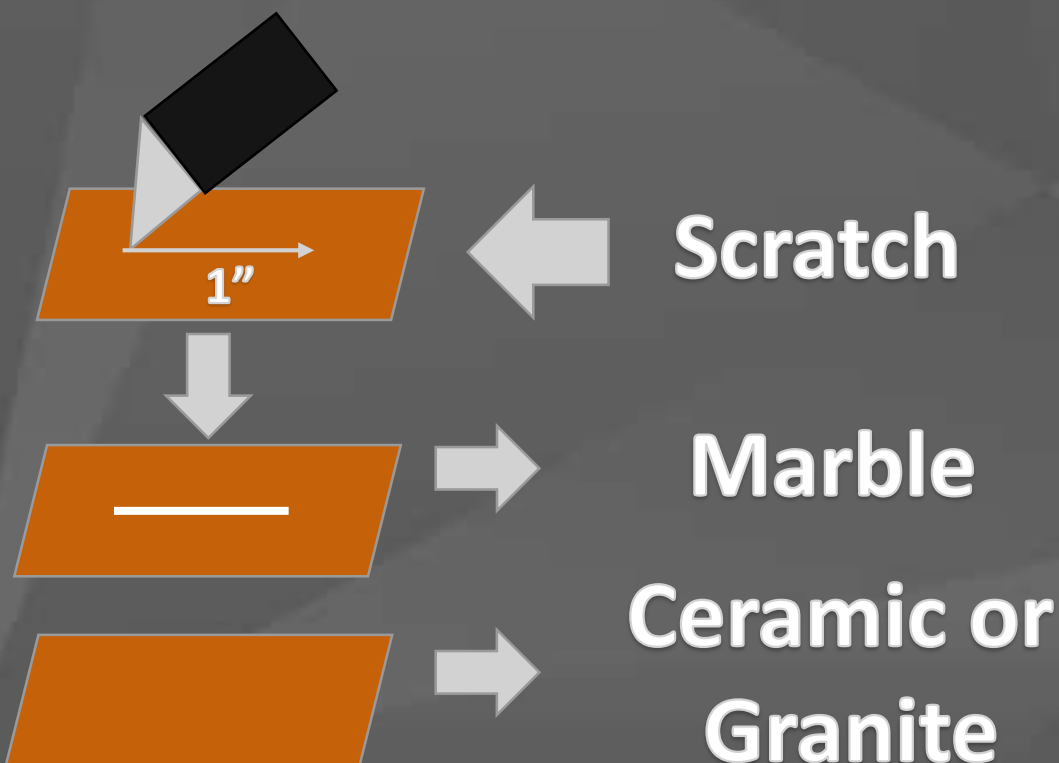
Tile / Larger or Equal to 12"x 12" / Not Textured

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

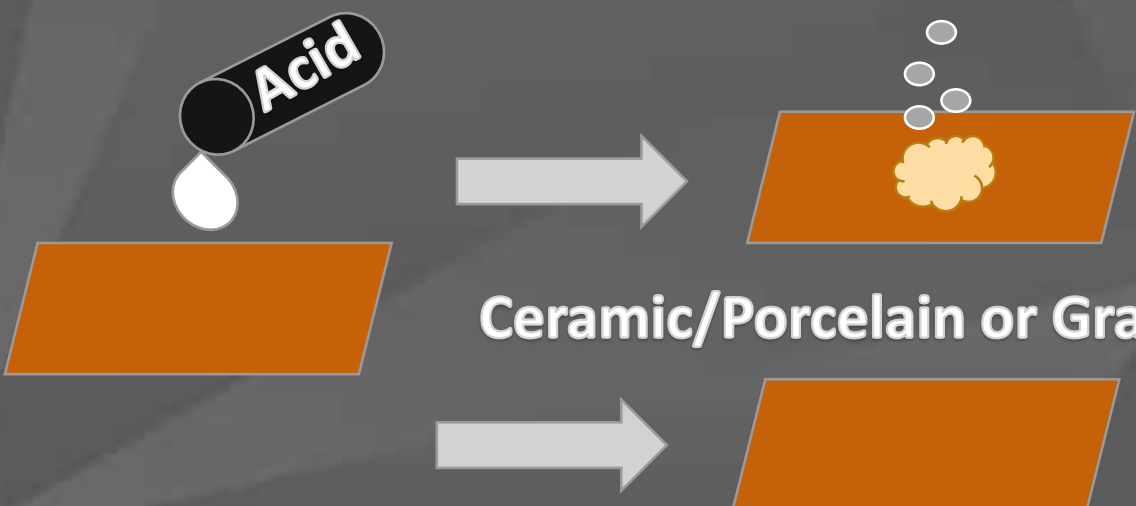
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Marble



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# Marble

Rectangle / Smaller than 12"x 24" / Not Textured

White

Tan/Brown

Red

Black

Green

Common white marbles:

Carrara- A white to light gray marble with light gray veining. The veining often has hazy edges, blending into the white matrix causing a mixed looks as opposed to contrasting.

Pictures

Calacatta- Calacutta is a purer white and the veining is a darker gray to black (sometimes may contain gold veining). There is often a very distinct transition from the dark vain to the white matrix, making the veins stand out more than Carrara.

Pictures

Thassos: A pure white marble originating in Greece. May sometimes have slight grey impurities present.

Pictures

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## Carrara Marble





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## Calacatta Marble



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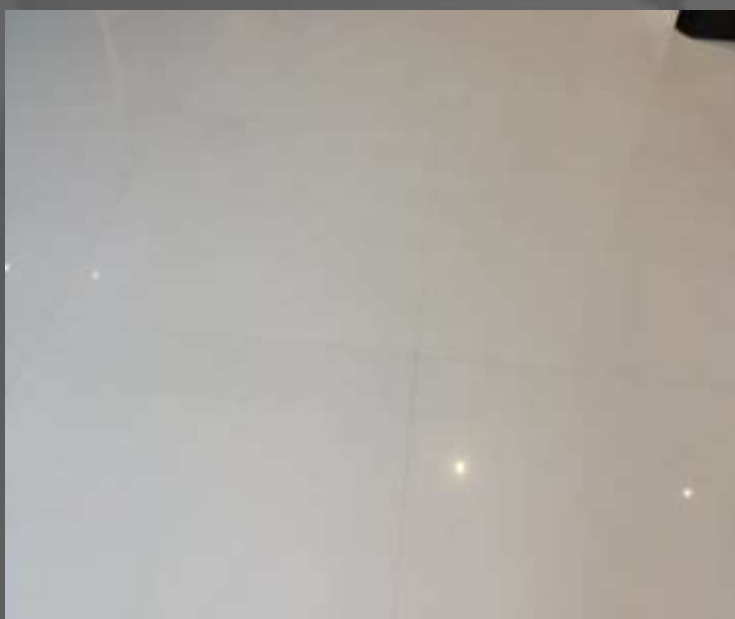
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## Thassos Marble



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## Marble

Rectangle / Smaller than 12"x 24" / Not Textured

White

Tan/Brown

Red

Black

Green

Common Tan/Brown marbles:

Crema Marfil- Cream/Tan matrix with small amounts of thin light brown veining.

Pictures

Emperador- Most often dark brown matrix but may be light brown or light gray with a large amount of fine tan or white veining. Often has so much veining that it looks like chunks of rock that have fractured apart.

Pictures

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## Crema Marfil Marble





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## Emperador Marble



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# Marble

Rectangle / Smaller than 12"x 24" / Not Textured

White

Tan/Brown

Red

Black

Green

Common red marble:

Rojo Alicante- Has a red matrix that can be anywhere in the light-medium-dark (red, pink, orange, burgundy) shades with most commonly white veining (sometimes fine black veins).

Pictures

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## Rojo Alicante Marble





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# Marble

Rectangle / Smaller than 12"x 24" / Not Textured

White

Tan/Brown

Red

Black

Green

Common black marble:

Negro Marquina-Black matrix with very crisp, contrasting white veins.

Pictures



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## Black Marble



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## Marble

Rectangle / Smaller than 12"x 24" / Not Textured

White

Tan/Brown

Red

Black

Green

Serpentine (Green Marble) - Serpentine is one of the more unknown stone types used in flooring today and is often referred to as green marble. It will visually look very similar to marble, with white/brown veins and a light-dark green bulk color. Serpentine, unlike marble is not made up of calcium based minerals. This confusion is often not an issue, as serpentine can take a polish and has a hardness similar to marble. Another common serpentine is labeled as rainforest marble which is green-brown with brown veins. Mohs' hardness is 3-6 depending on mineral construction.

[Pictures](#)

[What's  
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Hardness?](#)



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Serpentine (3-6)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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Rectangle / Smaller than 12"x 24" / Not Textured

**Serpentine**

**Rainforest**

**Green**





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# Marble

Uncoated/Bare

Crystallization

Coated

Impregnator

Polishing Compound

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## Marble-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Marble-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Marble-Uncoated/Bare

Staining/etching





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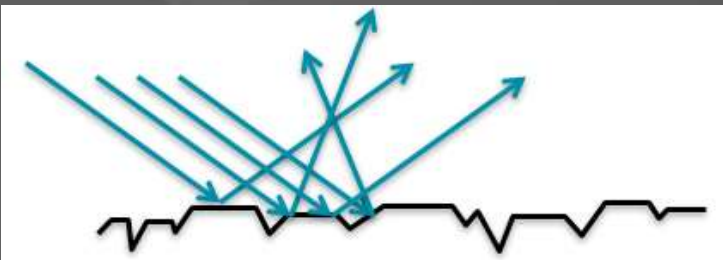


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## Marble-Uncoated/Bare

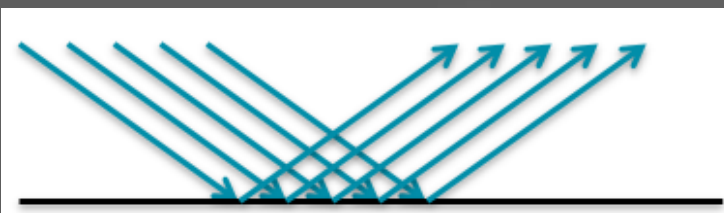
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Marble-Uncoated/Bare

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Marble-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

## Pictures



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## Marble-Uncoated/Bare

Soiling/soil build-up





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# Marble-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Marble-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

Periodic Maintenance:

- Re-crystallize

Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

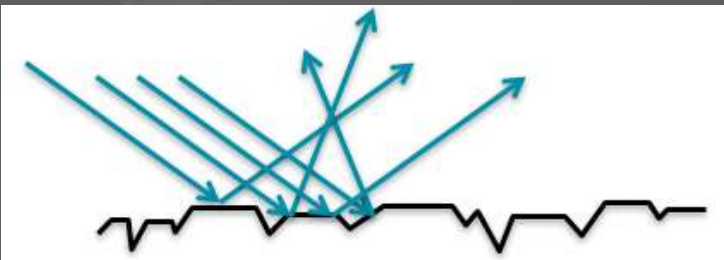
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## Marble-Crystallization

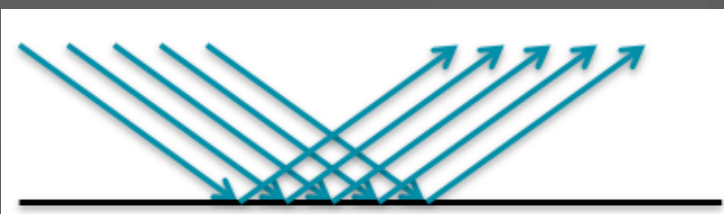
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Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Marble-Crystallization

Dulling





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## Marble-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



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## Marble-Crystallization

Spalling



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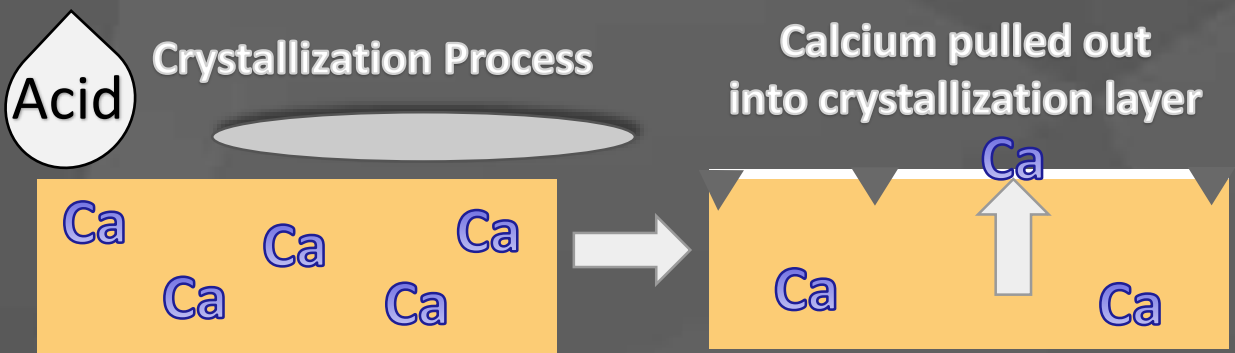


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## Marble-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.

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# Marble-Crystallization

Over-Crystallization





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## Marble-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

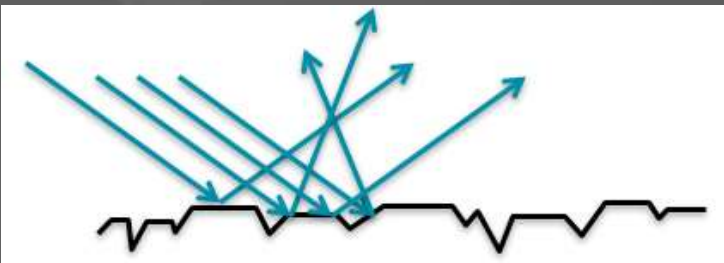
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## Marble-Coated

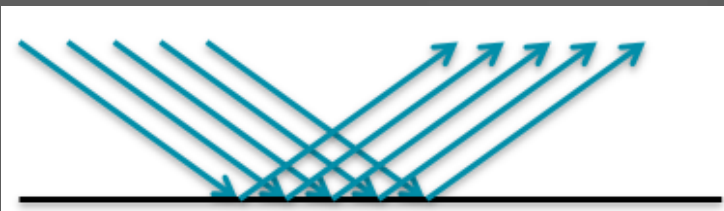
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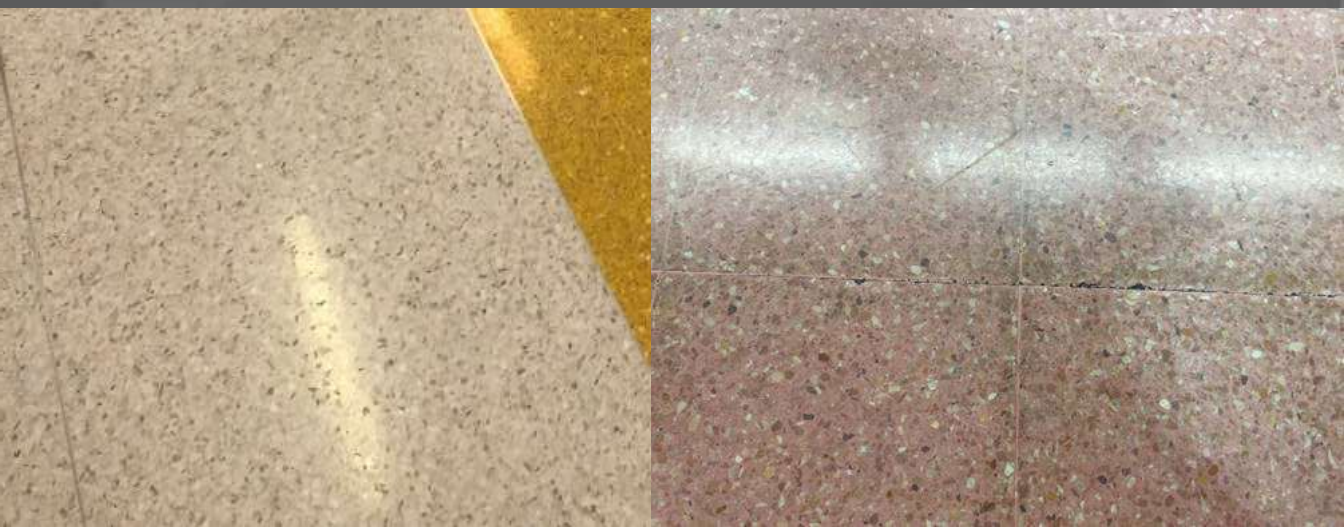
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## Marble-Coated

Dulling



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## Marble-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Marble-Coated

Soiling



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## Marble

# Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Rectangle / Smaller than 12”x 24” / Not Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Tile / Larger or Equal to 12”x 12” / Not Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





Rectangle / Smaller than 12”x 24” / Not Textured

# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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# 3M FLOOR CARE GUIDE



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## Marble-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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## Marble-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Marble-Impregnator

Staining/etching



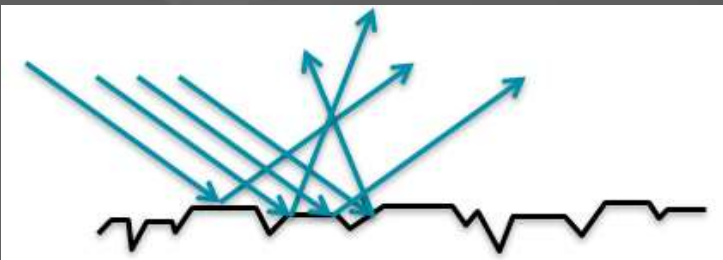
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## Marble-Impregnator

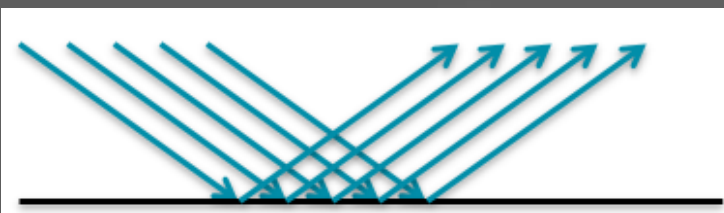
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
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## Marble-Impregnator

Dulling/scratching





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## Marble-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

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## Marble-Impregnator

Soiling/soil build-up



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## Marble-Polishing Compound

- Most marble has been polished in the factories using various grades of abrasives followed by a final step using an abrasive in combination with oxalic acid. This same process can also be done to refresh natural calcareous stone that has dulled over time.
- Most often, polishes are used with a red or natural floor pad. The polishing compound is mixed with water and buffed with 175rpm floor machine. Floors with deeper scratches or other damage typically must be diamond honed prior to using marble polishing products. The calcium oxalate formed in the reaction is washed away with the slurry from the process leaving behind a smoothed and polished stone surface that has not been chemically altered, just highly polished.
- Note that the above does not mean that oxalic acid will not etch stone surfaces. Oxalic acid (and any acid) dropped on a marble surface will etch. Factory polishing and marble restoration are performed under controlled circumstances to reach desired results.

**Maintenance &  
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# Marble-Polishing Compound

## Polishing Compound

The polishing compound process leaves a highly polished surface when finished. There is no protection on the surface, making it susceptible to damage from abrasion and staining or etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be required if the floor is damaged or deeply scratched. The polishing compound process is re-done to bring a polish back to the stone.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# Marble-Polishing Compound

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# Marble-Polishing Compound

Staining/etching



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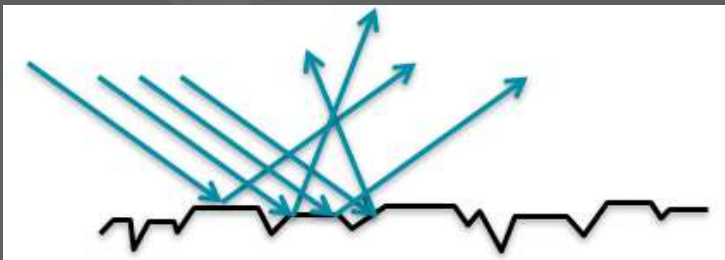


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## Marble-Polishing Compound

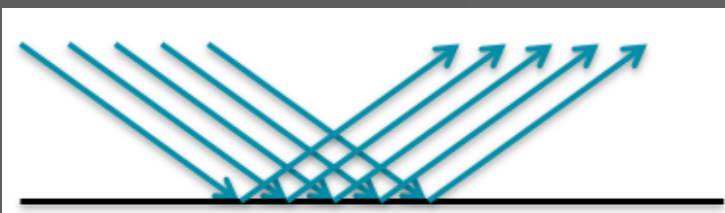
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# Marble-Polishing Compound

Dulling/scratching





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## Marble-Polishing Compound

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
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Solutions and possible causes:

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# Marble-Polishing Compound

Soiling/soil build-up



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**Stone Floors**

Rectangle / Larger or Equal to 12"x 24"

**Textured  
(Rough Sawn,  
Natural)**

**Not Textured  
(Honed,  
Polished)**



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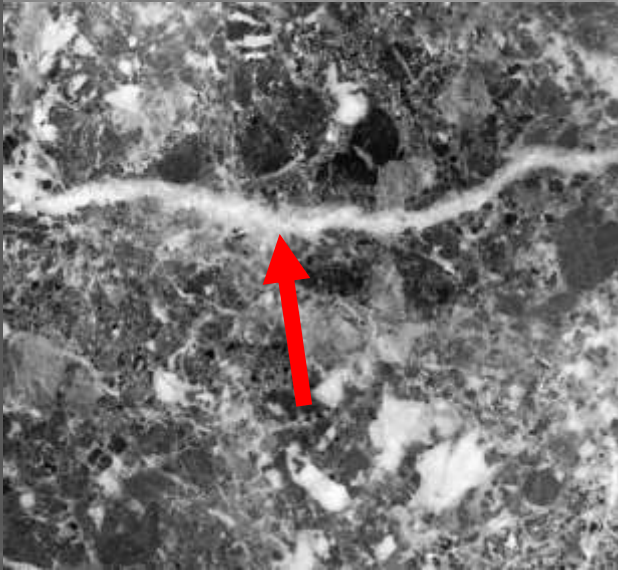
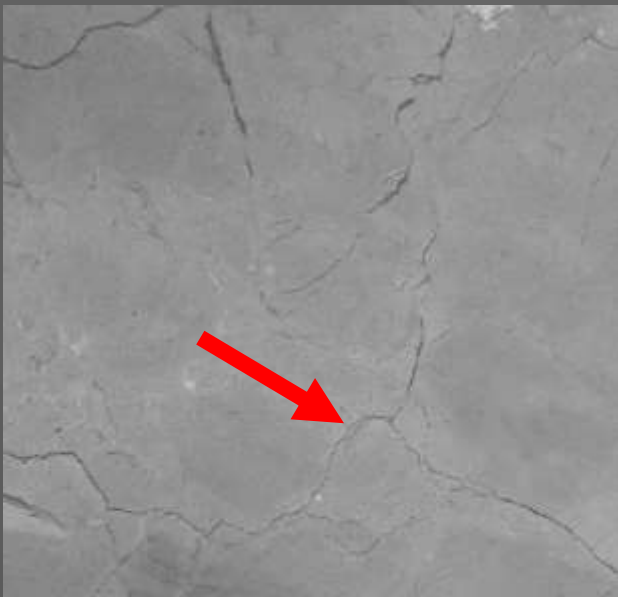
Stone Floors

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## Does the tile have veins?

Yes

No





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# 3M FLOOR CARE GUIDE

## Marble

Rectangle / Larger or Equal to 12"x 24" \ Not Textured

[White](#)[Tan/Brown](#)[Red](#)[Black](#)[Green](#)[Maintenance & Troubleshooting](#)

Marble is a very common type of stone used for flooring because of its abundant variety of colors and natural beauty.

Marble is most often made up of limestone/dolostone (carbonate minerals- calcite, dolomite, etc.) that has been subjected to high heat and pressure. This causes physical changes to the crystalline structure (color, fractures) as well as chemical changes (veining).

Physical traits: Because of the minerals that make up marble, it is on the softer side of stones with a Mohs hardness between 3-5. This means that the bare stone may scratch when exposed to foot traffic.

Chemical traits: Acids will cause marble to react(will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)



Rectangle / Larger or Equal to 12”x 24” \ Not Textured

# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Marble (3-5)

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	← Fingernail (2.5)
Fluorite	4	← Copper Penny (3.5)
Apatite	5	
Orthoclase	6	← Knife (5.5)
Quartz	7	← Steel Nail (6.5)
Topaz	8	
Corundum	9	
Diamond	10	

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# 3M FLOOR CARE GUIDE



Tile / Larger or Equal to 12"x 12" / Not Textured

## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Marble

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

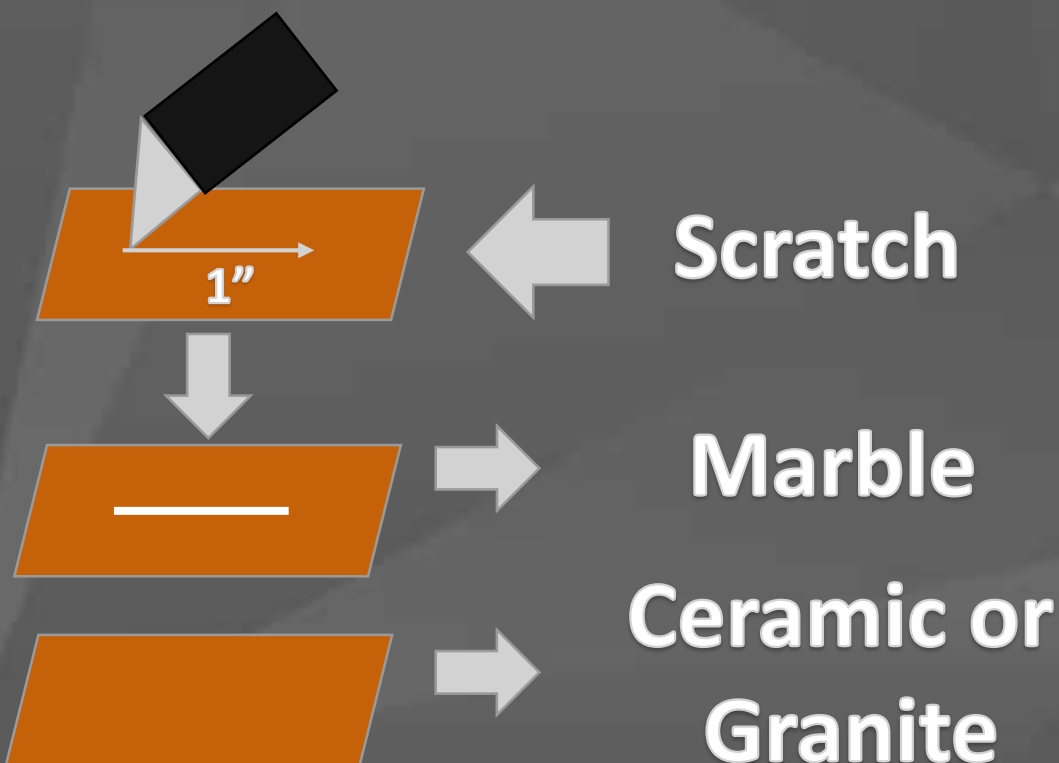
Tile / Larger or Equal to 12"x 12" / Not Textured

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.





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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

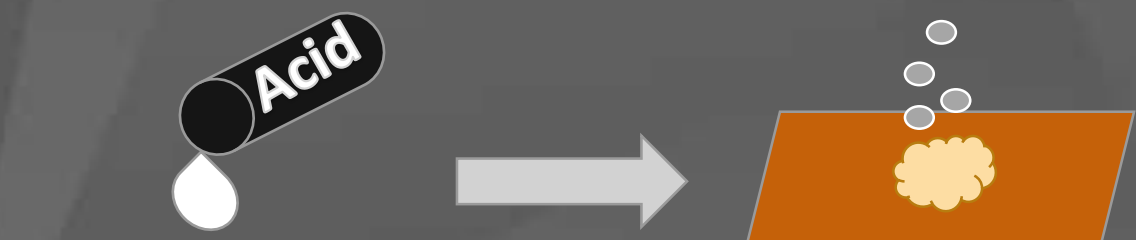
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Marble



### Ceramic/Porcelain or Granite



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# Marble

Rectangle / Larger or Equal to 12"x 24" / Not Textured

White

Tan/Brown

Red

Black

Green

Common white marbles:

Carrara- A white to light gray marble with light gray veining. The veining often has hazy edges, blending into the white matrix causing a mixed looks as opposed to contrasting.

Pictures

Calacatta- Calacutta is a purer white and the veining is a darker gray to black (sometimes may contain gold veining). There is often a very distinct transition from the dark vain to the white matrix, making the veins stand out more than Carrara.

Pictures

Thassos: A pure white marble originating in Greece. May sometimes have slight grey impurities present.

Pictures

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## Carrara Marble





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## Calacatta Marble





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## Thassos Marble



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# Marble

Rectangle / Larger or Equal to 12"x 24" / Not Textured

White

Tan/Brown

Red

Black

Green

Common Tan/Brown marbles:

Crema Marfil- Cream/Tan matrix with small amounts of thin light brown veining.

Pictures

Emperador- Most often dark brown matrix but may be light brown or light gray with a large amount of fine tan or white veining. Often has so much veining that it looks like chunks of rock that have fractured apart.

Pictures

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## Crema Marfil Marble





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## Emperador Marble





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# Marble

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White

Tan/Brown

Red

Black

Green

Common red marble:

Rojo Alicante- Has a red matrix that can be anywhere in the light-medium-dark (red, pink, orange, burgundy) shades with most commonly white veining (sometimes fine black veins).

Pictures

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## Rojo Alicante Marble



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# Marble

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White

Tan/Brown

Red

Black

Green

Common black marble:

Negro Marquina-Black matrix with very crisp, contrasting white veins.

Pictures

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## Black Marble





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## Marble

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White

Tan/Brown

Red

Black

Green

Serpentine (Green Marble) - Serpentine is one of the more unknown stone types used in flooring today and is often referred to as green marble. It will visually look very similar to marble, with white/brown veins and a light-dark green bulk color. Serpentine, unlike marble is not made up of calcium based minerals. This confusion is often not an issue, as serpentine can take a polish and has a hardness similar to marble. Another common serpentine is labeled as rainforest marble which is green-brown with brown veins. Mohs' hardness is 3-6 depending on mineral construction.

[Pictures](#)[What's Mohs Hardness?](#)



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Serpentine (3-6)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

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**Serpentine**

**Rainforest**

**Green**





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## Marble

Uncoated/Bare

Crystallization

Coated

Impregnator

Polishing Compound



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## Marble-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Marble-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Marble-Uncoated/Bare

Staining/etching





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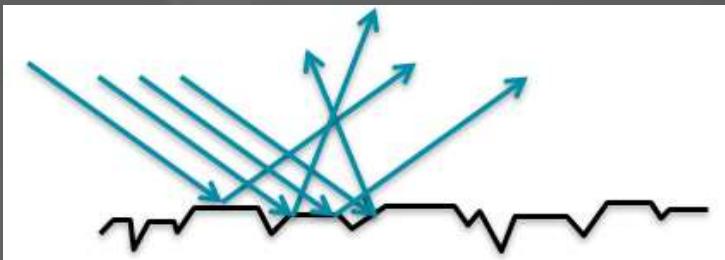


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## Marble-Uncoated/Bare

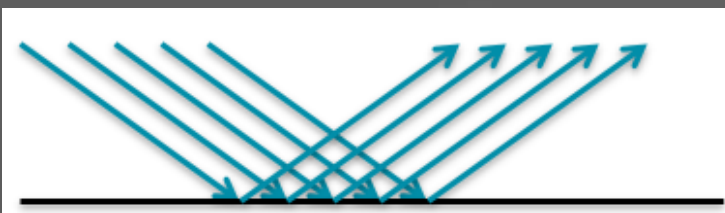
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



## Pictures



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## **Marble-Uncoated/Bare**

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Marble-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

## Pictures



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## Marble-Uncoated/Bare

Soiling/soil build-up



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# Marble-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

**Maintenance &  
Troubleshooting**



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# Marble-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

Periodic Maintenance:

- Re-crystallize

Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

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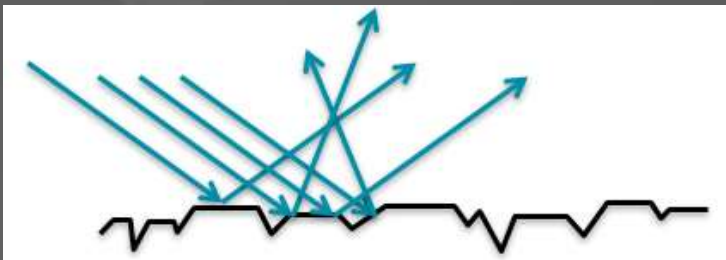


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## Marble-Crystallization

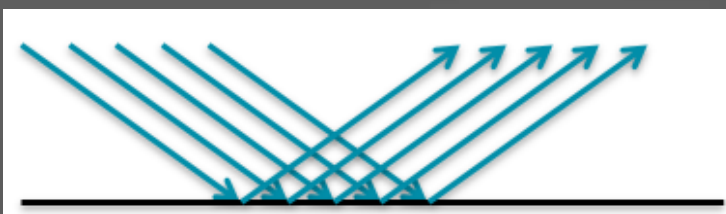
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Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Marble-Crystallization

Dulling



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## Marble-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



### Pictures



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## Marble-Crystallization

Spalling



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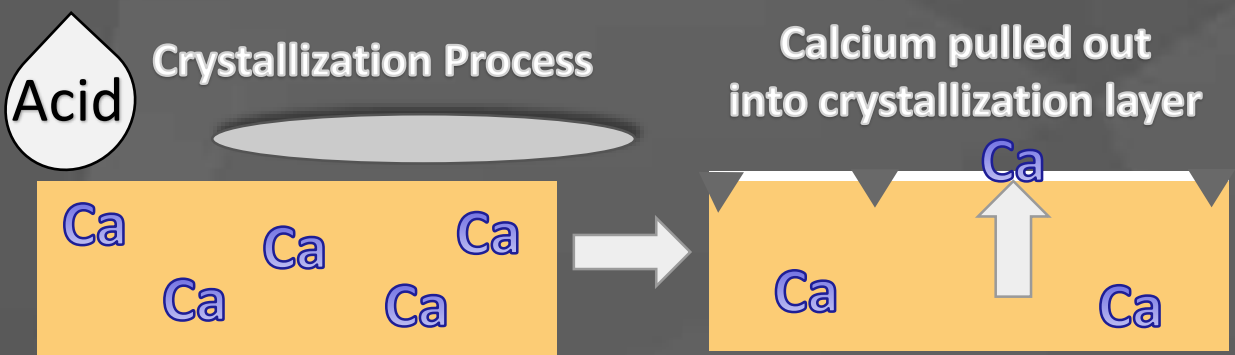


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## Marble-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



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## Marble-Crystallization

Over-Crystallization





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# 3M FLOOR CARE GUIDE



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## Marble-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems



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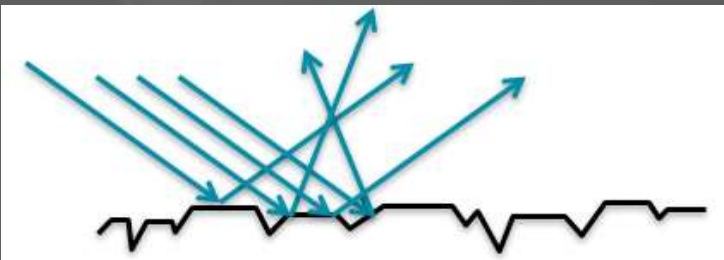


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## Marble-Coated

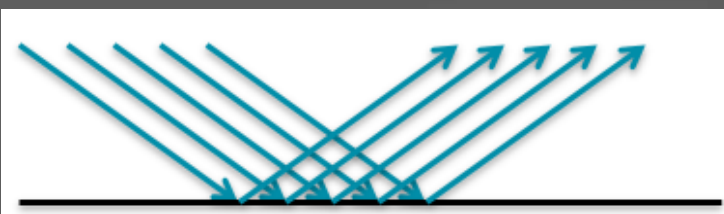
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Marble-Coated

Dulling



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## Marble-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Marble-Coated

Soiling





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## Marble

# Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Rectangle / Larger or Equal to 12”x 24” / Not Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Rectangle / Larger or Equal to 12”x 24” / Not Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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## Marble-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Marble-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Marble-Impregnator

Staining/etching



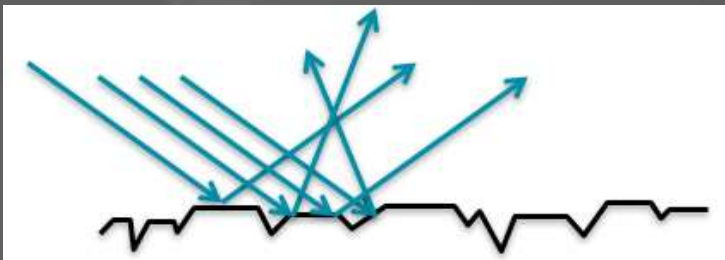
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## Marble-Impregnator

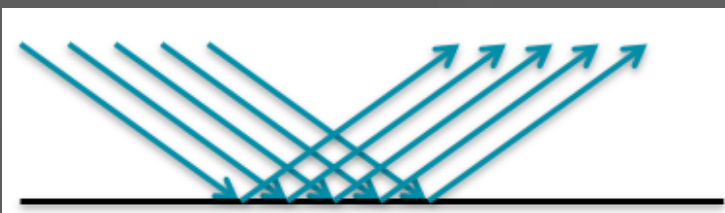
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Marble-Impregnator

Dulling/scratching



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## Marble-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Marble-Impregnator

Soiling/soil build-up



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## Marble-Polishing Compound

- Most marble has been polished in the factories using various grades of abrasives followed by a final step using an abrasive in combination with oxalic acid. This same process can also be done to refresh natural calcareous stone that has dulled over time.
- Most often, polishes are used with a red or natural floor pad. The polishing compound is mixed with water and buffed with 175rpm floor machine. Floors with deeper scratches or other damage typically must be diamond honed prior to using marble polishing products. The calcium oxalate formed in the reaction is washed away with the slurry from the process leaving behind a smoothed and polished stone surface that has not been chemically altered, just highly polished.
- Note that the above does not mean that oxalic acid will not etch stone surfaces. Oxalic acid (and any acid) dropped on a marble surface will etch. Factory polishing and marble restoration are performed under controlled circumstances to reach desired results.

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# Marble-Polishing Compound

## Polishing Compound

The polishing compound process leaves a highly polished surface when finished. There is no protection on the surface, making it susceptible to damage from abrasion and staining or etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be required if the floor is damaged or deeply scratched. The polishing compound process is re-done to bring a polish back to the stone.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# Marble-Polishing Compound

## Staining/etching

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## Marble-Polishing Compound

Staining/etching



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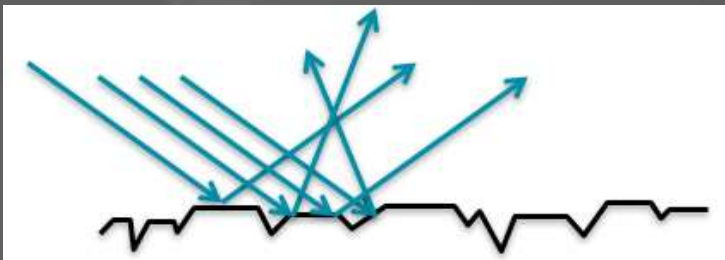


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## Marble-Polishing Compound

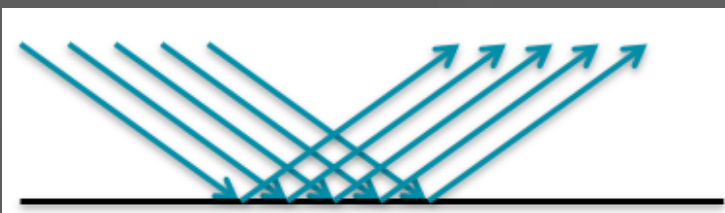
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# Marble-Polishing Compound

Dulling/scratching



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## Marble-Polishing Compound

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## Marble-Polishing Compound

Soiling/soil build-up



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**Does the tile have  
pits/holes or a flowing  
layered pattern?**

Yes

No



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## Travertine

Travertine is a sub-class of limestone that is formed from hot springs or caves near the earth's surface. Travertine is not subjected to the high pressures of most limestone resulting in some physical differences including pitting and void formation. Air or other organic material gets trapped in the formation and over time solidifies the voids into the rock as it hardens. This process also make travertine more porous than other limestone and marble. The pits/voids are often filled with epoxy to create a smooth surface.

Physical traits: Pitted or has off-colored circles from being filled. Tan-cream-light red in color with flowing linear layers. Mohs hardness between 3-4.

Chemical traits: Acids will cause travertine to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Travertine (3-4)

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	← Fingernail (2.5)
Fluorite	4	← Copper Penny (3.5)
Apatite	5	
Orthoclase	6	← Knife (5.5)
Quartz	7	← Steel Nail (6.5)
Topaz	8	
Corundum	9	
Diamond	10	





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# Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

Travertine	Ceramic/Porcelain
<ul style="list-style-type: none"><li>• Pattern on each tile will be completely random</li><li>• Tiles are cut and are identically sized, grout lines can be less than 1/8”</li><li>• Bare stone is porous and will absorb liquids</li><li>• Edges are usually 90°</li><li>• Cracks will appear along weak points in tile, usually random or jagged</li><li>• Will scratch from scratch test</li><li>• Will fizz in acid test</li></ul>	<ul style="list-style-type: none"><li>• Pattern will often be repeated and seen in multiple tiles</li><li>• Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8”</li><li>• Non-porous, will not absorb liquids</li><li>• Edges are often rounded</li><li>• Cracks will be strait or rounded, but crack cleanly</li><li>• Will not scratch from scratch test</li><li>• Will not fizz in acid test</li></ul>

Acid Test

Scratch Test

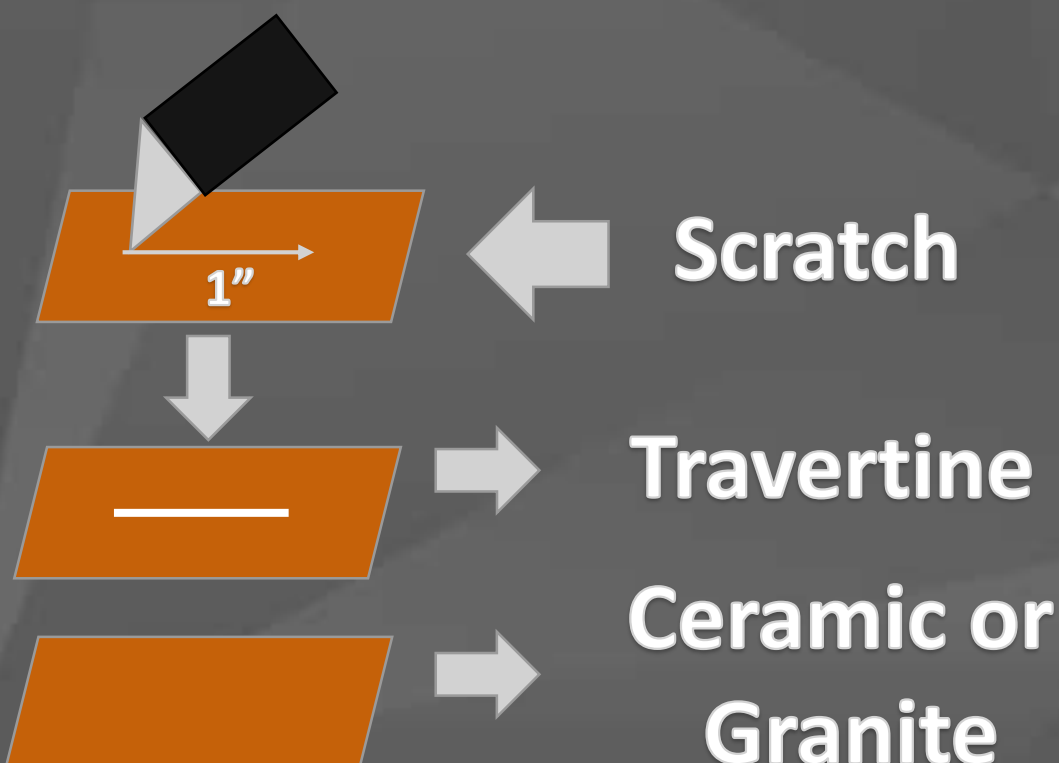
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

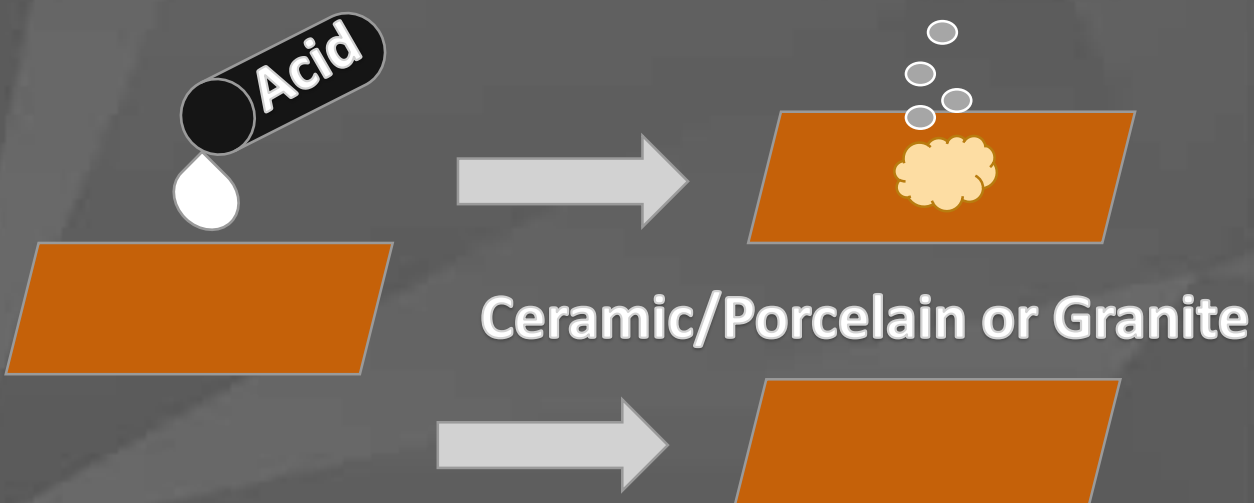
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Travertine



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## Travertine





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# Travertine

Uncoated/Bare

Crystallization

Coated

Impregnator

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## Travertine-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Travertine-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Travertine-Uncoated/Bare

Staining/etching





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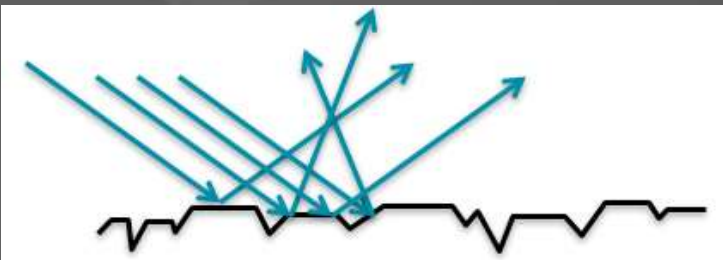


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## Travertine-Uncoated/Bare

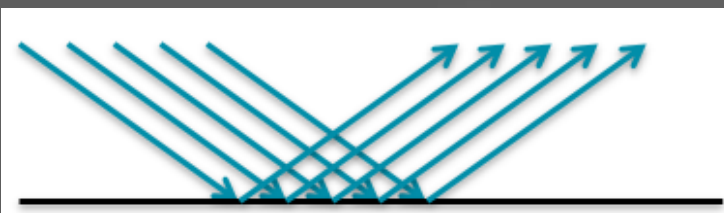
### Dulling/scratching

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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Travertine-Uncoated/Bare

Dulling/scratching



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## Travertine-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Uncoated/Bare

Soiling/soil build-up





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# Travertine-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Travertine-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

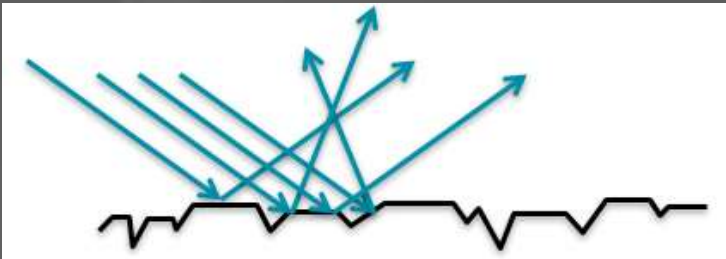
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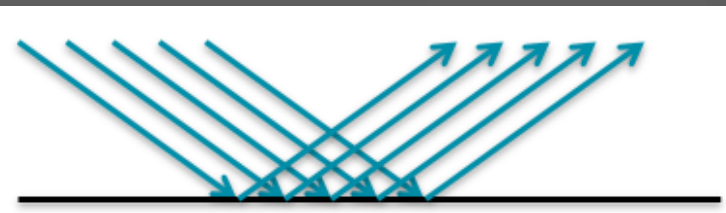
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# Travertine-Crystallization

Dulling





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## Travertine-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



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## Travertine-Crystallization

Spalling







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# Travertine-Crystallization

Over-Crystallization





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## Travertine-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

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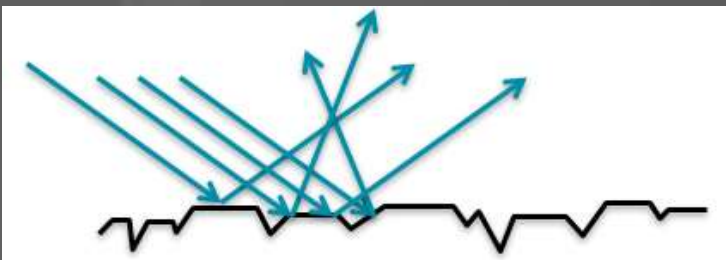


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## Travertine-Coated

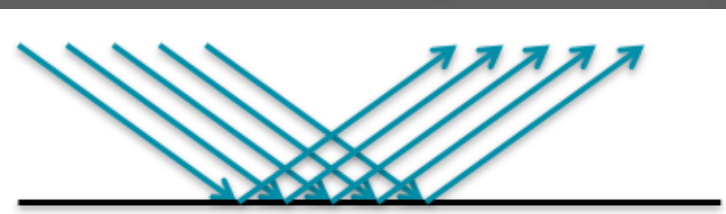
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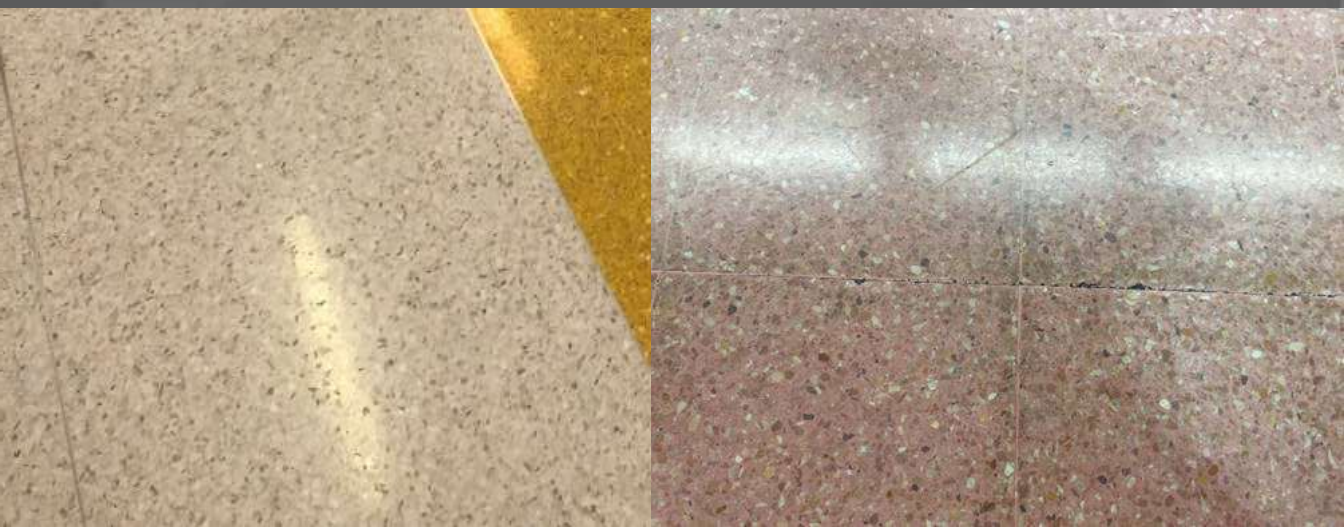
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# Travertine-Coated

Dulling



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## Travertine-Coated

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- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Coated

Soiling



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# Travertine

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



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# Streaking/Mop Lines/Poor Leveling

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

### Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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# Powdering

## Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

## Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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## Travertine-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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## Travertine-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Travertine-Impregnator

Staining/etching



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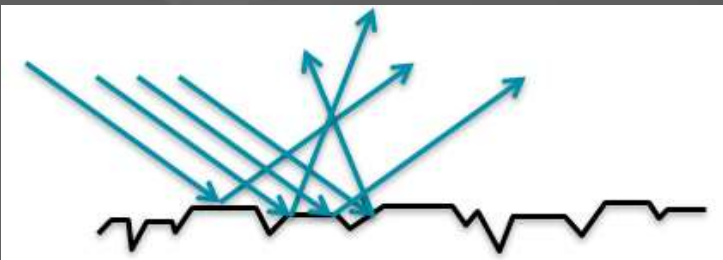


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## Travertine-Impregnator

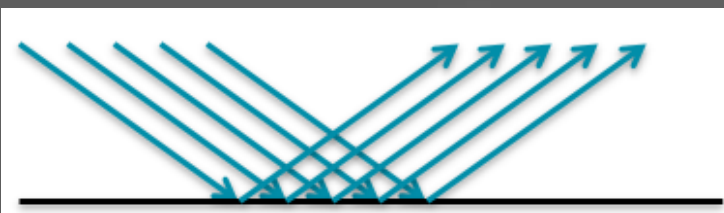
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Travertine-Impregnator

Dulling/scratching





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## Travertine-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Impregnator

Soiling/soil build-up



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**Does the tile have  
fossils or dark  
serrated/jagged  
lines?**

**Yes**

**No**





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## Limestone

Limestone is a sedimentary rock that is primarily composed of calcium carbonate. It is formed most often by a layer of coral or sea shells that have settled to the bottom of the sea and then buried. That layer is then subject to pressure from overlaying deposits, causing compaction and creating limestone.

Physical traits: Light tan-dark tan-beige and very often uniform in color. May contain fossils of sea shells, ammonites, or tubes. Will often have Stylolites which are dark jagged/serrated lines in the stone which form perpendicular to the direction or pressure. Mohs hardness between 3-4.

Chemical Traits: Limestone will chemically react with acid to produce carbon dioxide gas (fizz and possibly etch surface)

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Limestone (3-4)

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	← Fingernail (2.5)
Fluorite	4	← Copper Penny (3.5)
Apatite	5	
Orthoclase	6	← Knife (5.5)
Quartz	7	← Steel Nail (6.5)
Topaz	8	
Corundum	9	
Diamond	10	

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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Limestone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

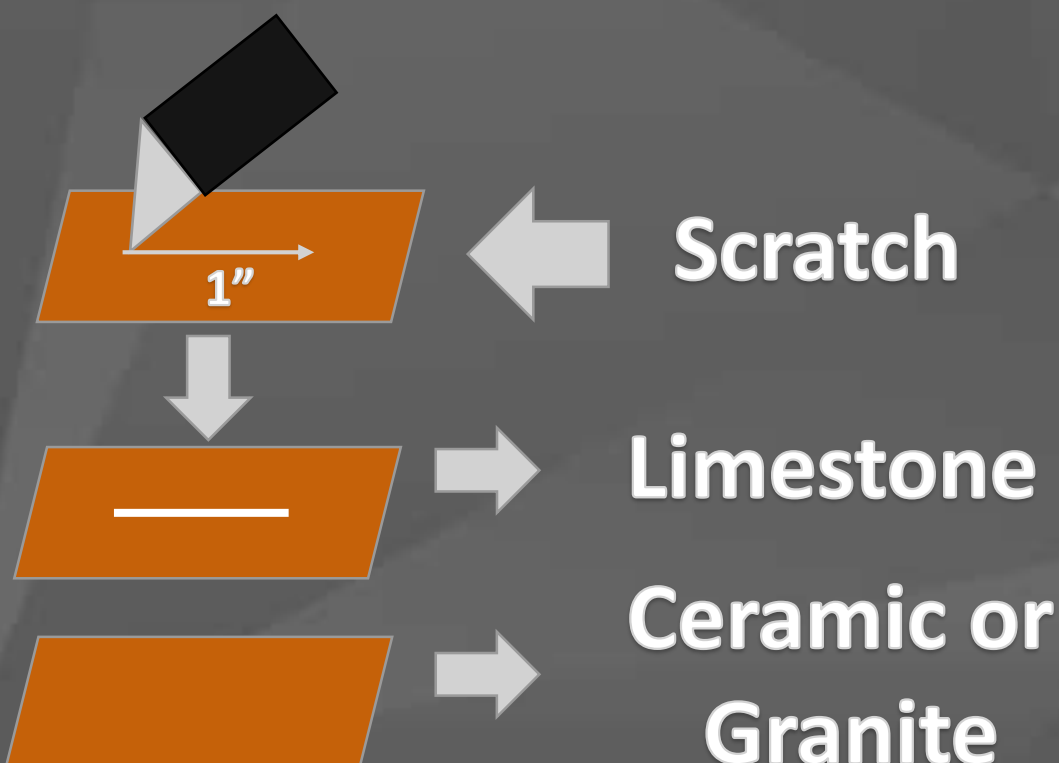
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

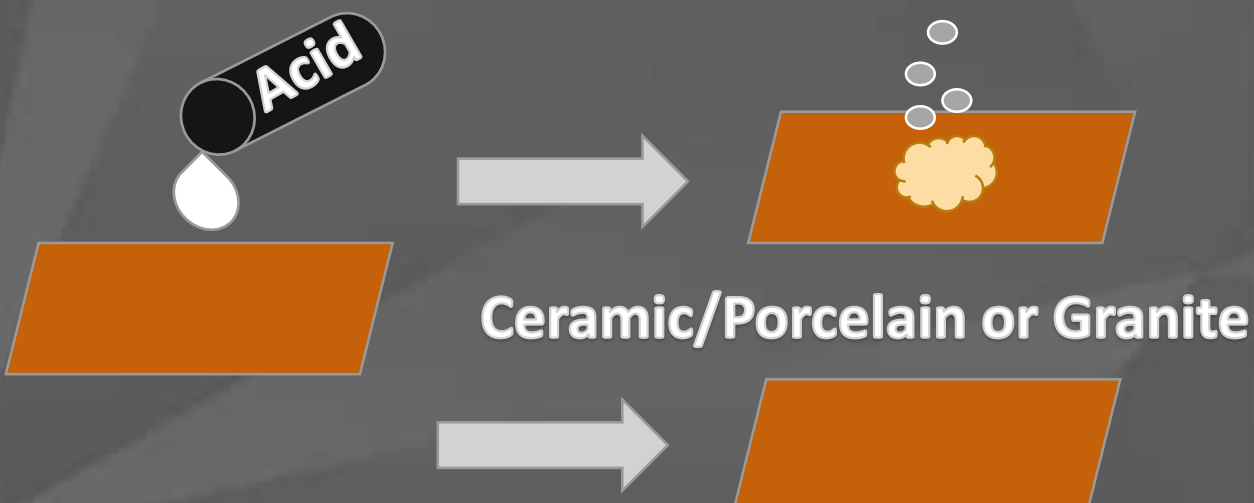
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Limestone





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## Limestone



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## Limestone

Uncoated/Bare

Crystallization

Coated

Impregnator

Polishing Compound

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## Limestone-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Limestone-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Limestone-Uncoated/Bare

Staining/etching



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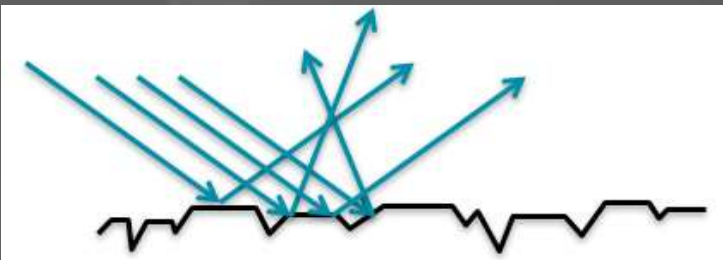


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## Limestone-Uncoated/Bare

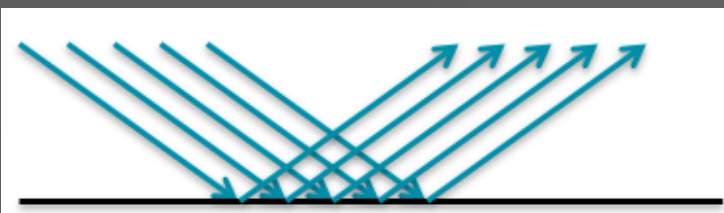
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Limestone-Uncoated/Bare

Dulling/scratching



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## Limestone-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

## Pictures



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## Limestone-Uncoated/Bare

Soiling/soil build-up



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# Limestone-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Limestone-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization



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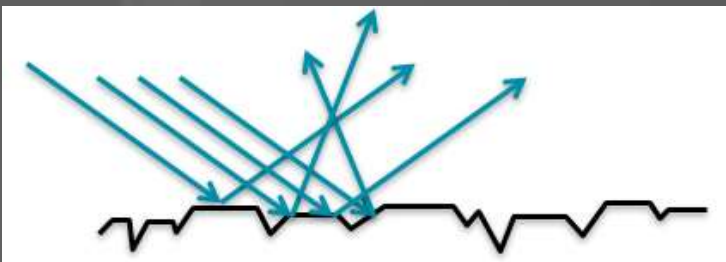


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## Limestone-Crystallization

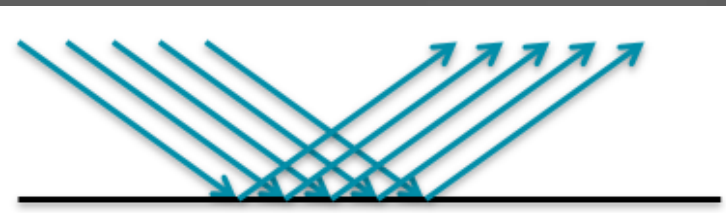
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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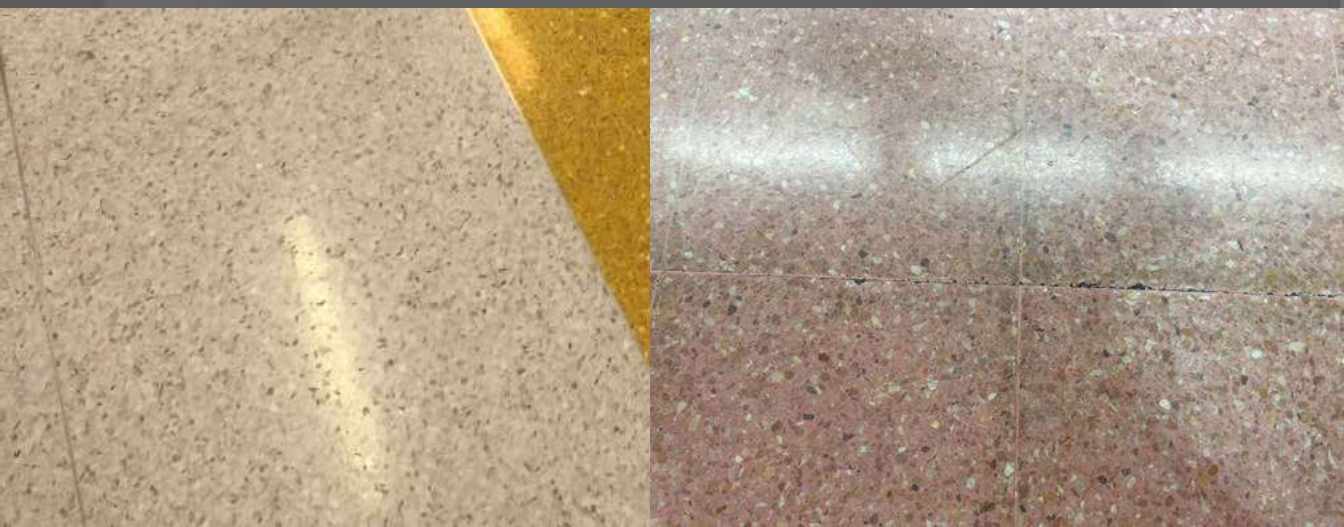
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# Limestone-Crystallization

Dulling



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## Limestone-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.

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## Limestone-Crystallization

Spalling





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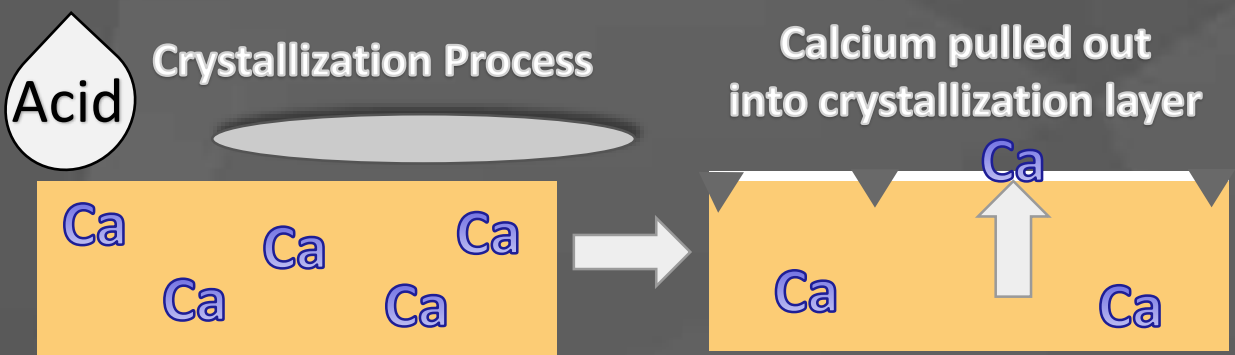


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## Limestone-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.

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# Limestone-Crystallization

Over-Crystallization



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## Limestone-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

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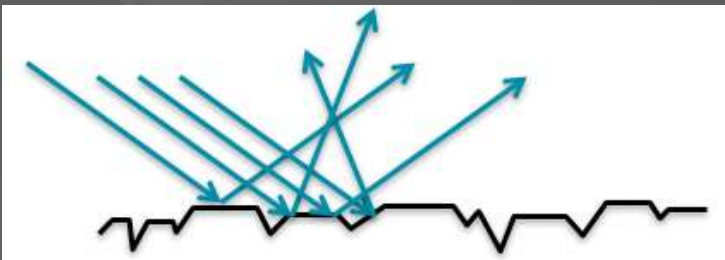


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## Limestone-Coated

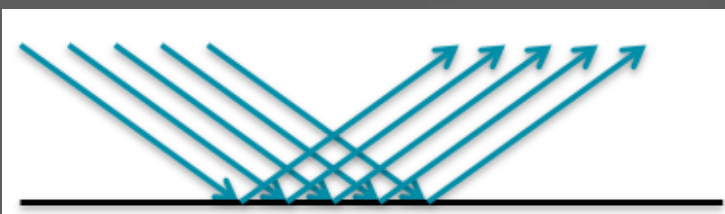
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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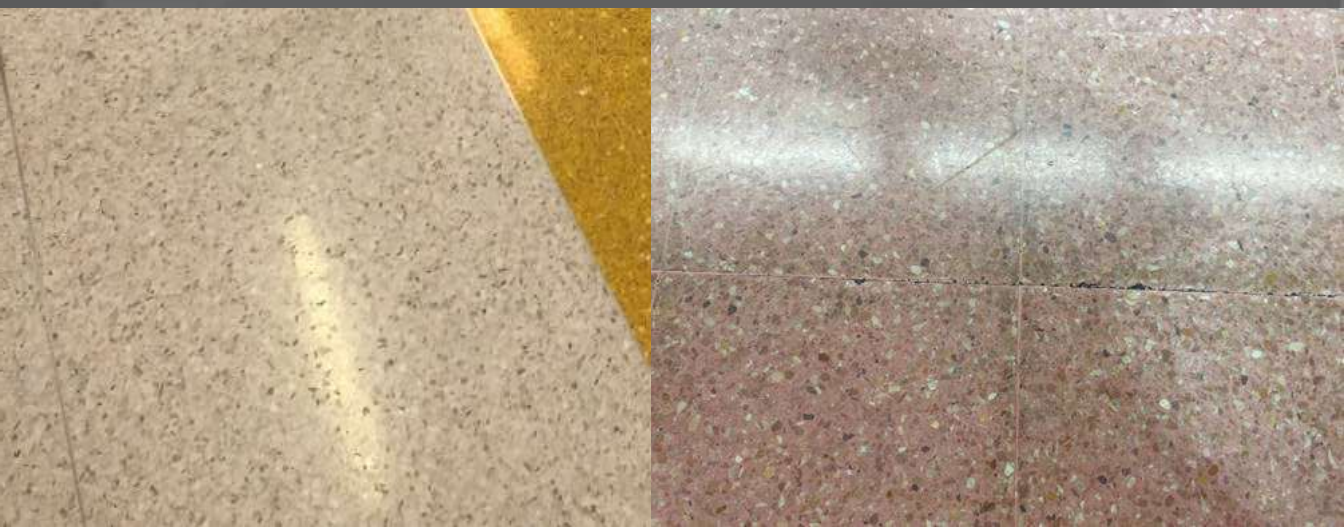
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**Limestone-Coated**

Dulling





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## Limestone-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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**Limestone-Coated**

Soiling



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# Limestone

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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## Low Gloss/Poor Gloss

### Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

### Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.





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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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# Powdering

## Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

## Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.



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# 3M FLOOR CARE GUIDE



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## Limestone-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Limestone-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Limestone-Impregnator

Staining/etching





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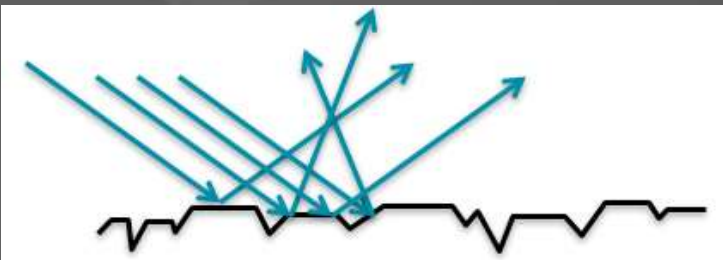


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## Limestone-Impregnator

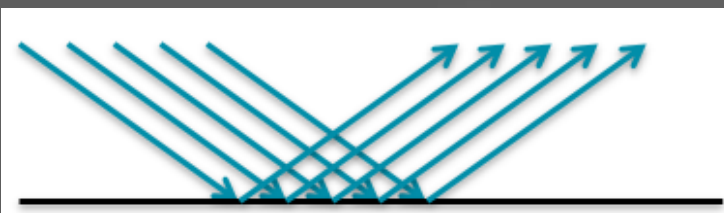
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
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# Limestone-Impregnator

Dulling/scratching



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## Limestone-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

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## Limestone-Impregnator

Soiling/soil build-up



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## Limestone-Polishing Compound

- Most marble has been polished in the factories using various grades of abrasives followed by a final step using an abrasive in combination with oxalic acid. This same process can also be done to refresh natural calcareous stone that has dulled over time.
- Most often, polishes are used with a red or natural floor pad. The polishing compound is mixed with water and buffed with 175rpm floor machine. Floors with deeper scratches or other damage typically must be diamond honed prior to using marble polishing products. The calcium oxalate formed in the reaction is washed away with the slurry from the process leaving behind a smoothed and polished stone surface that has not been chemically altered, just highly polished.
- Note that the above does not mean that oxalic acid will not etch stone surfaces. Oxalic acid (and any acid) dropped on a marble surface will etch. Factory polishing and marble restoration are performed under controlled circumstances to reach desired results.

**Maintenance &  
Troubleshooting**



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# Limestone-Polishing Compound

## Polishing Compound

The polishing compound process leaves a highly polished surface when finished. There is no protection on the surface, making it susceptible to damage from abrasion and staining or etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be required if the floor is damaged or deeply scratched. The polishing compound process is re-done to bring a polish back to the stone.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# Limestone-Polishing Compound

## Staining/etching

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# Limestone-Polishing Compound

Staining/etching





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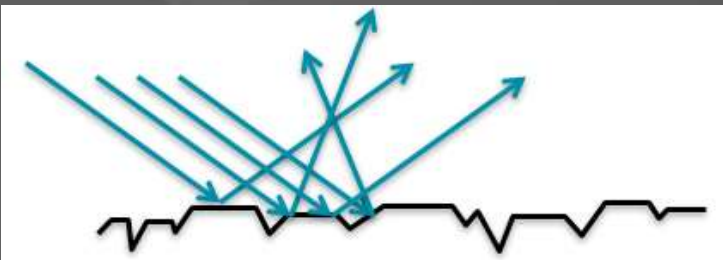


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## Limestone-Polishing Compound

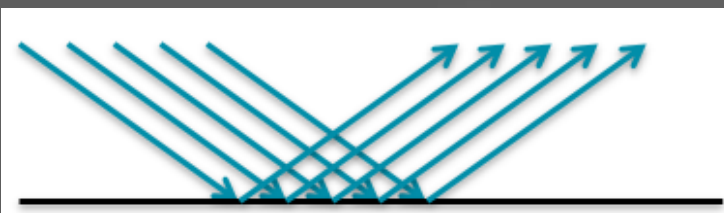
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# Limestone-Polishing Compound

Dulling/scratching



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## Limestone-Polishing Compound

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
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- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
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# Limestone-Polishing Compound

Soiling/soil build-up



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**Are there visible grains  
or lineations?**

Yes

No





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## Sandstone

Sandstone is a sedimentary rock formed from sand-sized grains of mineral, rock or organic material which have been cemented together to make a solid stone. Sandstone may have many distinct visible layers due to its varied composition.

Physical traits: Light tan-brown-red in color and will often have different shaded layers throughout. Will often have a smooth/matte look but can also be seen polished. Can sometimes see individual grains of sand. Very porous and will readily absorb water and stains very quickly. Because sandstone is made up of sand grains held together by a binder, it is only as strong as the binder. This results in a relatively soft rock that has a general Mohs hardness between 3-5.

Chemical traits: Acids can sometimes cause the binder in sandstone to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium carbonate.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Sandstone (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)  
Copper Penny (3.5)  
Knife (5.5)  
Steel Nail (6.5)

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# 3M FLOOR CARE GUIDE



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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Sandstone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- May fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

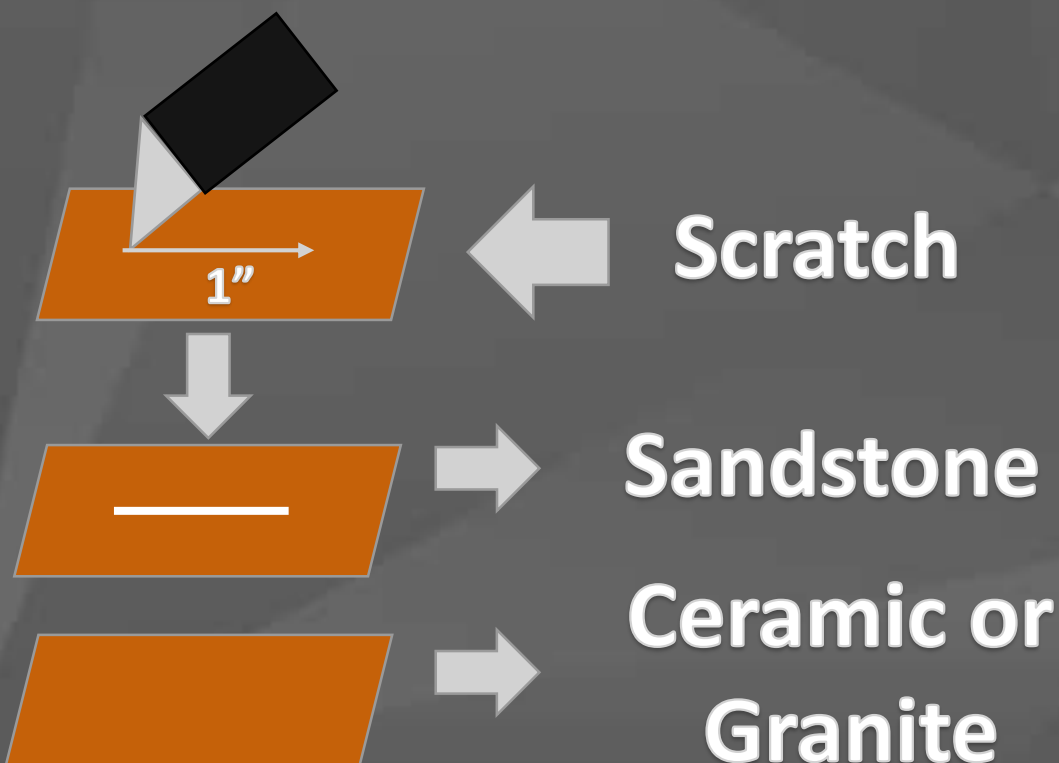
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.





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# 3M FLOOR CARE GUIDE

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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

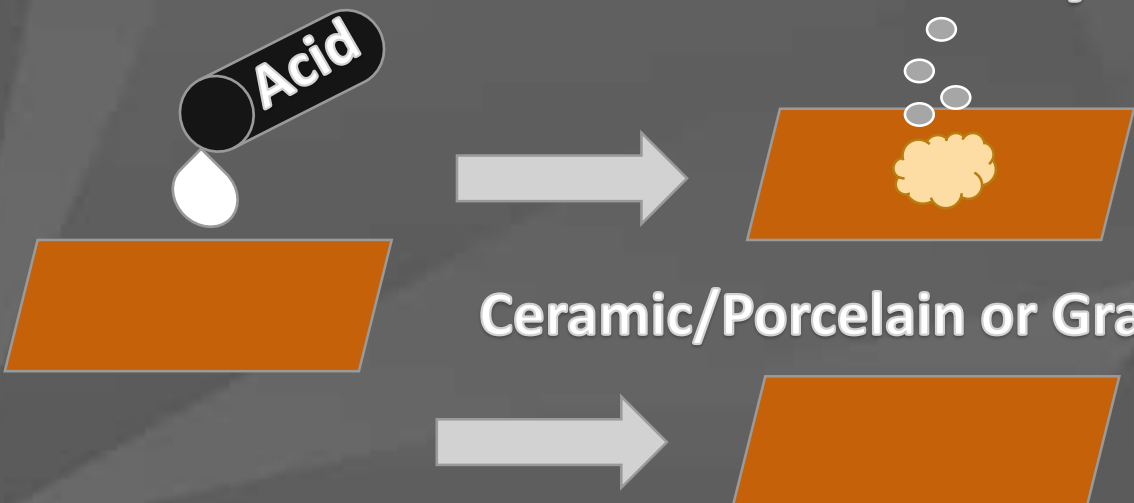
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Sandstone may fizz**



**Ceramic/Porcelain or Granite**

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## Sandstone



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## Sandstone

Uncoated/Bare

Coated

Impregnator

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## Sandstone-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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## Sandstone-Uncoated/Bare

### Staining/etching

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- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
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## Sandstone-Uncoated/Bare

Staining/etching



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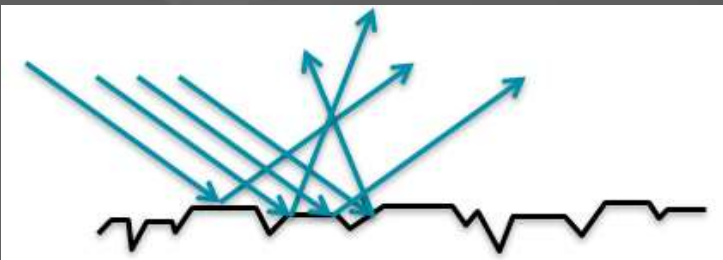


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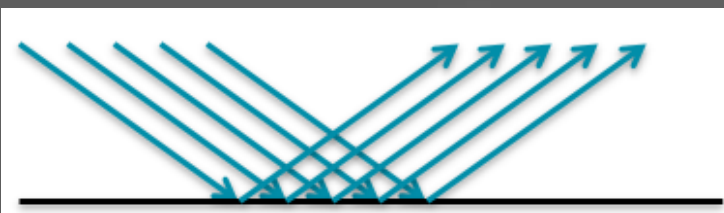
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## Sandstone-Uncoated/Bare

Dulling/scratching





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## Sandstone-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Sandstone-Uncoated/Bare

Soiling/soil build-up



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## Sandstone-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems



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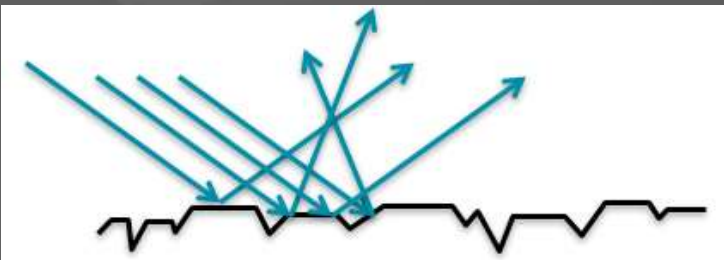


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## Sandstone-Coated

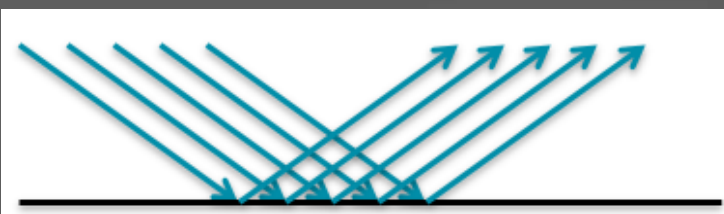
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Sandstone-Coated

Dulling



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## Sandstone-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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**Sandstone-Coated**

Soiling





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# Sandstone

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes





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## Low Gloss/Poor Gloss

### Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

### Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



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# Streaking/Mop Lines/Poor Leveling

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

### Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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# Powdering

## Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

## Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.



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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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## Sandstone-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Sandstone-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Sandstone-Impregnator

Staining/etching





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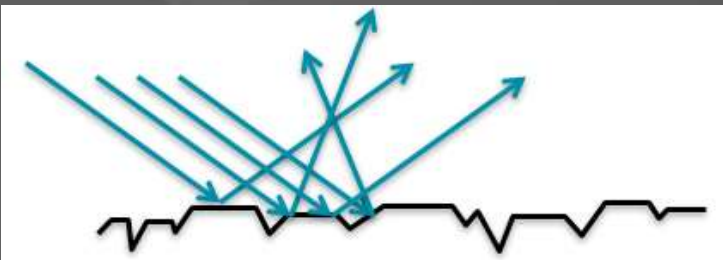


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## Sandstone-Impregnator

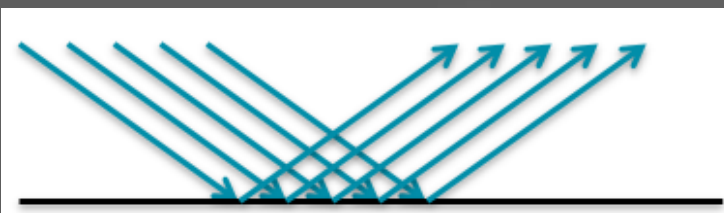
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## Sandstone-Impregnator

Dulling/scratching



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## Sandstone-Impregnator

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## Sandstone-Impregnator

Soiling/soil build-up





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## Granite

Granite is an igneous rock that is formed from cooling magma below the Earth's surface. Because of the long time that it takes for the granite to cool, medium to large crystals can form in the granite that are visible to the human eye.

Physical traits: Most common colors fall into a few different categories; Salt & Pepper, pink-red & black/white, mostly white, and mostly black. Will have a smooth polished surface. Usually will have visible crystalline grains growing into others or overlapping other grains. Mohs hardness between 6-7.

Chemical traits: Because of granites crystalline structure and hardness, it is much less porous than other natural stones. It will however still absorb liquids and is susceptible to staining. Granite will not fizz under the presence of acid, but can still be damaged/etched by acid (especially more aggressive acids).

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

Granite (6-7)

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# 3M FLOOR CARE GUIDE



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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Granite

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will not scratch from scratch test
- May fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

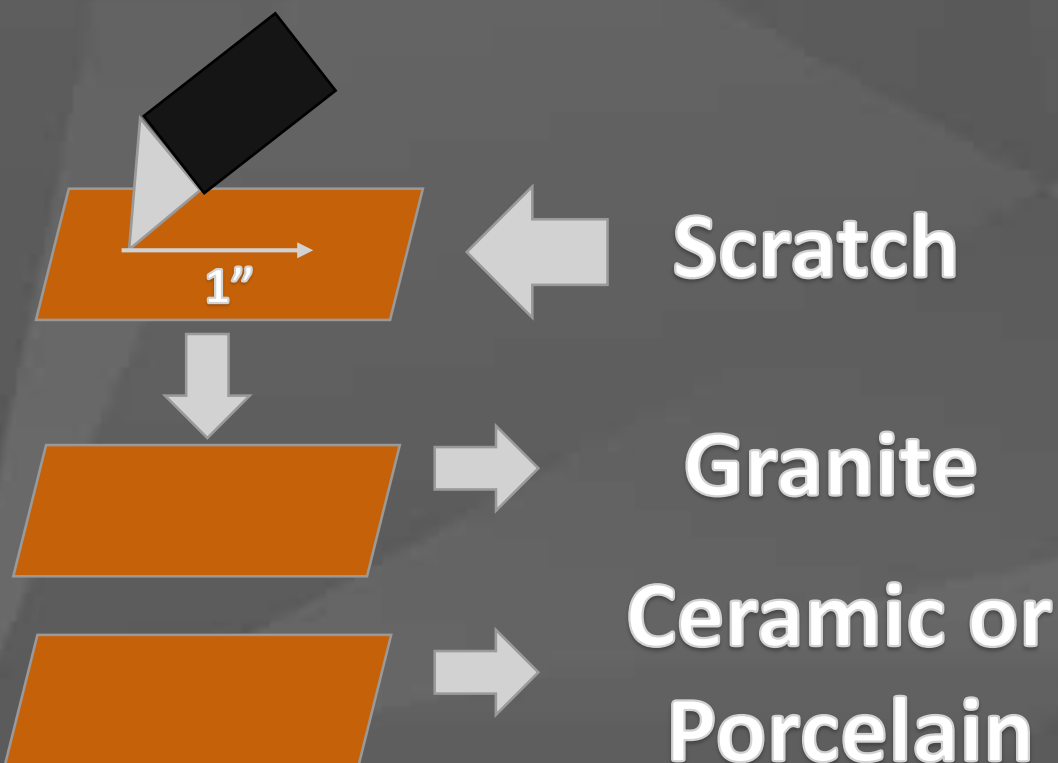
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.





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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

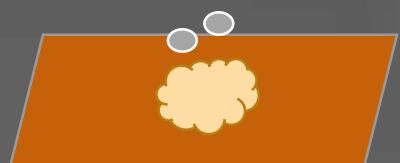
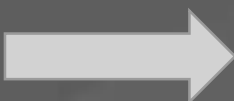
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Granite may fizz**



**Ceramic/Porcelain or Granite**



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## Granite





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## Granite

Uncoated/Bare

Coated

Impregnator

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# 3M FLOOR CARE GUIDE

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## Granite-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. Can be finished using a polishing compound to leave a high shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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## Granite-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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**Granite-Uncoated/Bare**

Staining/etching



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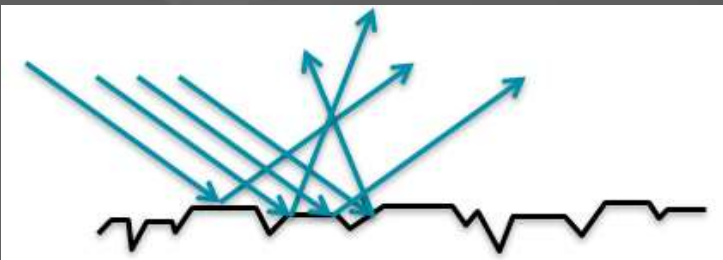


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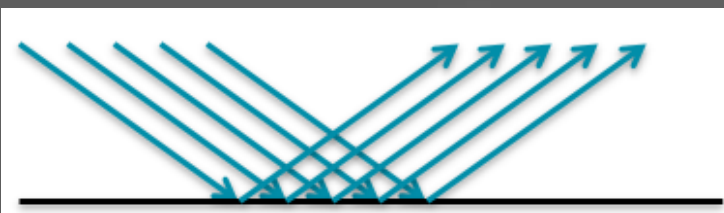
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## Granite-Uncoated/Bare

Dulling/scratching





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## Granite-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

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**Granite-Uncoated/Bare**

Soiling/soil build-up



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## Granite-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems



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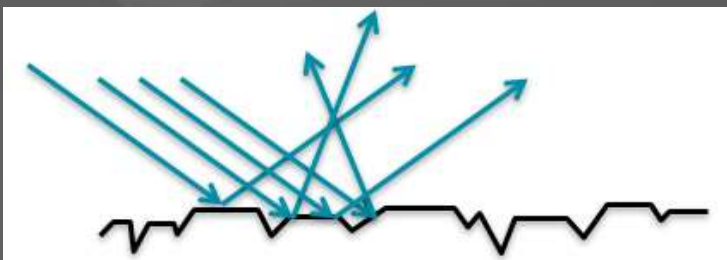


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## Granite-Coated

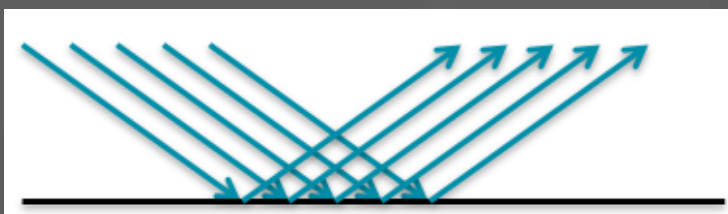
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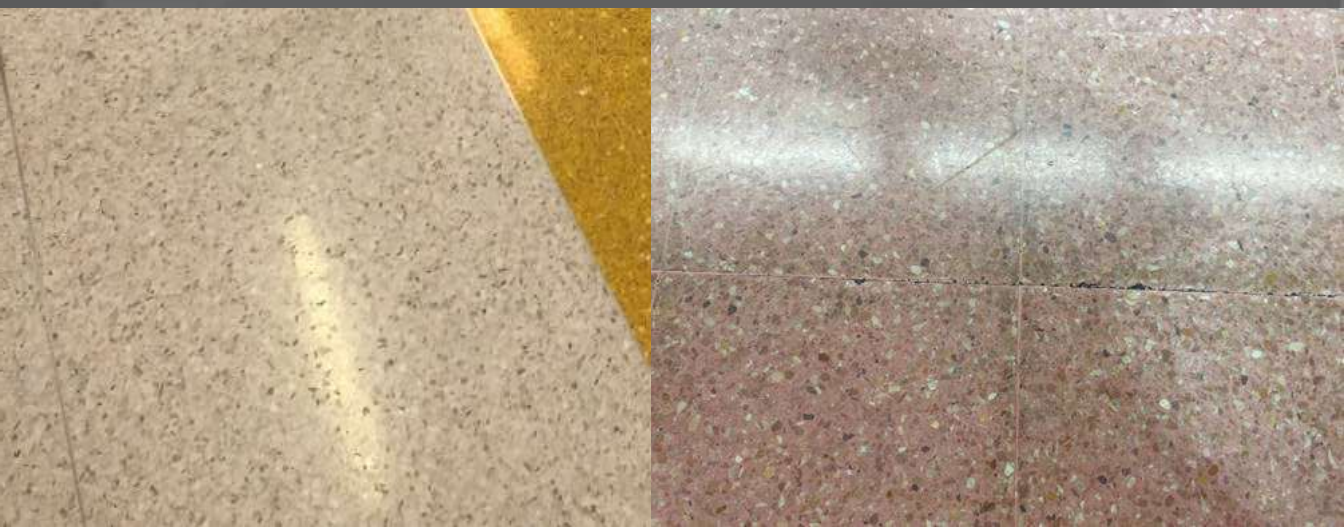
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## Granite-Coated

Dulling



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# 3M FLOOR CARE GUIDE



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## Granite-Coated

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**Granite-Coated**

Soiling





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# Granite

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes





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## Low Gloss/Poor Gloss

### Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

### Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



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# Streaking/Mop Lines/Poor Leveling

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

### Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



Rectangle / Larger or Equal to 12”x 24” / Not Textured

# Powdering

## Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

## Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.



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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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# 3M FLOOR CARE GUIDE



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## Granite-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Granite-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Granite-Impregnator

Staining/etching





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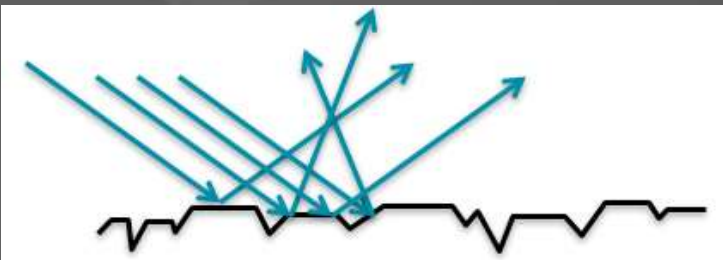


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## Granite-Impregnator

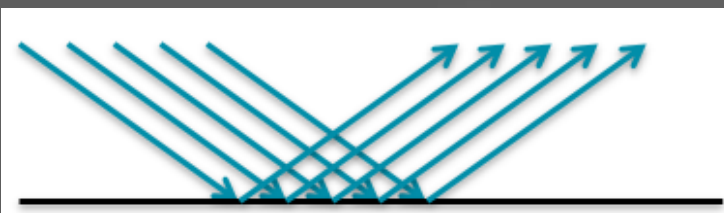
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Granite-Impregnator

Dulling/scratching



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## Granite-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Granite-Impregnator

Soiling/soil build-up





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# **3M** FLOOR CARE GUIDE



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**Sandstone**

**Travertine**

**Slate**

**Flagstone**

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# 3M FLOOR CARE GUIDE



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**Sandstone**

Travertine

Slate

Flagstone

Sandstone is a sedimentary rock formed from sand-sized grains of mineral, rock or organic material which have been cemented together to make a solid stone. Sandstone may have many distinct visible layers due to its varied composition.

Physical traits: Light tan-brown-red in color and will often have different shaded layers throughout. Will often have a smooth/matte look but can also be seen polished. Can sometimes see individual grains of sand. Very porous and will readily absorb water and stains very quickly. Because sandstone is made up of sand grains held together by a binder, it is only as strong as the binder. This results in a relatively soft rock that has a general Mohs hardness between 3-5.

Chemical traits: Acids can sometimes cause the binder in sandstone to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium carbonate.

**Possibly Ceramic?**

**What's Mohs Hardness?**

**Pictures**

**Maintenance & Troubleshooting**



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Sandstone (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



Tile / Larger or Equal to 12”x 12” / Not Textured

# Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

## Sandstone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8”
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- May fizz in acid test

Acid Test

## Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8”
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

Scratch Test



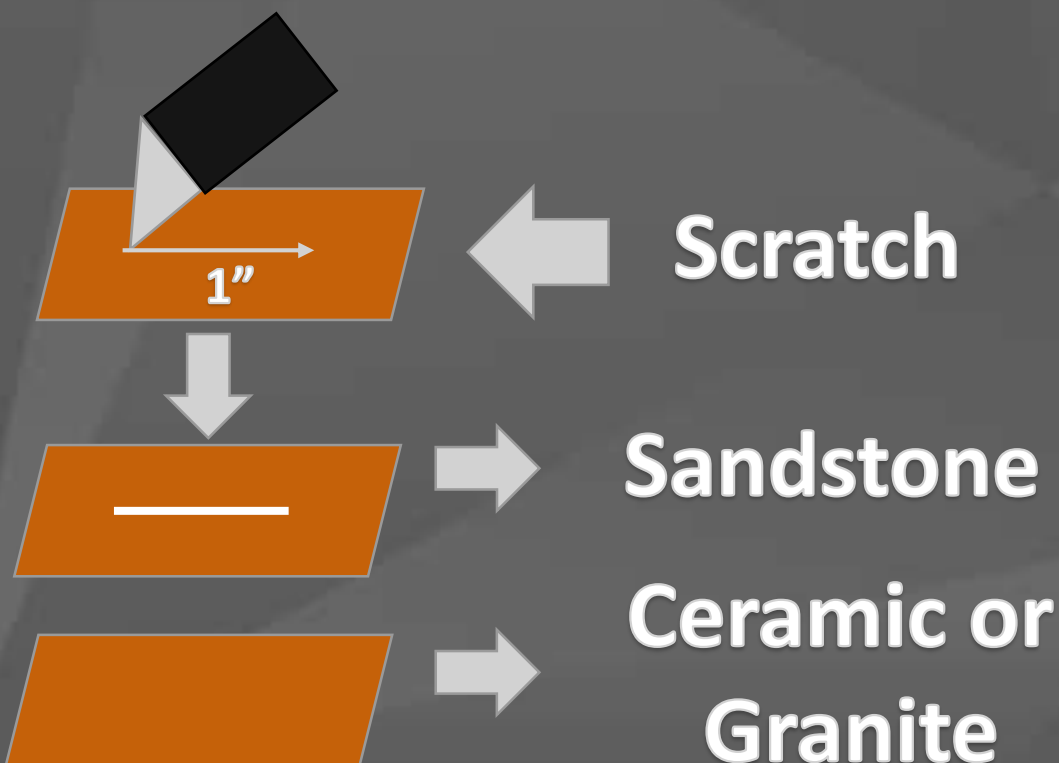
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

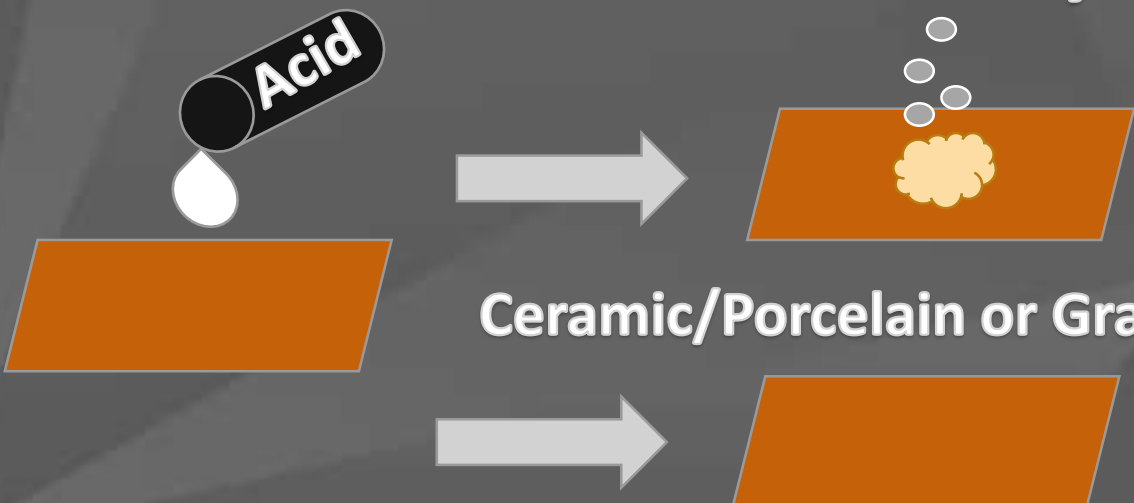
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Sandstone may fizz**



**Ceramic/Porcelain or Granite**

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**Sandstone**



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## Sandstone

Uncoated/Bare

Coated

Impregnator



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## Sandstone-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Sandstone-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Sandstone-Uncoated/Bare

Staining/etching





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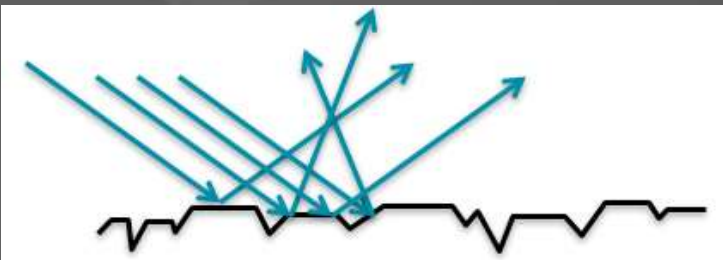


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## Sandstone-Uncoated/Bare

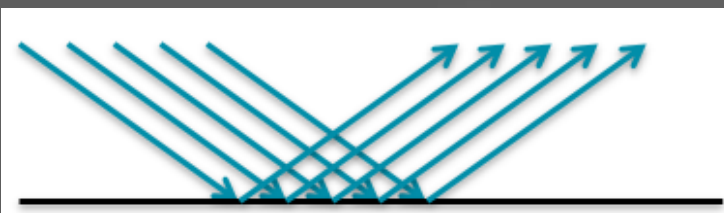
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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**Sandstone-Uncoated/Bare**

Dulling/scratching



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## Sandstone-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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**Sandstone-Uncoated/Bare**

Soiling/soil build-up



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## Sandstone-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems



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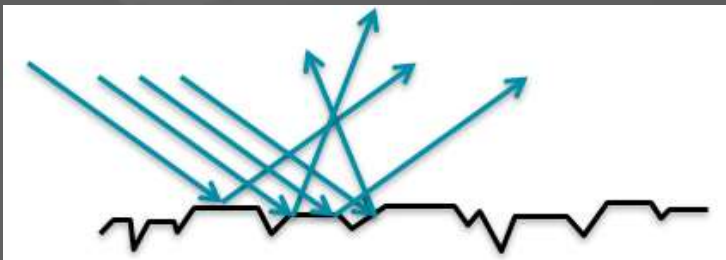


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## Sandstone-Coated

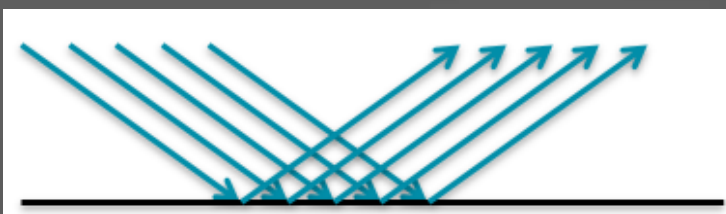
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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**Sandstone-Coated**

Dulling



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# 3M FLOOR CARE GUIDE



Rectangle / Larger or Equal to 12"x 24" / Textured

## Sandstone-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Sandstone-Coated

Soiling





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# Sandstone

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Rectangle / Larger or Equal to 12”x 24” / Textured

# Streaking/Mop Lines/Poor Leveling

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

### Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



Rectangle / Larger or Equal to 12”x 24” / Textured

# Finish Discolored/Yellowing/ Sticky Floors

**Potential Causes**

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

**Possible Solutions**

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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# 3M FLOOR CARE GUIDE



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## Sandstone-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Sandstone-Impregnator

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

## Pictures



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## Sandstone-Impregnator

Staining/etching



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# 3M FLOOR CARE GUIDE

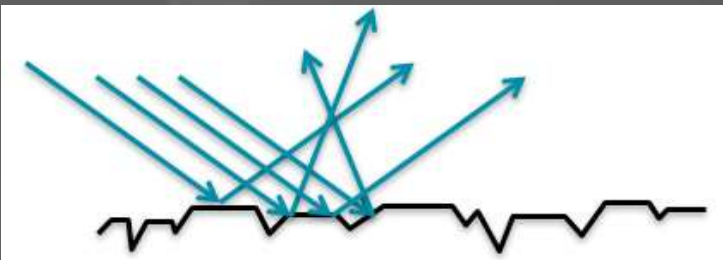


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## Sandstone-Impregnator

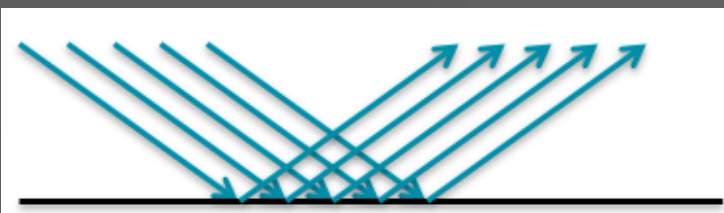
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Sandstone-Impregnator

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Sandstone-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Sandstone-Impregnator

Soiling/soil build-up



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Sandstone

Travertine

Slate

Flagstone

Travertine is a sub-class of limestone that is formed from hot springs or caves near the earth's surface. Travertine is not subjected to the high pressures of most limestone resulting in some physical differences including pitting and void formation. Air or other organic material gets trapped in the formation and over time solidifies the voids into the rock as it hardens. This process also make travertine more porous than other limestone and marble. The pits/voids are often filled with epoxy to create a smooth surface.

Physical traits: Has a pitted surface, creating a textured looking surface. Tan-cream-light red in color with flowing linear layers. Mohs hardness between 3-4.

Chemical traits: Acids will cause travertine to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Travertine (3-4)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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# 3M FLOOR CARE GUIDE



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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Travertine

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)



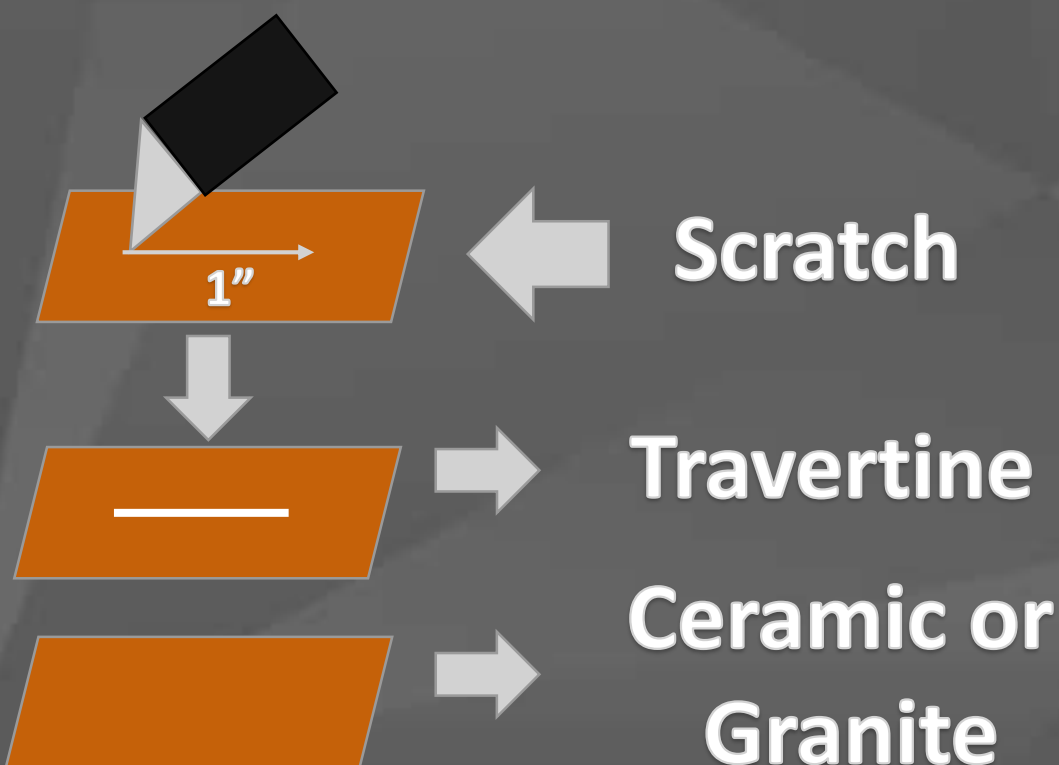
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## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

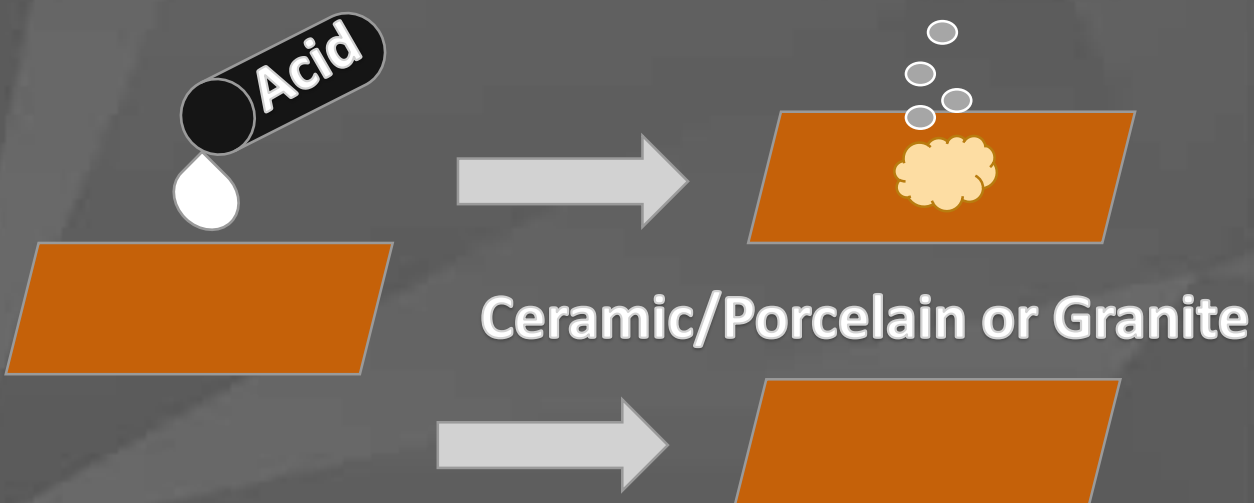
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Travertine



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Travertine



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# Travertine

Uncoated/Bare

Crystallization

Coated

Impregnator



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# 3M FLOOR CARE GUIDE



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## Travertine-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Travertine-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Travertine-Uncoated/Bare

Staining/etching





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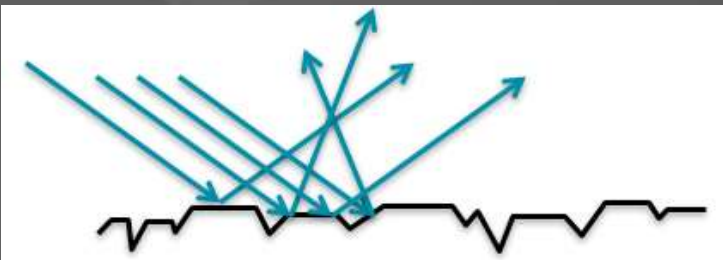


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## Travertine-Uncoated/Bare

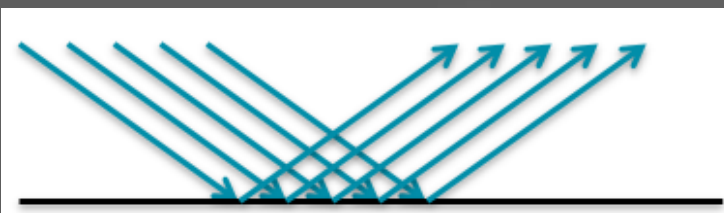
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Travertine-Uncoated/Bare

Dulling/scratching



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## Travertine-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Uncoated/Bare

Soiling/soil build-up



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# Travertine-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Travertine-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

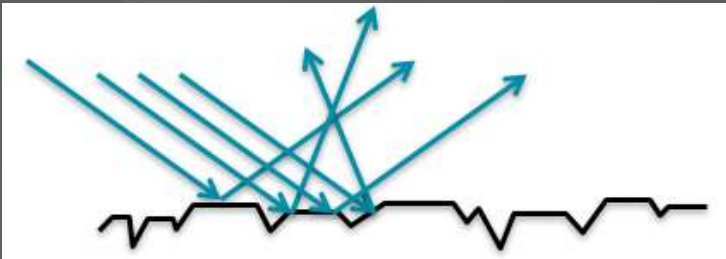
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## Travertine-Crystallization

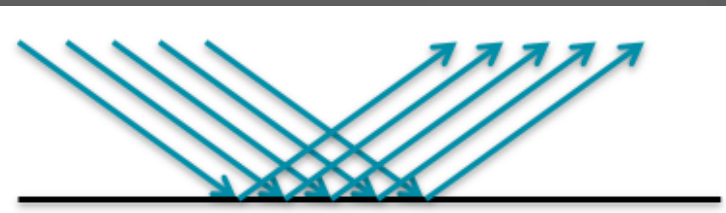
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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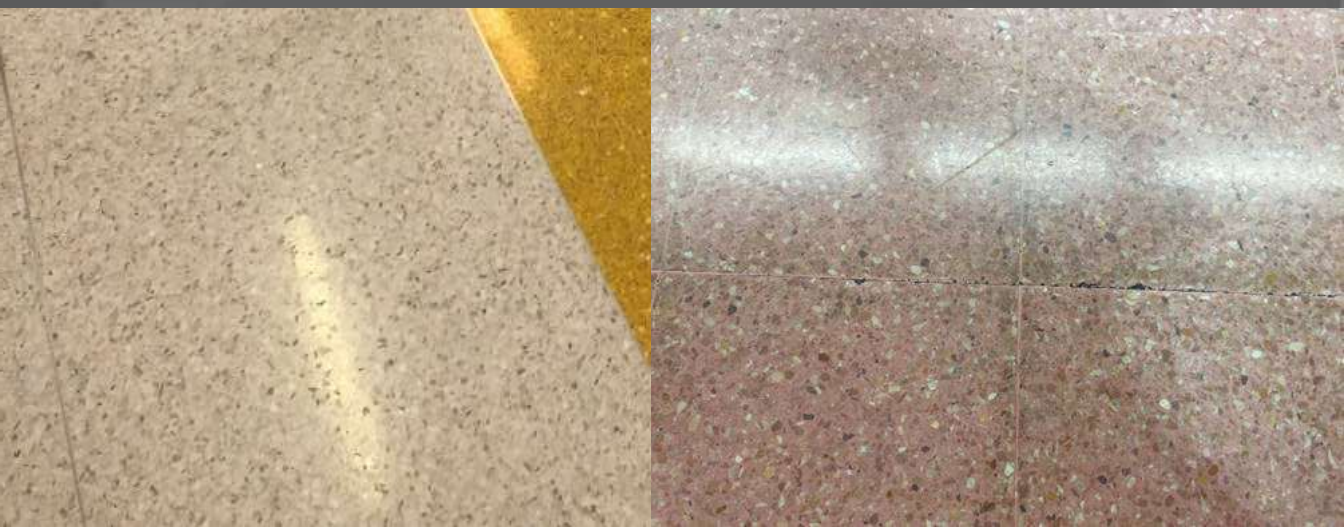
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# Travertine-Crystallization

Dulling



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## Travertine-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



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## Travertine-Crystallization

Spalling



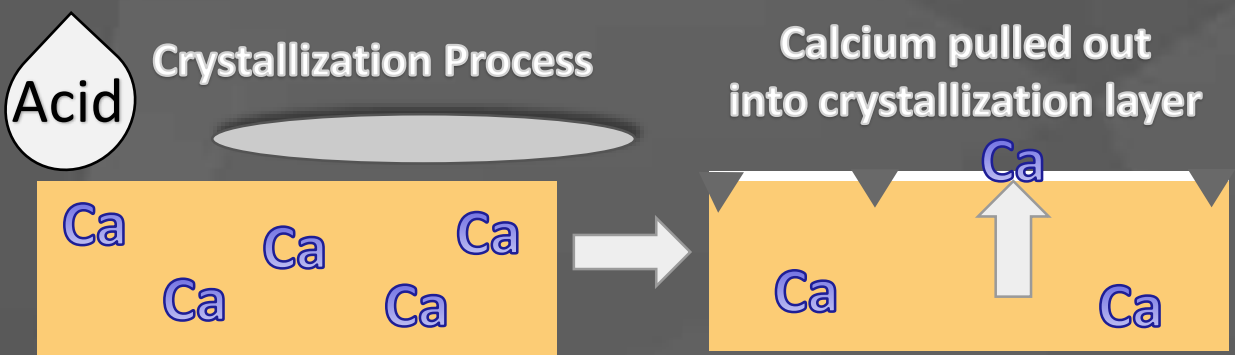
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## Travertine-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



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# Travertine-Crystallization

Over-Crystallization





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## Travertine-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems



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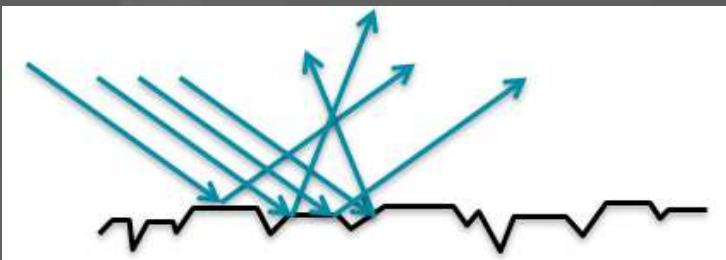


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## Travertine-Coated

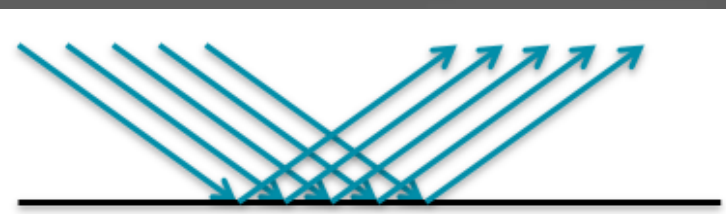
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# Travertine-Coated

Dulling



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## Travertine-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Travertine-Coated

Soiling





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# Travertine

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Rectangle / Larger or Equal to 12”x 24” / Textured

# Streaking/Mop Lines/Poor Leveling

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

### Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



Rectangle / Larger or Equal to 12”x 24” / Textured

# Finish Discolored/Yellowing/ Sticky Floors

**Potential Causes**

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

**Possible Solutions**

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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# 3M FLOOR CARE GUIDE



Rectangle / Larger or Equal to 12"x 24" / Textured

## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# 3M FLOOR CARE GUIDE



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## Travertine-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# Travertine-Impregnator

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Travertine-Impregnator

Staining/etching



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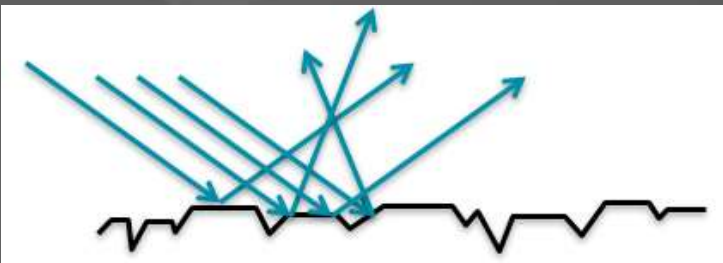


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## Travertine-Impregnator

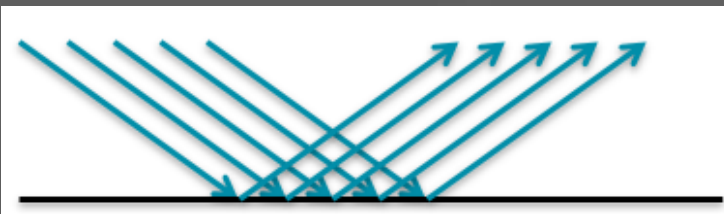
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Travertine-Impregnator

Dulling/scratching



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## Travertine-Impregnator

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Travertine-Impregnator

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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Sandstone

Travertine

Slate

Flagstone

Slate is a metamorphic stone that is made of layered shale subjected to high heat and pressure. One drawback to this layered composition is that slate may break or flake at the surface. However, the bulk material is very durable with low water absorption, so it is commonly used in roofing tiles as well as indoor and outdoor flooring.

Physical traits: Color can vary from black-gray-green-purple-rust. Can have a rough/gritty texture or can be smooth with partial sheets exposed. Mohs hardness between 3-5.

Chemical traits: Relatively good moisture resistance compared to other stones but may still require an impregnator. Avoid highly acidic or alkaline cleaners.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



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# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Slate (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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# 3M FLOOR CARE GUIDE



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## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Slate

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- May fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)



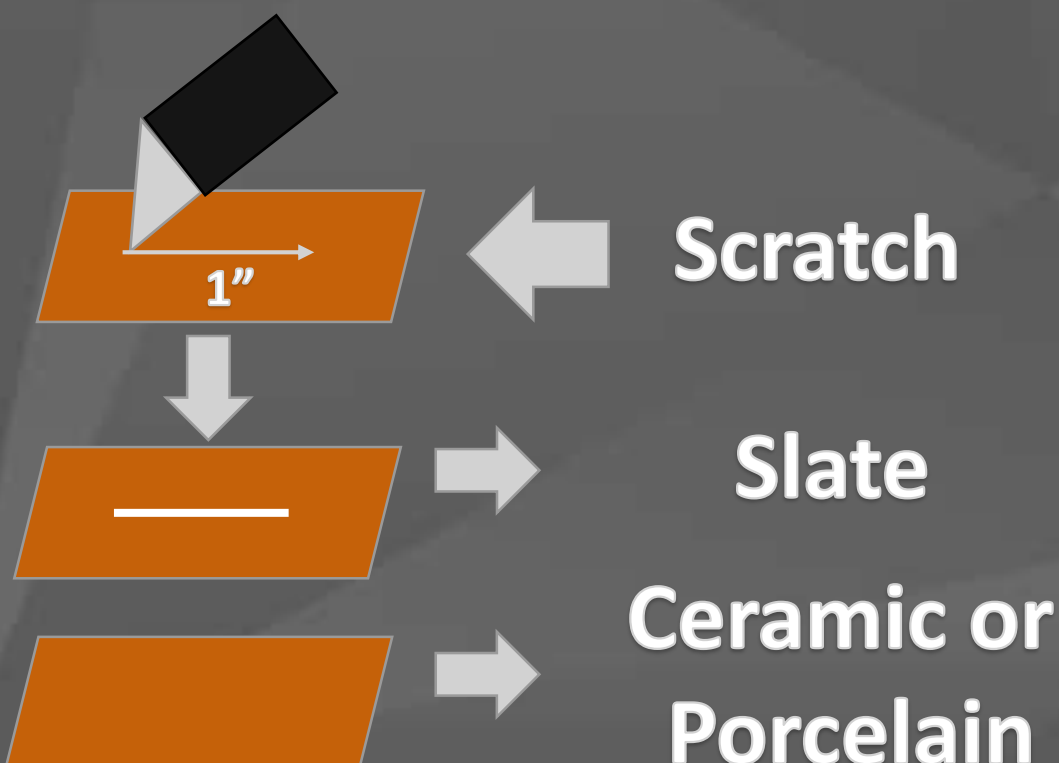
Tile / Larger or Equal to 12"x 12" / Not Textured

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

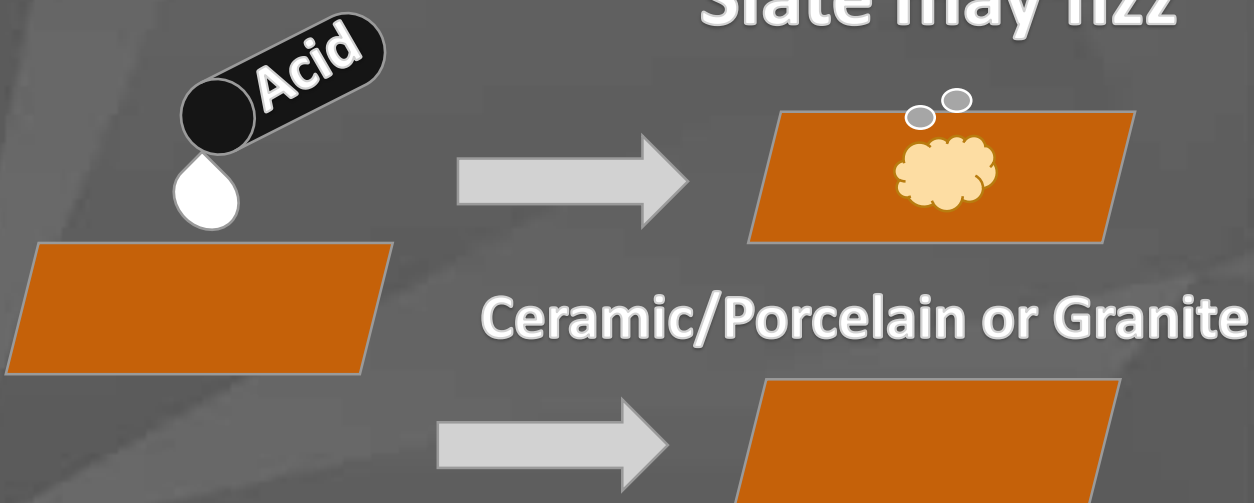
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Slate may fizz**



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Slate



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**Slate**

Uncoated/Bare

Coated



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## Slate-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Issues:

Dulling/scratching

Soiling/soil build-up

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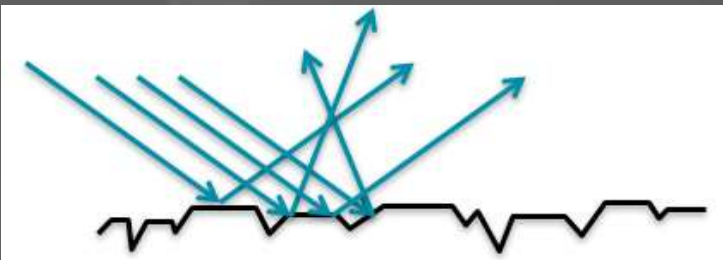


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## Slate-Uncoated/Bare

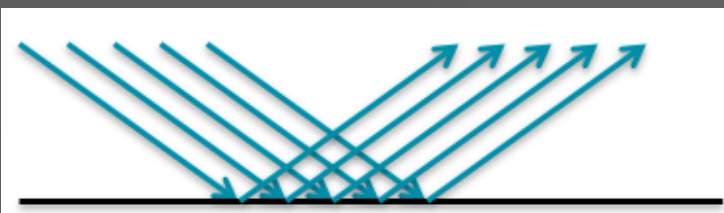
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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**Slate-Uncoated/Bare**

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Slate-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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**Slate-Uncoated/Bare**

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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## Slate-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

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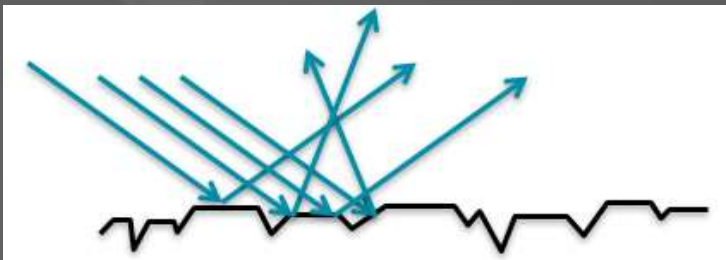


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## Slate-Coated

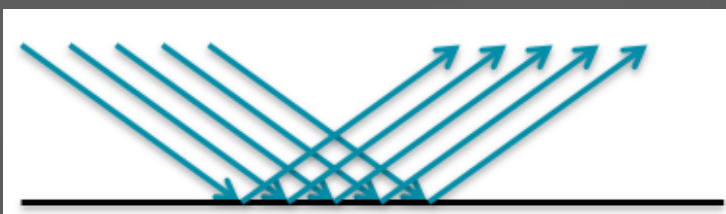
### Dulling

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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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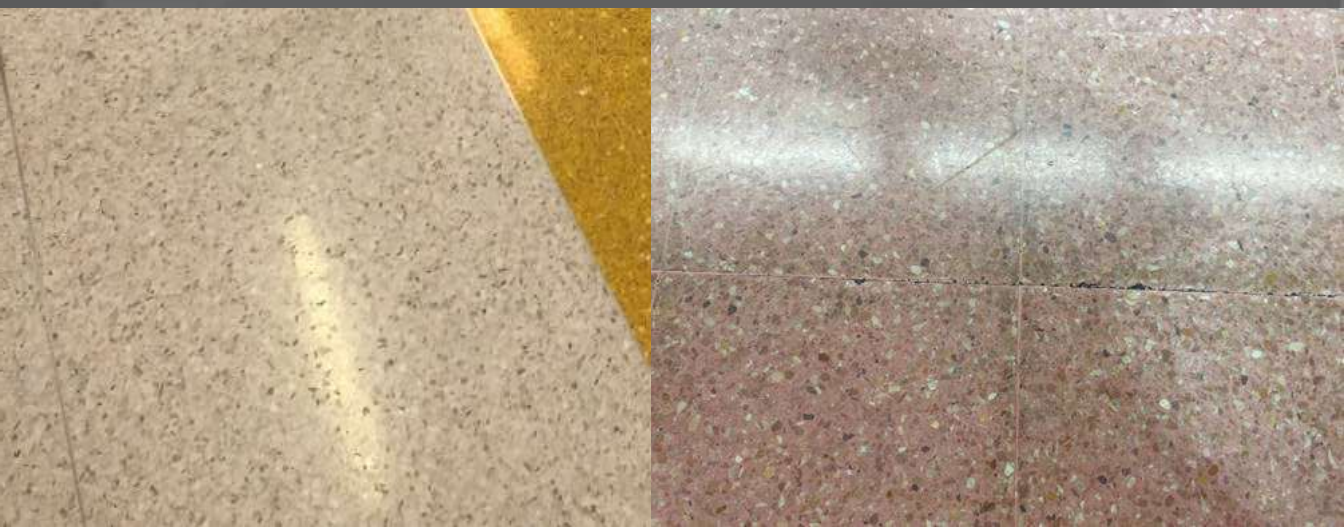
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**Slate-Coated**

Dulling





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## Slate-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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**Slate-Coated**

Soiling



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## Slate

# Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.





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# Streaking/Mop Lines/Poor Leveling

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

### Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



Rectangle / Larger or Equal to 12”x 24” / Textured

# Finish Discolored/Yellowing/ Sticky Floors

**Potential Causes**

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

**Possible Solutions**

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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# Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>



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# 3M FLOOR CARE GUIDE



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Sandstone

Travertine

Slate

Flagstone

Flagstone is a sandstone rock that is quarried in slab form. It can be cut to larger squares/rectangles but will often be random angular slabs.

Physical traits: Light tan-red-blue-gray in color. Has a rough/gritty look of a fresh rock surface. Can sometimes see individual grains of sand. Very porous and will readily absorb water and stains very quickly. Flagstone is a relatively soft rock that has a general Mohs hardness between 3-5.

Chemical traits: Acids can sometimes cause the flagstone to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium carbonate.

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**Flagstone**



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# Flagstone

Uncoated/Bare

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# 3M FLOOR CARE GUIDE



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## Flagstone-Uncoated/Bare

### Uncoated/Bare

A proper matting system is important to keep as much possible sand/grit off the tile to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily.
- Damp mop or autoscrub with neutral cleaner/peroxide cleaner, or degreaser if in a food soil environment.

Clean up any spill as soon as possible, especially acids which may etch the grout lines.

### Issues:

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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## Flagstone-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

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  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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Rectangle / Larger or Equal to 12"x 24" / Textured

## Flagstone-Uncoated/Bare

Soiling/soil build-up



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# **3M** FLOOR CARE GUIDE



**Stone Floors**

**Slab/Pour**

**Textured  
(Stamped,  
Etched)**

**Not Textured  
(Polished,  
Honed)**



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# 3M FLOOR CARE GUIDE



Slab/Pour / Textured

## Concrete

Concrete is a mixture of cement, aggregate, and water that is combined into a slurry and poured. Once dry, it creates a very hard and durable floor. Concrete is very common and requires relatively low maintenance to maintain when compared to other natural stones. Color staining agents can be mixed throughout the concrete or applied only to the surface material. May be stamped to look similar to brick or other patterned textured surfaces.

Physical traits: Light gray-gray-dark gray-white in color. May sometimes have visible round aggregate surrounded by a gray matrix if ground down. As concrete appearance may vary greatly (age, aggregate, matrix, additives), the hardness can widely vary. Uncoated concrete will scratch and powder if not properly protected.

Chemical traits: Acids will cause cement matrix to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium carbonate.

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Slab/Pour / Textured

Concrete

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Slab/Pour / Textured

**Concrete**

Uncoated/Bare

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Slab/Pour / Textured

## Concrete-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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Slab/Pour / Textured

## Concrete-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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Slab/Pour / Textured

## Concrete-Uncoated/Bare

Staining/etching



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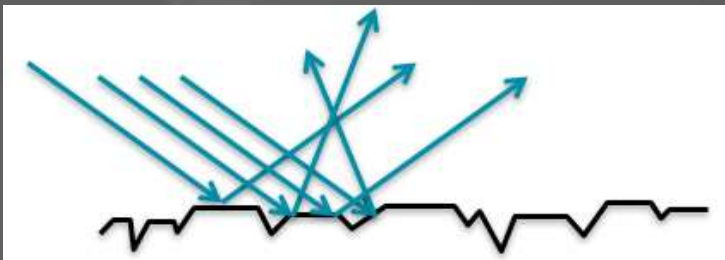


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## Concrete-Uncoated/Bare

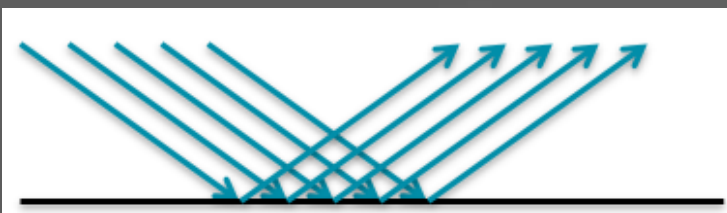
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Concrete-Uncoated/Bare

Dulling/scratching





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# 3M FLOOR CARE GUIDE



Slab/Pour / Textured

## Concrete-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Concrete-Uncoated/Bare

Soiling/soil build-up



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Concrete

Terrazzo

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# 3M FLOOR CARE GUIDE



Slab/Pour / Not Textured

## Concrete

## Terrazzo

Concrete is a mixture of cement, aggregate, and water that has been combined into a slurry and poured. Once dry, it creates a very hard and durable floor. Concrete is very common and requires relatively low maintenance to maintain when compared to other natural stones. Can also have color stains mixed throughout the concrete or applied just to the top surface. Other options are to acid stain which can create a mottled look.

Physical traits: Light gray-gray-dark gray-white in color. May sometimes have visible round aggregate surrounded by a gray matrix if ground down. Because concrete varies so much (age, aggregate, matrix, additives) the hardness can widely vary. Uncoated concrete will scratch and powder if not properly protected.

Chemical traits: Acids will cause cement matrix to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

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Concrete





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## Concrete-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Concrete-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Concrete-Uncoated/Bare

Staining/etching





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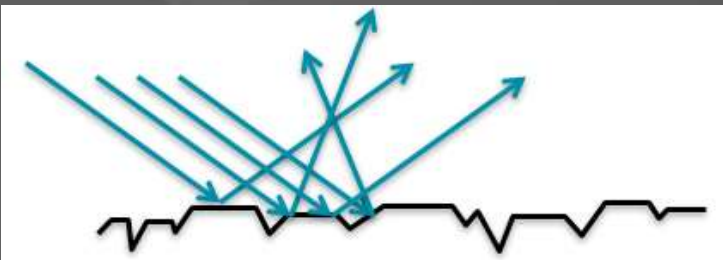


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## Concrete-Uncoated/Bare

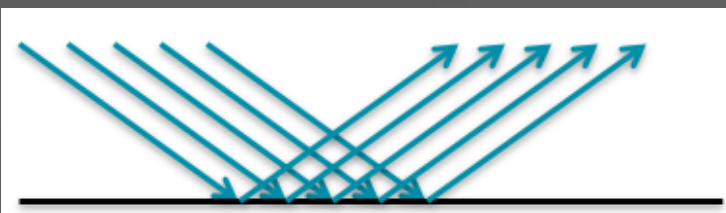
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Concrete-Uncoated/Bare

Dulling/scratching



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# 3M FLOOR CARE GUIDE



Slab/Pour / Not Textured

## Concrete-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Concrete-Uncoated/Bare

Soiling/soil build-up





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# 3M FLOOR CARE GUIDE



Slab/Pour / Not Textured

## Concrete-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

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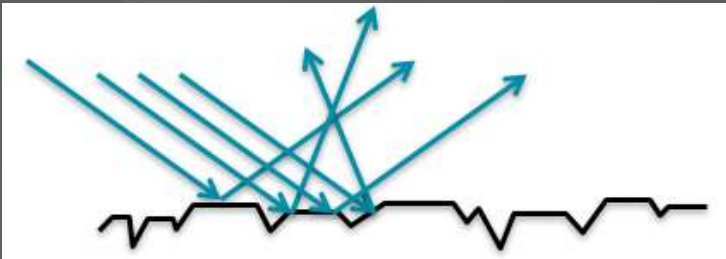


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## Concrete-Coated

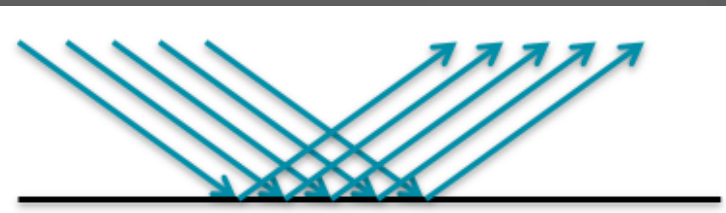
### Dulling

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- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Concrete-Coated

Dulling



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# 3M FLOOR CARE GUIDE



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## Concrete-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Concrete-Coated

Soiling



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# Concrete

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



Slab/Pour / Not Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



Slab/Pour / Not Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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## Concrete-Densifier

### Densifier

Using a chemical densifier will provide some protection by filling the surface pores, resulting in an increased surface density/hardness which in turn increases abrasion resistance. It however provides no protection against staining or acid etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent premature wear.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The chemical densifier must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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## Concrete-Densifier

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Concrete-Densifier

Staining/etching



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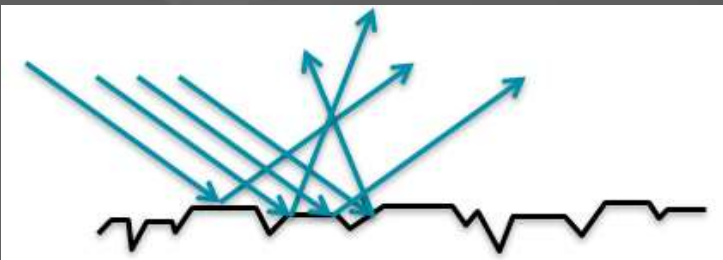


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## Concrete-Densifier

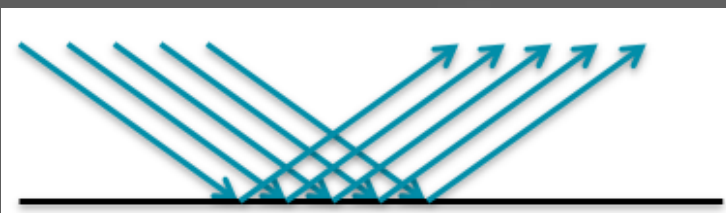
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# Concrete-Densifier

Dulling/scratching





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# 3M FLOOR CARE GUIDE



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## Concrete-Densifier

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
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## Concrete-Densifier

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



Slab/Pour / Not Textured

Concrete

Terrazzo

Terrazzo can be classified into two main types: cement terrazzo and resin (often epoxy) terrazzo:

**Cement Terrazzo** – Made of 70% crushed stone chips (most often marble) and 30% cement. Matrix will most often be white-grey in color. The stone chips and cement are mixed together and then poured into slabs and sectioned off with dividers (usually metal or plastic). Can be divided into squares/rectangles or even used to make more intricate patterns.

**Resin (Epoxy) Terrazzo**- Made of 70% crushed aggregate (marble, granite, glass, sea shells) and 30% resin matrix. The resin matrix can be almost any color. The stone chips and epoxy are mixed together and then poured into slabs and sectioned off with dividers (usually metal or plastic). Can be divided into squares/rectangles or even used to make more intricate patterns.

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## Terrazzo

Uncoated/Bare

Crystallization

Coated

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## Terrazzo-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



Slab/Pour / Not Textured

## Terrazzo-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Terrazzo-Uncoated/Bare

Staining/etching



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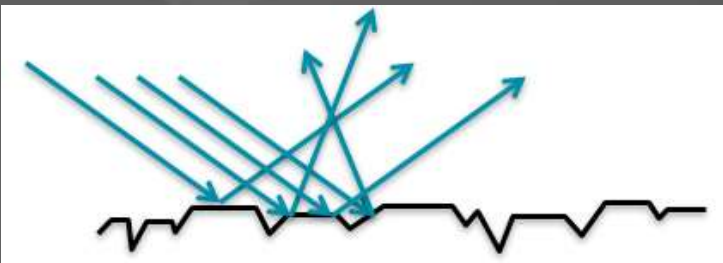


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## Terrazzo-Uncoated/Bare

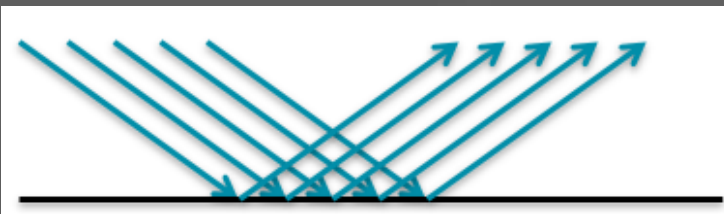
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Terrazzo-Uncoated/Bare

Dulling/scratching





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# 3M FLOOR CARE GUIDE



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## Terrazzo-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Terrazzo-Uncoated/Bare

Soiling/soil build-up



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# Terrazzo-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Terrazzo-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

Periodic Maintenance:

- Re-crystallize

Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization



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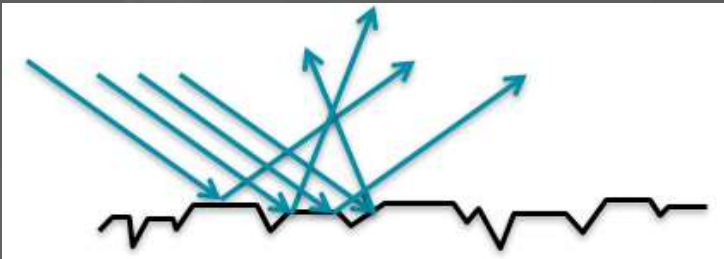


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## Terrazzo-Crystallization

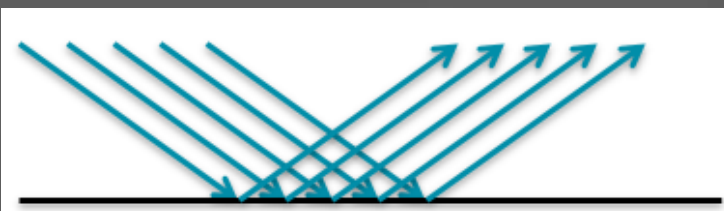
### Dulling

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



### Pictures



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# Terrazzo-Crystallization

Dulling



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# 3M FLOOR CARE GUIDE



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## Terrazzo-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.

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# Terrazzo-Crystallization

Spalling





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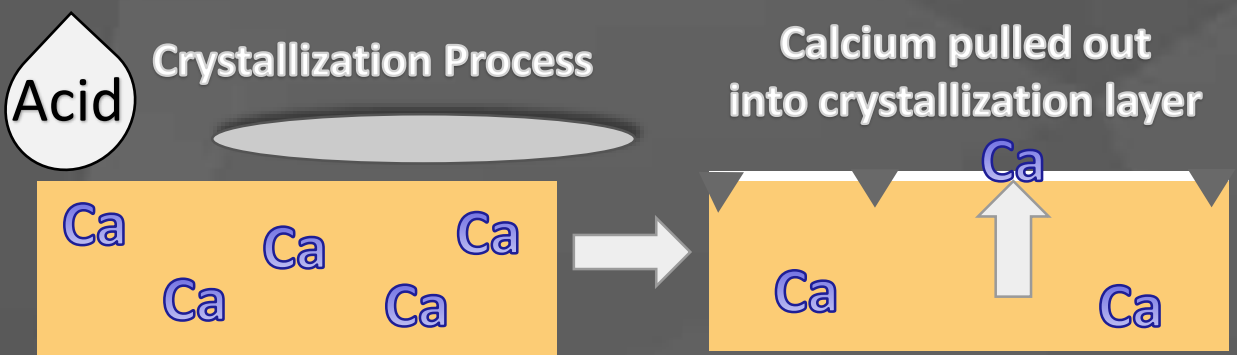


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## Terrazzo-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



## Pictures



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# Terrazzo-Crystallization

Over-Crystallization



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# 3M FLOOR CARE GUIDE



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## Terrazzo-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

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# 3M FLOOR CARE GUIDE

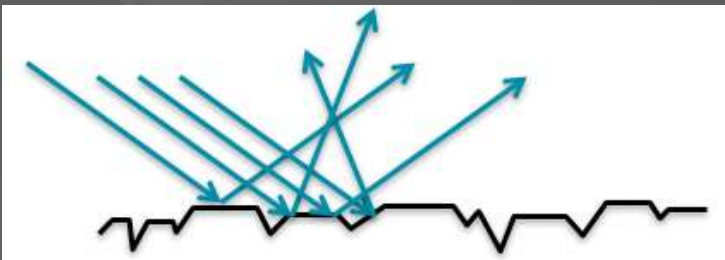


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## Terrazzo-Coated

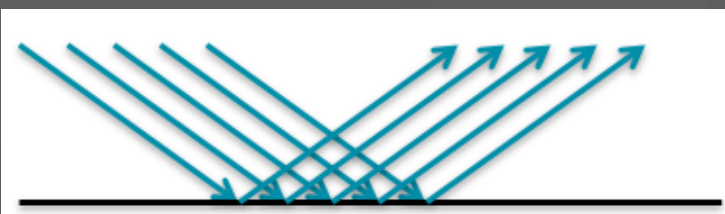
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# Terrazzo-Coated

Dulling





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# 3M FLOOR CARE GUIDE



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## Terrazzo-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Terrazzo-Coated

Soiling



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# Terrazzo

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.





Slab/Pour / Not Textured

# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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# 3M FLOOR CARE GUIDE



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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.



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## Information and Maintenance Tips

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Sandstone

Granite

Ceramic

Slate

Terrazzo

Concrete

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# 3M FLOOR CARE GUIDE

## Marble

[White](#)[Tan/Brown](#)[Red](#)[Black](#)[Green](#)[Maintenance & Troubleshooting](#)

Marble is a very common type of stone used for flooring because of its abundant variety of colors and natural beauty.

Marble is most often made up of limestone/dolostone (carbonate minerals- calcite, dolomite, etc.) that has been subjected to high heat and pressure. This causes physical changes to the crystalline structure (color, fractures) as well as chemical changes (veining).

Physical traits: Because of the minerals that make up marble, it is on the softer side of stones with a Mohs hardness between 3-5. This means that the bare stone may scratch when exposed to foot traffic.

Chemical traits: Acids will cause marble to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)



# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Marble (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Marble

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

[Scratch Test](#)

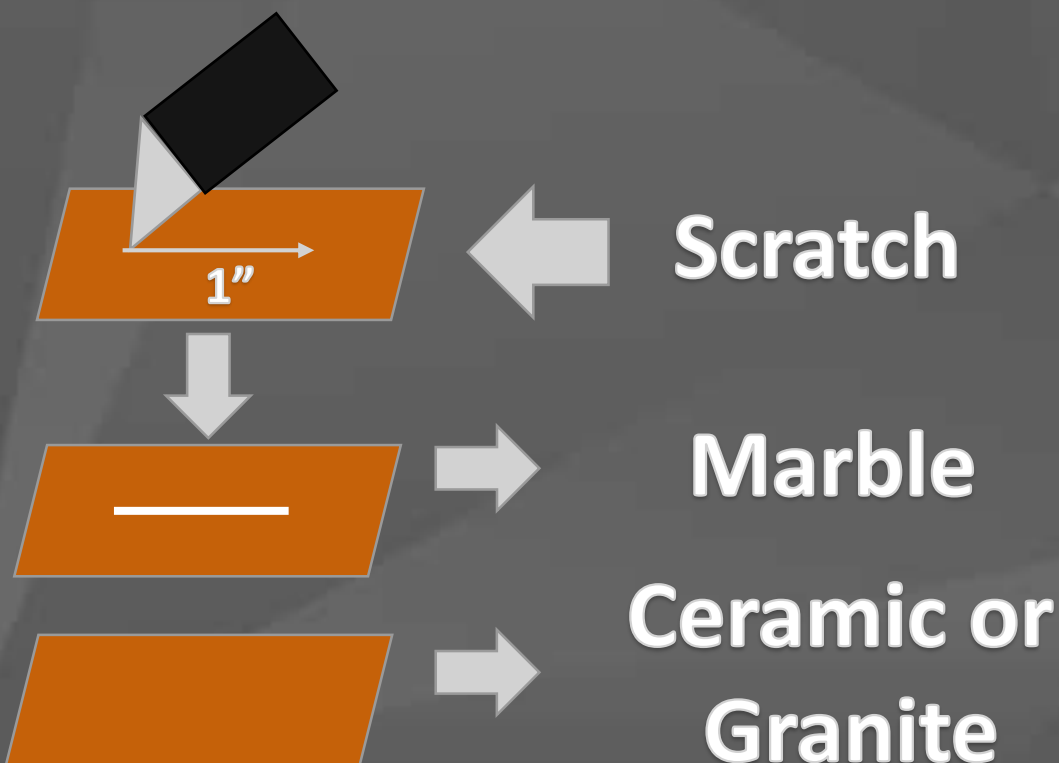


## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

## Acid Test

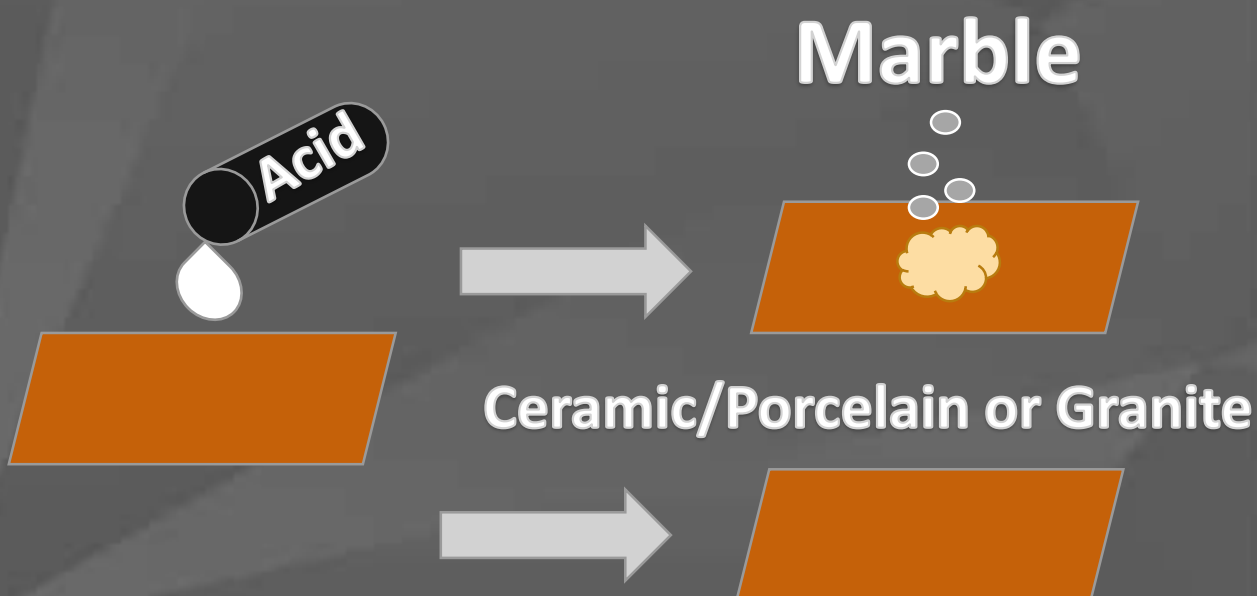
Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# Marble

White

Tan/Brown

Red

Black

Green

Common white marbles:

Carrara- A white to light gray marble with light gray veining. The veining often has hazy edges, blending into the white matrix causing a mixed looks as opposed to contrasting.

Pictures

Calacatta- Calacutta is a purer white and the veining is a darker gray to black (sometimes may contain gold veining). There is often a very distinct transition from the dark vain to the white matrix, making the veins stand out more than Carrara.

Pictures

Thassos: A pure white marble originating in Greece. May sometimes have slight grey impurities present.

Pictures

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# Carrara Marble





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# Calacatta Marble



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## Thassos Marble



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## Marble

White

Tan/Brown

Red

Black

Green

Common Tan/Brown marbles:

Crema Marfil- Cream/Tan matrix with small amounts of thin light brown veining.

## Pictures

Emperador- Most often dark brown matrix but may be light brown or light gray with a large amount of fine tan or white veining. Often has so much veining that it looks like chunks of rock that have fractured apart.

## Pictures

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# Crema Marfil Marble





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# Emperador Marble



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## Marble

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Common red marble:

Rojo Alicante- Has a red matrix that can be anywhere in the light-medium-dark (red, pink, orange, burgundy) shades with most commonly white veining (sometimes fine black veins).

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## Rojo Alicante Marble





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# Marble

White

Tan/Brown

Red

Black

Green

Common black marble:

Negro Marquina-Black matrix with very crisp, contrasting white veins.

Pictures



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# Black Marble



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# 3M FLOOR CARE GUIDE

## Marble

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Serpentine (Green Marble) - Serpentine is one of the more unknown stone types used in flooring today and is often referred to as green marble. It will visually look very similar to marble, with white/brown veins and a light-dark green bulk color. Serpentine, unlike marble is not made up of calcium based minerals. This confusion is often not an issue, as serpentine can take a polish and has a hardness similar to marble. Another common serpentine is labeled as rainforest marble which is green-brown with brown veins. Mohs' hardness is 3-6 depending on mineral construction.

[Pictures](#)[What's Mohs Hardness?](#)



# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Serpentine (3-6)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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Serpentine

Rainforest

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# Marble

Uncoated/Bare

Crystallization

Coated

Impregnator

Polishing Compound

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## Marble-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# Marble-Uncoated/Bare

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Marble-Uncoated/Bare

Staining/etching





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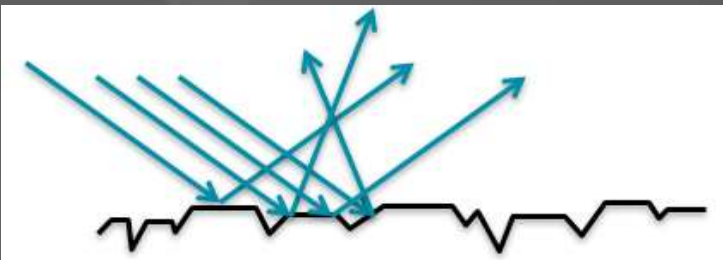
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## Marble-Uncoated/Bare

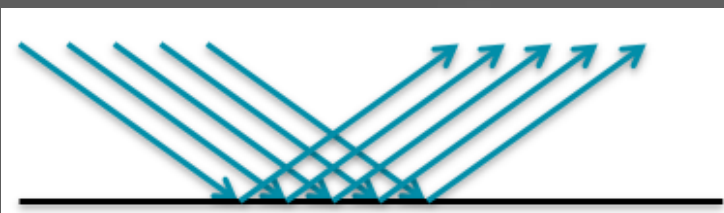
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
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# Marble-Uncoated/Bare

Dulling/scratching





# Marble-Uncoated/Bare

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

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# Marble-Uncoated/Bare

Soiling/soil build-up







# Marble-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Marble-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

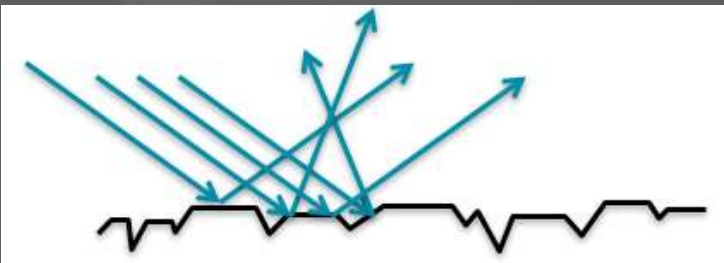
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## Marble-Crystallization

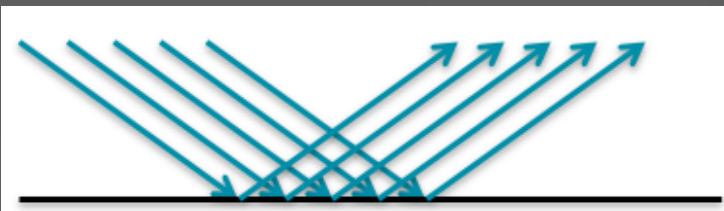
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# Marble-Crystallization

Dulling





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# 3M FLOOR CARE GUIDE

## Marble-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.

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# Marble-Crystallization

Spalling

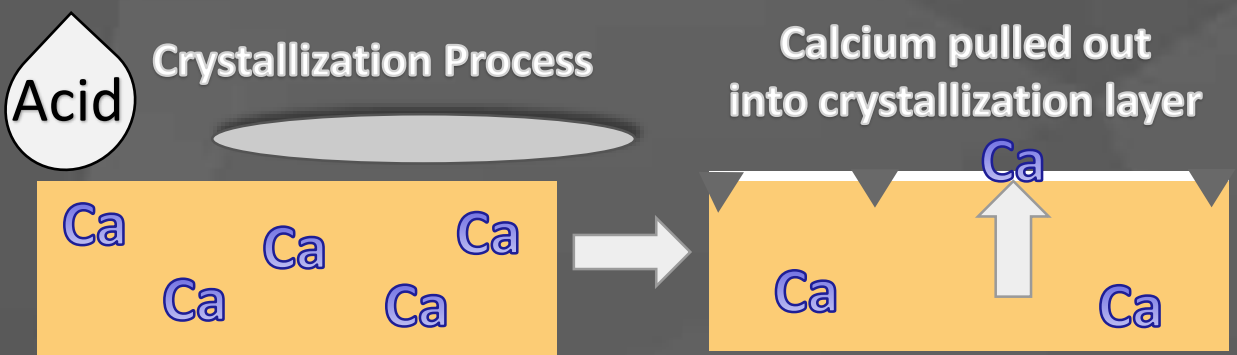


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## Marble-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



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# Marble-Crystallization

Over-Crystallization





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# Marble-Coated

## Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

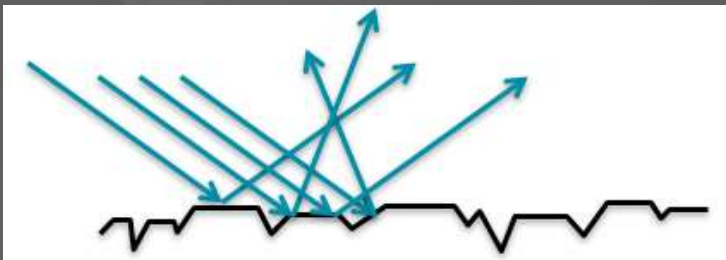
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## Marble-Coated

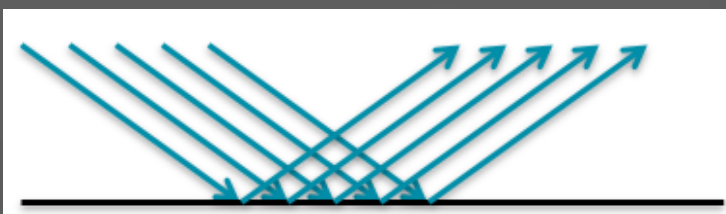
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# Marble-Coated

Dulling



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# 3M FLOOR CARE GUIDE



## Marble-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Marble-Coated

Soiling



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# Marble

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# Marble-Impregnator

## Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up





# Marble-Impregnator

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Marble-Impregnator

Staining/etching

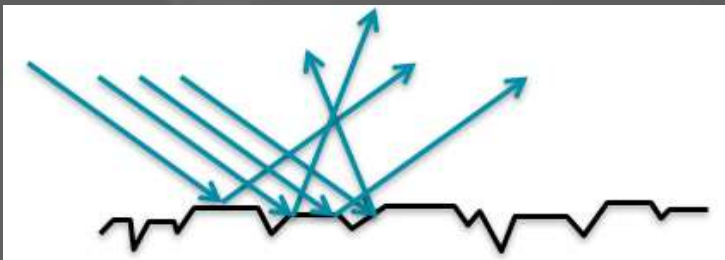


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## Marble-Impregnator

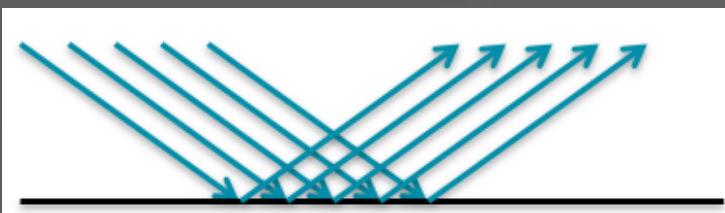
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The two most common ways to fix this are:

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# Marble-Impregnator

Dulling/scratching







# Marble-Impregnator

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
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# Marble-Impregnator

Soiling/soil build-up





## Marble-Polishing Compound

- Most marble has been polished in the factories using various grades of abrasives followed by a final step using an abrasive in combination with oxalic acid. This same process can also be done to refresh natural calcareous stone that has dulled over time.
- Most often, polishes are used with a red or natural floor pad. The polishing compound is mixed with water and buffed with 175rpm floor machine. Floors with deeper scratches or other damage typically must be diamond honed prior to using marble polishing products. The calcium oxalate formed in the reaction is washed away with the slurry from the process leaving behind a smoothed and polished stone surface that has not been chemically altered, just highly polished.
- Note that the above does not mean that oxalic acid will not etch stone surfaces. Oxalic acid (and any acid) dropped on a marble surface will etch. Factory polishing and marble restoration are performed under controlled circumstances to reach desired results.

**Maintenance &  
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# Marble-Polishing Compound

## Polishing Compound

The polishing compound process leaves a highly polished surface when finished. There is no protection on the surface, making it susceptible to damage from abrasion and staining or etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be required if the floor is damaged or deeply scratched. The polishing compound process is re-done to bring a polish back to the stone.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up





# Marble-Polishing Compound

## Staining/etching

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# Marble-Polishing Compound

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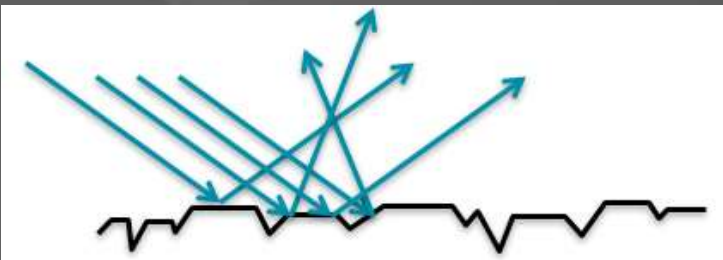




# Marble-Polishing Compound

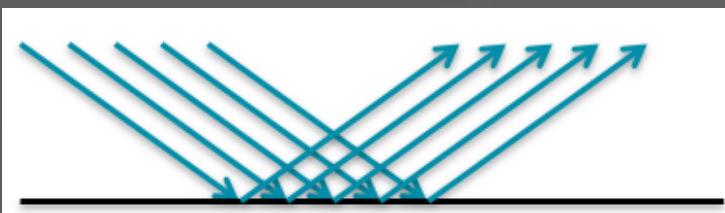
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# Marble-Polishing Compound

Dulling/scratching







# Marble-Polishing Compound

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# Marble-Polishing Compound

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



## Travertine

Travertine is a sub-class of limestone that is formed from hot springs or caves near the earth's surface. Travertine is not subjected to the high pressures of most limestone resulting in some physical differences including pitting and void formation. Air or other organic material gets trapped in the formation and over time solidifies the voids into the rock as it hardens. This process also make travertine more porous than other limestone and marble. The pits/voids are often filled with epoxy to create a smooth surface.

Physical traits: Pitted or has off-colored circles from being filled. Tan-cream-light red in color with flowing linear layers. Mohs hardness between 3-4.

Chemical traits: Acids will cause travertine to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Travertine (3-4)

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	← Fingernail (2.5)
Fluorite	4	← Copper Penny (3.5)
Apatite	5	
Orthoclase	6	← Knife (5.5)
Quartz	7	← Steel Nail (6.5)
Topaz	8	
Corundum	9	
Diamond	10	





## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Travertine

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

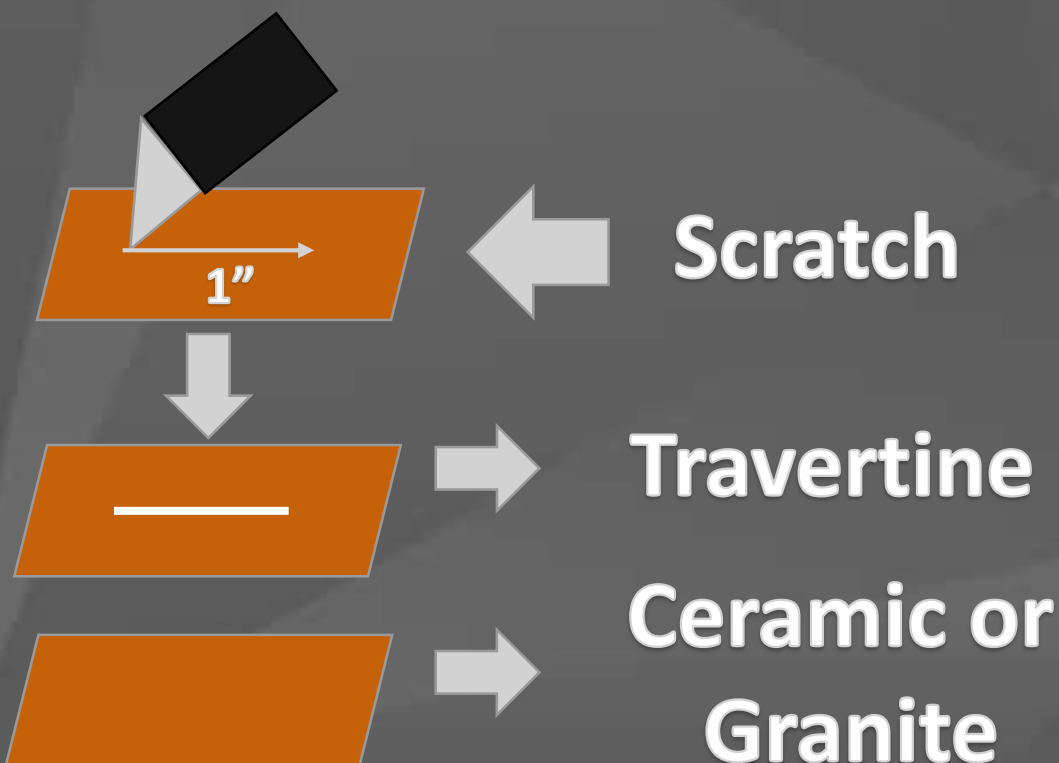
[Scratch Test](#)

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

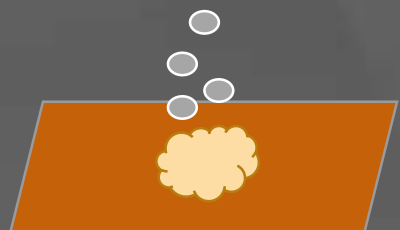
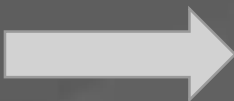
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

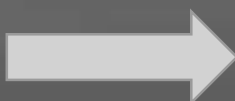
If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Travertine



### Ceramic/Porcelain or Granite



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## Travertine





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# Travertine

Uncoated/Bare

Crystallization

Coated

Impregnator

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# Travertine-Uncoated/Bare

## Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



# Travertine-Uncoated/Bare

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Travertine-Uncoated/Bare

Staining/etching





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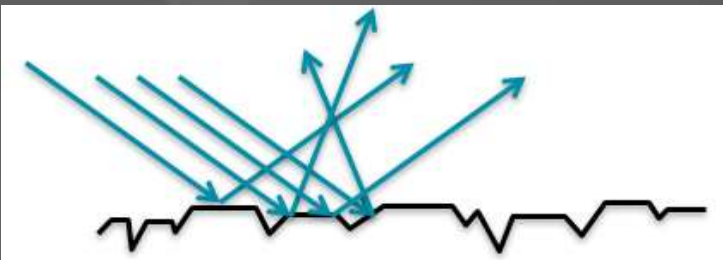
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## Travertine-Uncoated/Bare

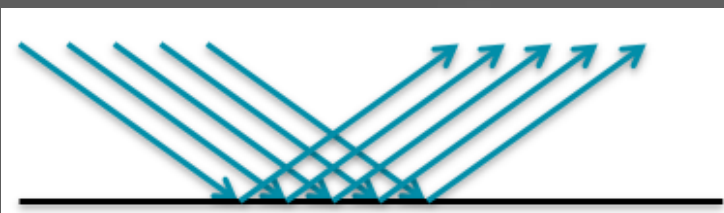
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Travertine-Uncoated/Bare

Dulling/scratching





# Travertine-Uncoated/Bare

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Travertine-Uncoated/Bare

Soiling/soil build-up







# Travertine-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Travertine-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

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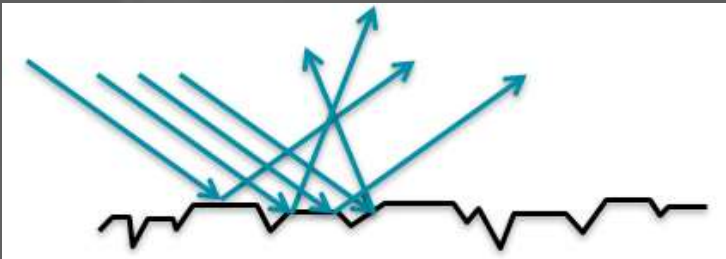
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## Travertine-Crystallization

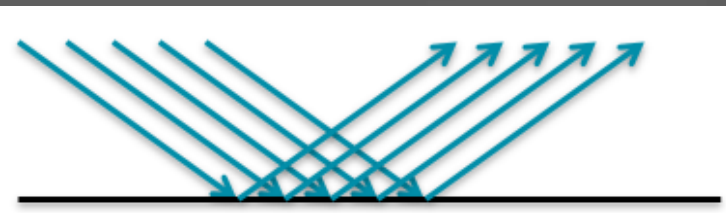
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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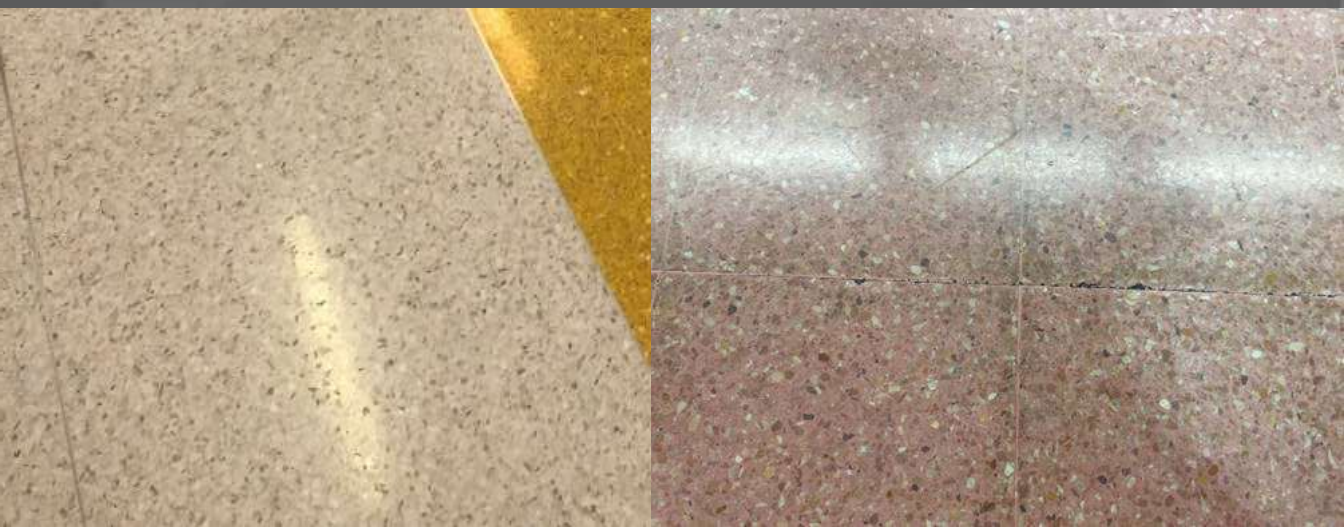
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# Travertine-Crystallization

Dulling





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# 3M FLOOR CARE GUIDE

## Travertine-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



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# Travertine-Crystallization

Spalling

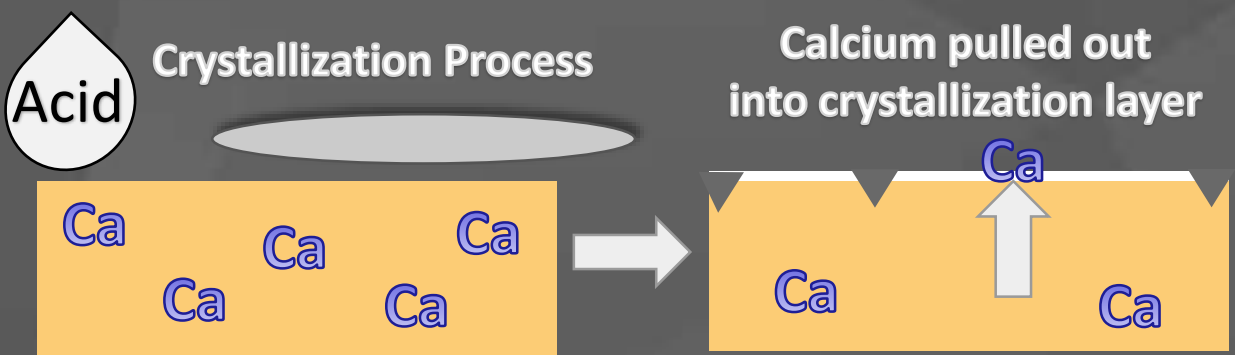


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## Travertine-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



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# Travertine-Crystallization

Over-Crystallization





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# Travertine-Coated

## Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

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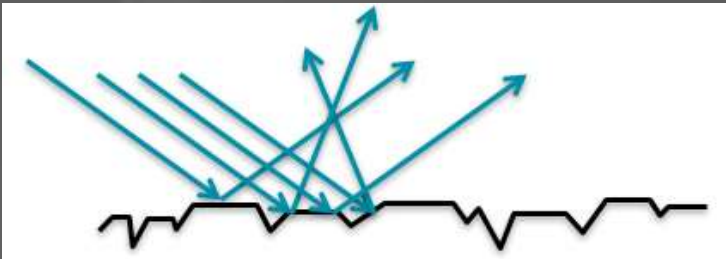
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## Travertine-Coated

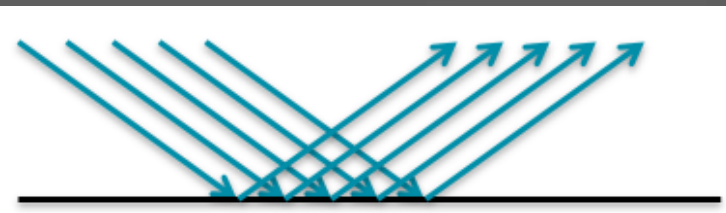
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# Travertine-Coated

Dulling





# Travertine-Coated

## Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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Soiling



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# Travertine

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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# Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

# Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# Travertine-Impregnator

## Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up





# Travertine-Impregnator

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Travertine-Impregnator

Staining/etching

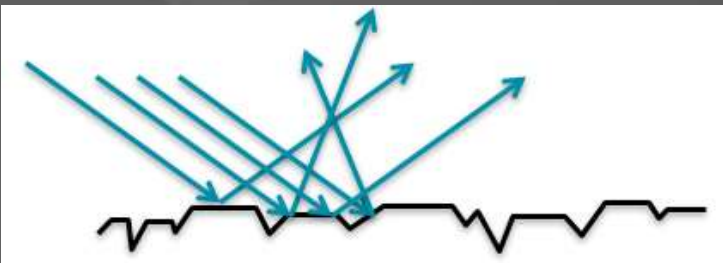




# Travertine-Impregnator

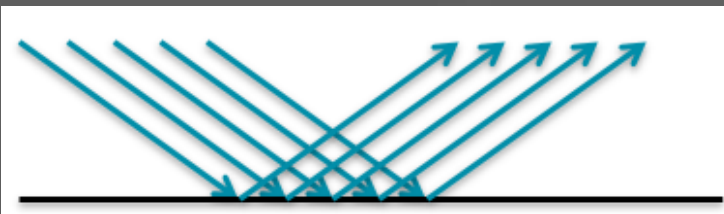
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
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# Travertine-Impregnator

Dulling/scratching







# Travertine-Impregnator

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
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- Grease build up from food soil

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- Aggressiveness of the pad:
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# Travertine-Impregnator

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



## Marble

## Limestone

Limestone is a sedimentary rock that is primarily composed of calcium carbonate. It is formed most often by a layer of coral or sea shells that have settled to the bottom of the sea and then buried. That layer is then subject to pressure from overlaying deposits, causing compaction and creating limestone.

Physical traits: Light tan-dark tan-beige and very often uniform in color. May contain fossils of sea shells, ammonites, or tubes. Will often have Stylolites which are dark jagged/serrated lines in the stone which form perpendicular to the direction of pressure. Mohs hardness between 3-4.

Chemical Traits: Limestone will chemically react with acid to produce carbon dioxide gas (fizz and possibly etch surface)

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Limestone (3-4)

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	← Fingernail (2.5)
Fluorite	4	← Copper Penny (3.5)
Apatite	5	
Orthoclase	6	← Knife (5.5)
Quartz	7	← Steel Nail (6.5)
Topaz	8	
Corundum	9	
Diamond	10	



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# Limestone



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# 3M FLOOR CARE GUIDE

## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Limestone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

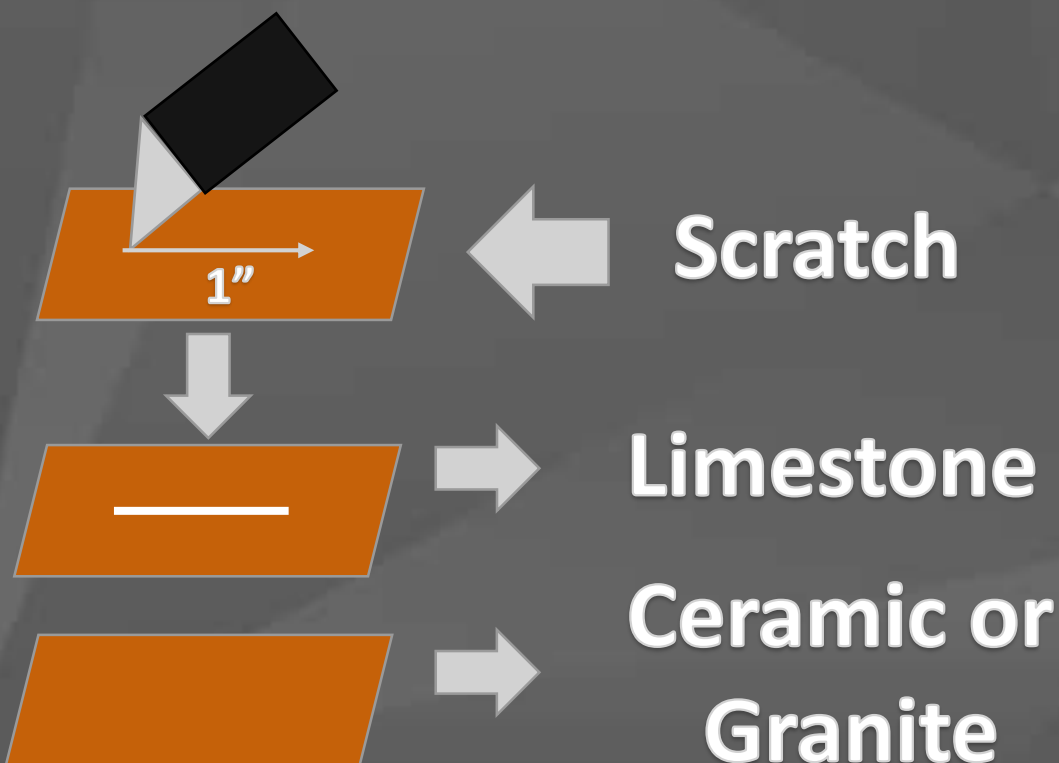
[Scratch Test](#)

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

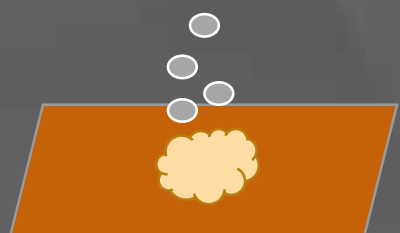
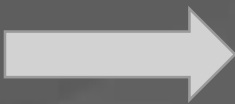
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Limestone



### Ceramic/Porcelain or Granite





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# Limestone

Uncoated/Bare

Crystallization

Coated

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# Limestone-Uncoated/Bare

## Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



# Limestone-Uncoated/Bare

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Limestone-Uncoated/Bare

Staining/etching

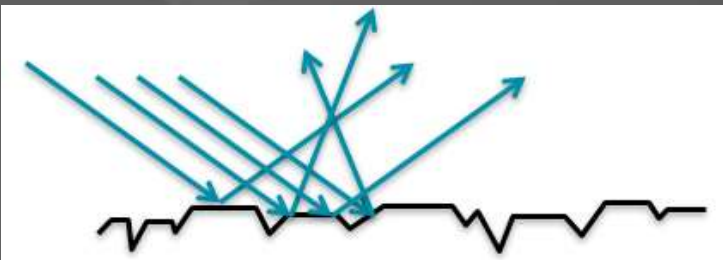




# Limestone-Uncoated/Bare

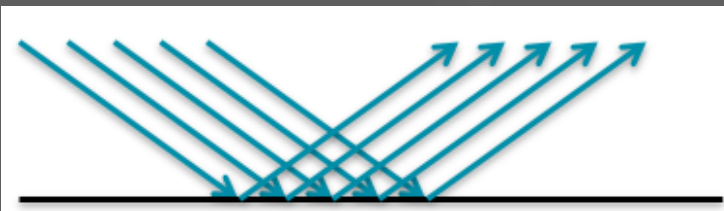
## Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Limestone-Uncoated/Bare

Dulling/scratching





# Limestone-Uncoated/Bare

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Limestone-Uncoated/Bare

Soiling/soil build-up





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# Limestone-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Limestone-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

### Periodic Maintenance:

- Re-crystallize

### Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization

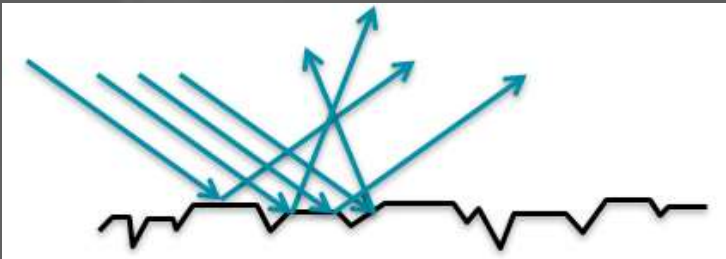
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# 3M FLOOR CARE GUIDE

## Limestone-Crystallization

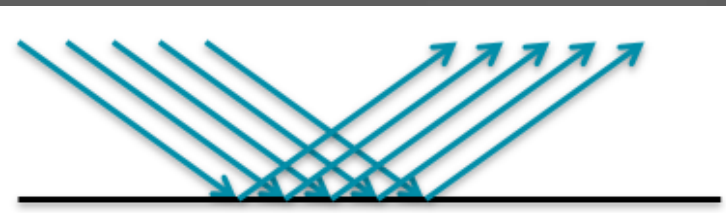
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# Limestone-Crystallization

Dulling





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# 3M FLOOR CARE GUIDE

## Limestone-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.



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# Limestone-Crystallization

Spalling



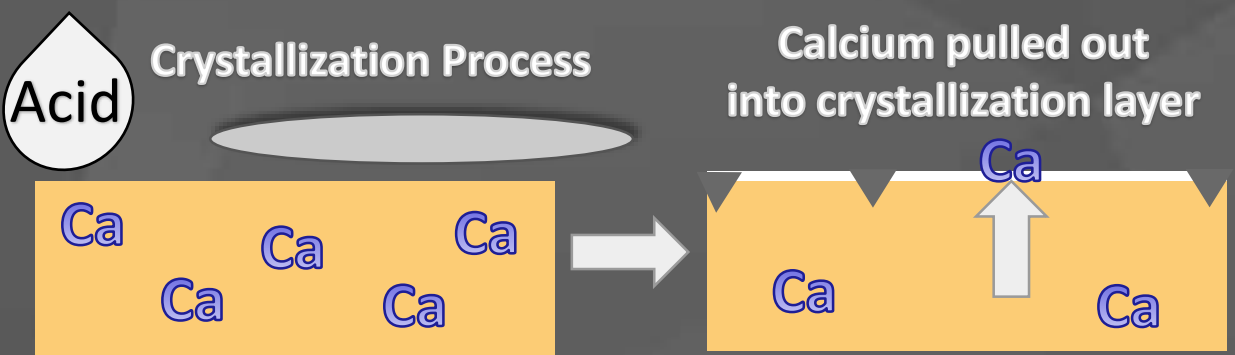
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# 3M FLOOR CARE GUIDE

## Limestone-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.



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# Limestone-Crystallization

Over-Crystallization





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## Limestone-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

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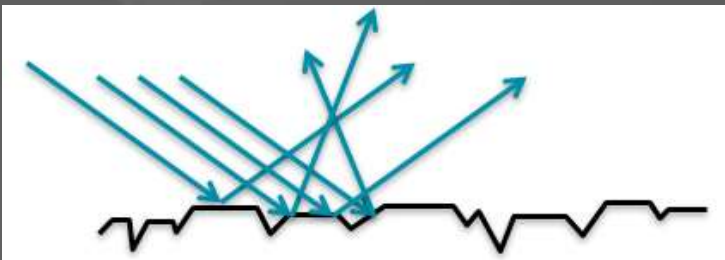
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## Limestone-Coated

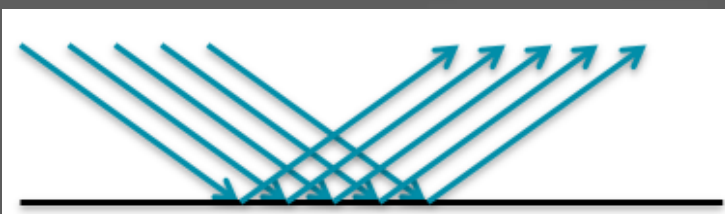
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# Limestone-Coated

Dulling



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# 3M FLOOR CARE GUIDE



## Limestone-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Limestone-Coated

Soiling



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# Limestone

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# Limestone-Impregnator

## Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up





# Limestone-Impregnator

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Limestone-Impregnator

Staining/etching

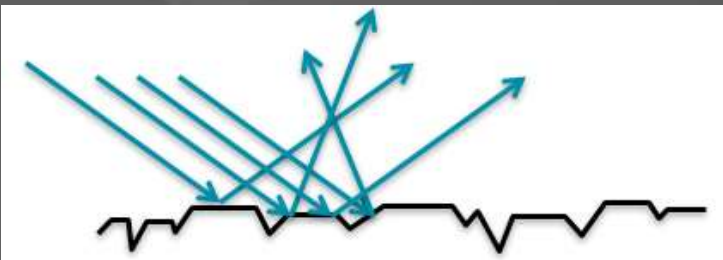




# Limestone-Impregnator

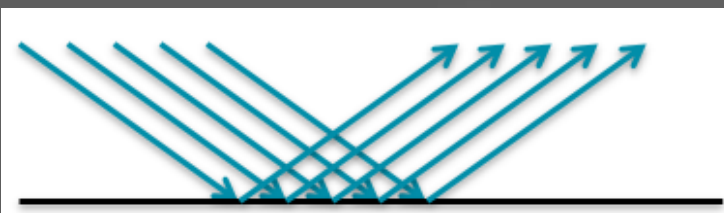
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# Limestone-Impregnator

Dulling/scratching







# Limestone-Impregnator

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
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Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

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# Limestone-Impregnator

Soiling/soil build-up



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# Limestone-Polishing Compound

- Most marble has been polished in the factories using various grades of abrasives followed by a final step using an abrasive in combination with oxalic acid ( $\text{H}_2\text{C}_2\text{O}_4$ ). This same process can also be done to refresh natural calcareous stone that has dulled over time.
- Most often, polishes are used with a red or natural floor pad under a 175rpm floor machine. The polishing compound is mixed with water and buffed with 175rpm floor machine. Floors with deeper scratches or other damage, typically must be diamond honed prior to using marble polishing products. The calcium oxalate ( $\text{CaC}_2\text{O}_4$ ) formed in the reaction is washed away with the slurry from the process leaving behind a smoothed and polished stone surface that has not been chemically altered, just highly polished.
- Note that the above does not mean that oxalic acid will not etch stone surfaces. Oxalic acid (and any acid) dropped on a marble surface will etch. Factory polishing and marble restoration are performed under controlled circumstances to reach desired results.

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# Limestone-Polishing Compound

## Polishing Compound

The polishing compound process leaves a highly polished surface when finished. There is no protection on the surface, making it susceptible to damage from abrasion and staining or etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be required if the floor is damaged or deeply scratched. The polishing compound process is re-done to bring a polish back to the stone.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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# Limestone-Polishing Compound

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# Limestone-Polishing Compound

Staining/etching

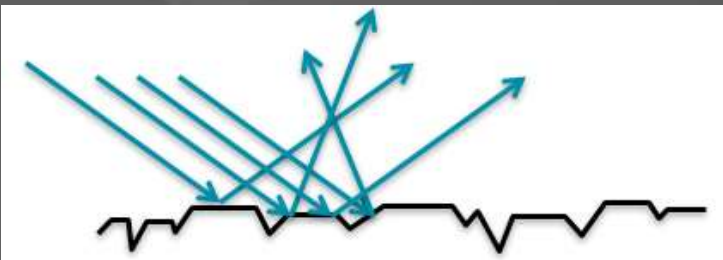




# Limestone-Polishing Compound

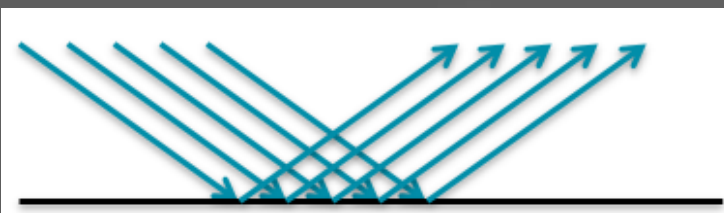
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# Limestone-Polishing Compound

Dulling/scratching







# Limestone-Polishing Compound

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- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Limestone-Polishing Compound

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



## Sandstone

Sandstone is a sedimentary rock formed from sand-sized grains of mineral, rock or organic material which have been cemented together to make a solid stone. Sandstone may have many distinct visible layers due to its varied composition.

**Physical traits:** Light tan-brown-red in color and will often have different shaded layers throughout. Will often have a smooth/matte look but can also be seen polished. Can sometimes see individual grains of sand. Very porous and will readily absorb water and stains very quickly. Because sandstone is made up of sand grains held together by a binder, it is only as strong as the binder. This results in a relatively soft rock that has a general Mohs hardness between 3-5.

**Chemical traits:** Acids can sometimes cause the binder in sandstone to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium carbonate.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Sandstone (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)



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# **3M** FLOOR CARE GUIDE



## Sandstone





## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Sandstone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- May fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

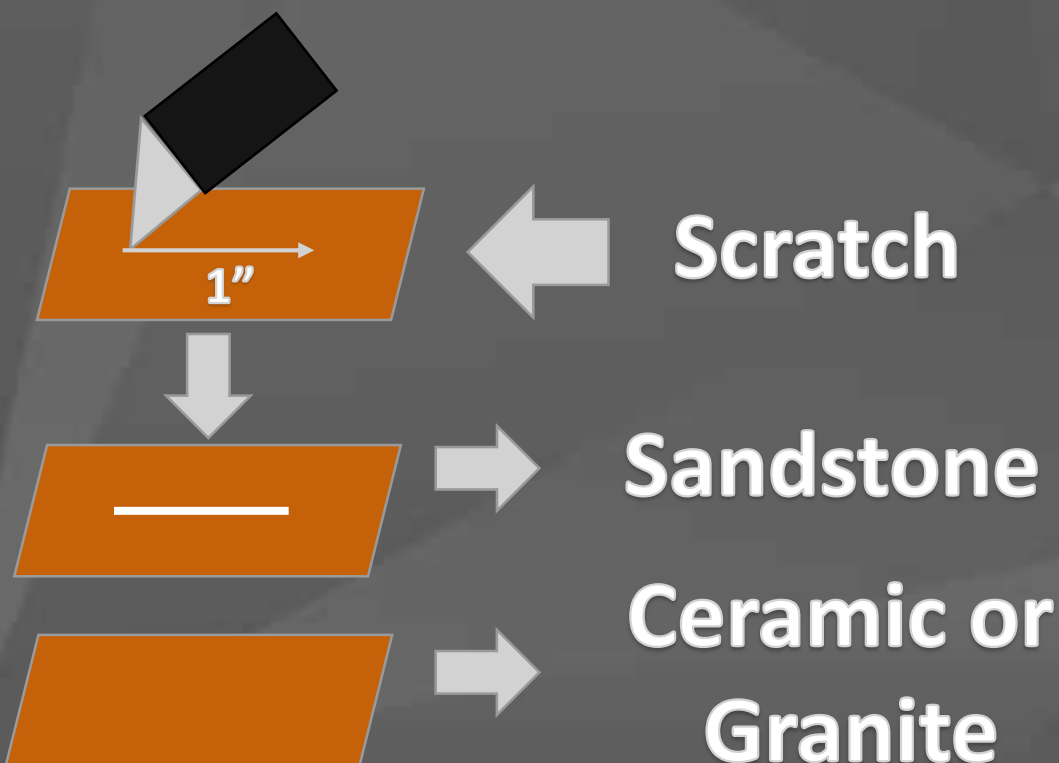
[Scratch Test](#)

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

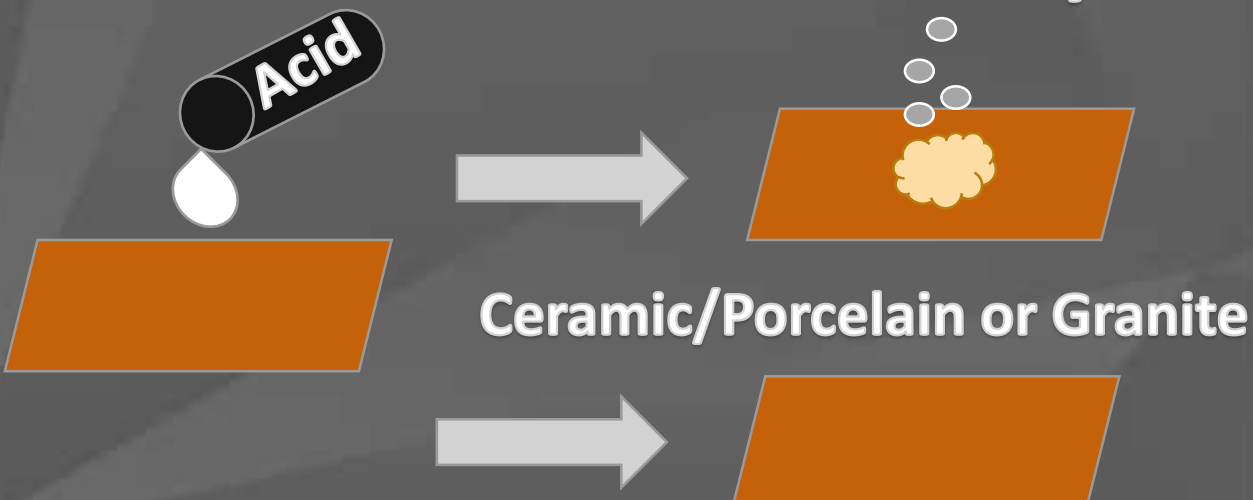
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Sandstone may fizz





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# Sandstone

Uncoated/Bare

Coated

Impregnator

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# Sandstone-Uncoated/Bare

## Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



# Sandstone-Uncoated/Bare

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Sandstone-Uncoated/Bare

Staining/etching





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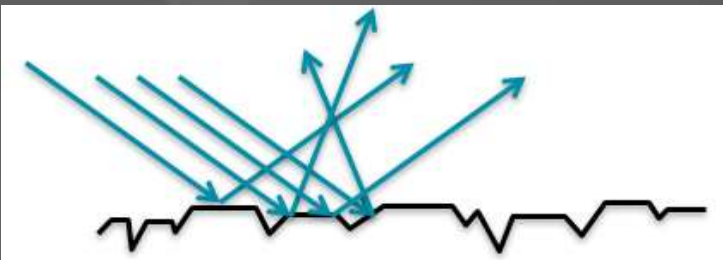
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## Sandstone-Uncoated/Bare

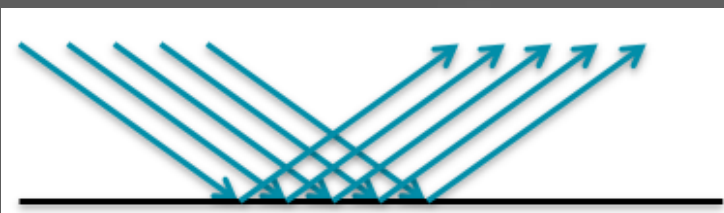
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Sandstone-Uncoated/Bare

Dulling/scratching



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# Sandstone-Uncoated/Bare

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Sandstone-Uncoated/Bare

Soiling/soil build-up





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## Sandstone-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

### Issues:

Dulling

Soiling

Common Coating Problems

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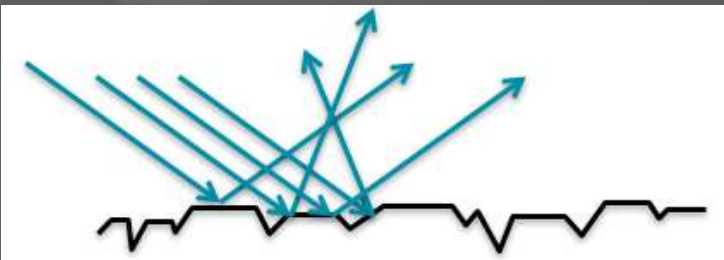
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## Sandstone-Coated

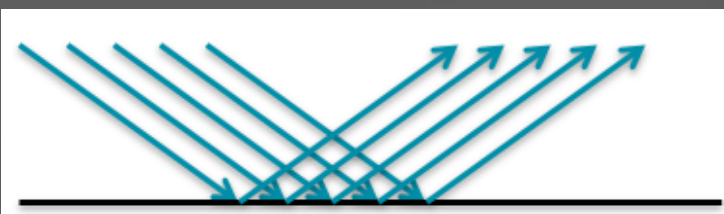
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# Sandstone-Coated

Dulling



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# 3M FLOOR CARE GUIDE



## Sandstone-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Sandstone-Coated

Soiling



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# Sandstone

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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# Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# Sandstone-Impregnator

## Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up





# Sandstone-Impregnator

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Sandstone-Impregnator

Staining/etching



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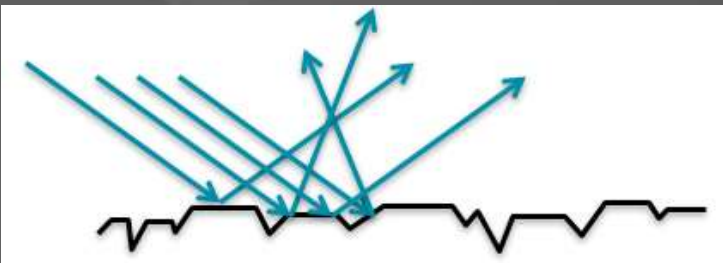
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## Sandstone-Impregnator

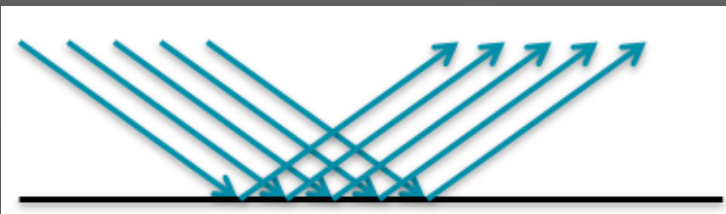
### Dulling/scratching

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# Sandstone-Impregnator

Dulling/scratching







# Sandstone-Impregnator

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

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  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
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# Sandstone-Impregnator

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



## Granite

Granite is an igneous rock that is formed from cooling magma below the Earth's surface. Because of the long time that it takes for the granite to cool, medium to large crystals can form in the granite that are visible to the human eye.

Physical traits: Most common colors fall into a few different categories; Salt & Pepper, pink-red & black/white, mostly white, and mostly black. Will have a smooth polished surface. Usually will have visible crystalline grains growing into others or overlapping other grains. Mohs hardness between 6-7.

Chemical traits: Because of granites crystalline structure and hardness, it is much less porous than other natural stones. It will however still absorb liquids and is susceptible to staining. Granite will not fizz under the presence of acid, but can still be damaged/etched by acid (especially more aggressive acids).

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)





# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

Granite (6-7)



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# 3M FLOOR CARE GUIDE



## Granite





## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Granite

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will not scratch from scratch test
- May fizz in acid test

**Acid Test**

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

**Scratch Test**

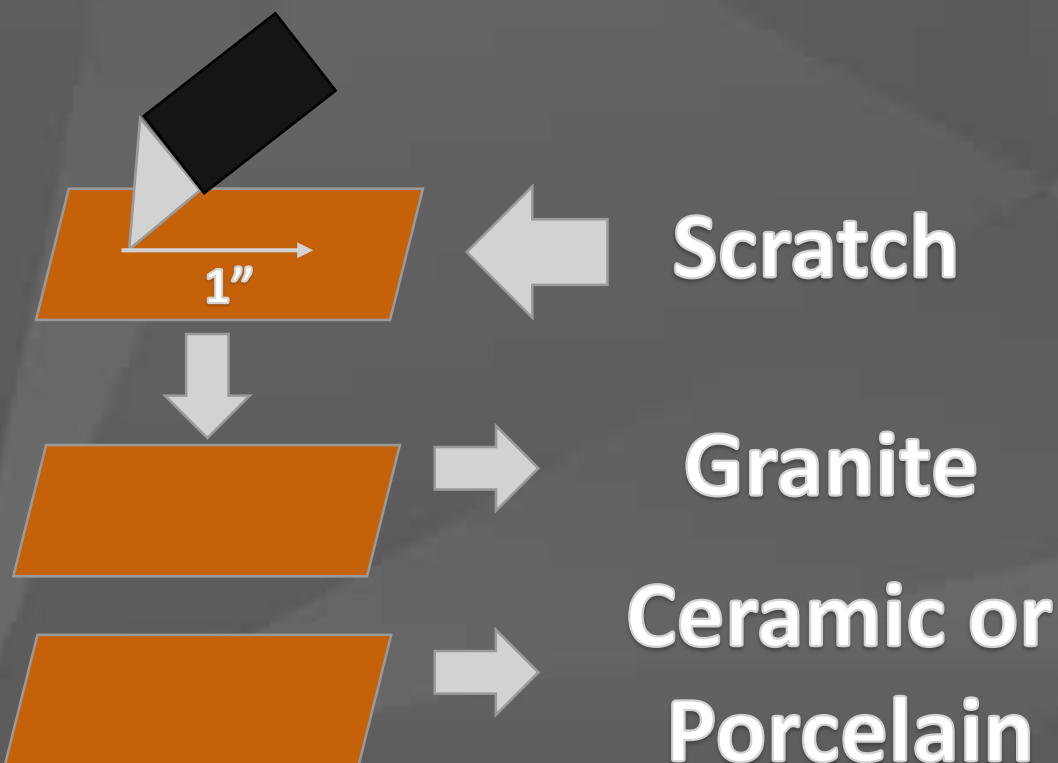


## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Granite may fizz**





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# Granite

Uncoated/Bare

Coated

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# Granite-Uncoated/Bare

## Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. Can be finished using a polishing compound to leave a high shine.

## Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Granite-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Granite-Uncoated/Bare

Staining/etching



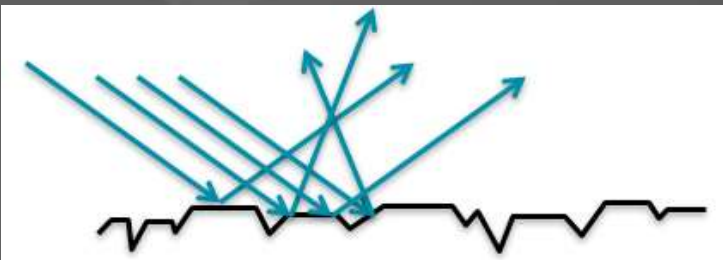


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## Granite-Uncoated/Bare

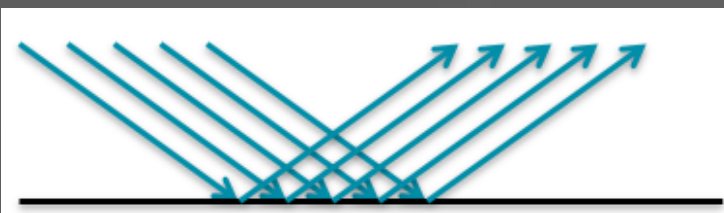
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Granite-Uncoated/Bare

Dulling/scratching





# Granite-Uncoated/Bare

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Granite-Uncoated/Bare

Soiling/soil build-up





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# Granite-Coated

## Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems

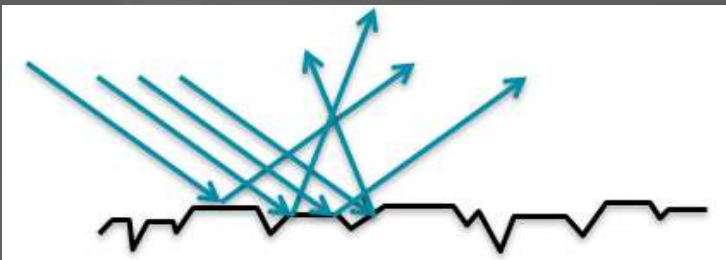
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# 3M FLOOR CARE GUIDE

## Granite-Coated

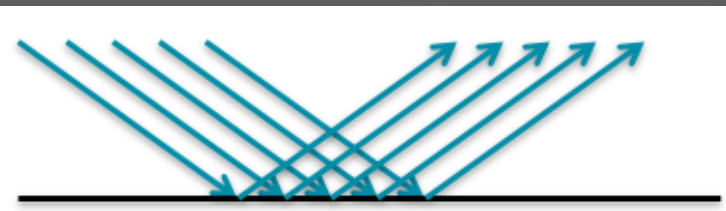
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# Granite-Coated

Dulling



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# 3M FLOOR CARE GUIDE



## Granite-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
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- Dust build up, especially along the baseboards
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- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Granite-Coated

Soiling



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# Granite

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# 3M FLOOR CARE GUIDE

## Granite-Impregnator

### Impregnator

Using an impregnator will provide some protection by preventing liquids from soaking into the bare stone immediately, giving an opportunity to clean up a stain before it penetrates. It however provides no protection against abrasion or traffic scratching. Therefore a proper matting system is important to keep as much possible sand/grit off the stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The impregnator must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up





# Granite-Impregnator

## Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Granite-Impregnator

Staining/etching



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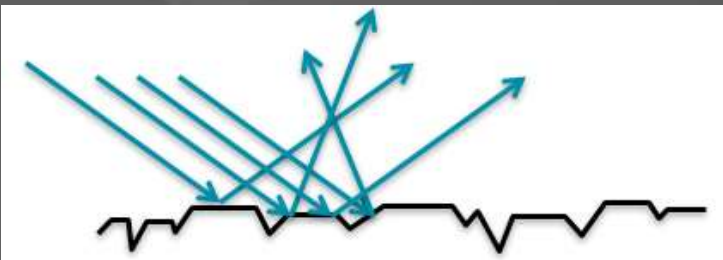
# 3M FLOOR CARE GUIDE



## Granite-Impregnator

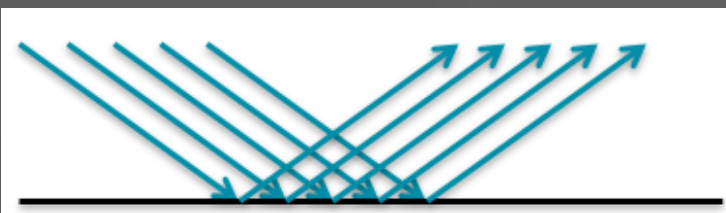
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# Granite-Impregnator

Dulling/scratching







# Granite-Impregnator

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
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# Granite-Impregnator

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



## Ceramic

Ceramic tile is made of clay that is fired at high temperatures to create a durable/rigid tile. As this tile is man-made, it may come in many different sizes and shapes.

Physical traits: Will have either a glazed surface (smooth and reflective) or an unglazed surface (rough and matte). The surface can have a broad amount of colors/patterns. Mohs hardness usually between 6-8.

Chemical traits: Resistant to most chemicals but the grout is susceptible to damage from acids if cementitious.

[Ceramic Test](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

Ceramic (6-8)



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Ceramic



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# 3M FLOOR CARE GUIDE

## Ceramic Test

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Natural Stone

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- Will fizz in acid test

[Acid Test](#)

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
- Will not fizz in acid test

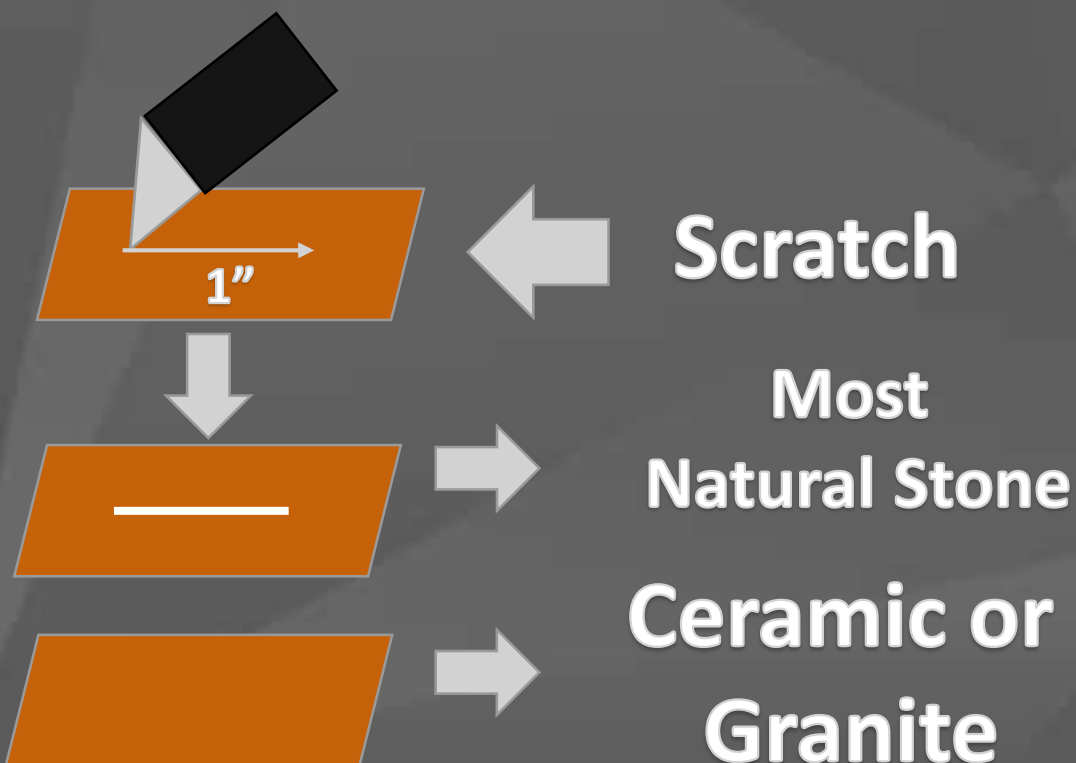
[Scratch Test](#)

## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

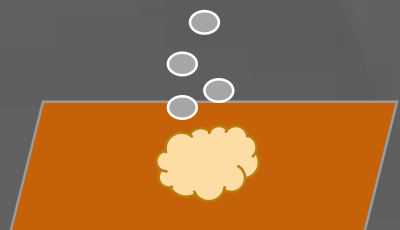
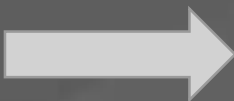
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

**Most Natural Stone**



**Ceramic or Porcelain**





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# Ceramic Tile

Uncoated/Bare

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# Ceramic Tile-Uncoated/Bare

## Uncoated/Bare

A proper matting system is important to keep as much possible sand/grit off the tile to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily.
- Damp mop or autoscrub with neutral cleaner/peroxide cleaner, or degreaser if in a food soil environment.

Clean up any spill as soon as possible, especially acids which may etch the grout lines.

## Issues:

### Soiling/soil build-up



# Ceramic Tile-Uncoated/Bare

## Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
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- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Ceramic Tile-Uncoated/Bare

Soiling/soil build-up





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# 3M FLOOR CARE GUIDE



## Slate

Slate is a metamorphic stone that is made of layered shale subjected to high heat and pressure. One drawback to this layered composition is that slate may break or flake at the surface. However, the bulk material is very durable with low water absorption, so it is commonly used in roofing tiles as well as indoor and outdoor flooring.

Physical traits: Color can vary from black-gray-green-purple-rust. Can have a rough/gritty texture or can be smooth with partial sheets exposed. Mohs hardness between 3-5.

Chemical traits: Relatively good moisture resistance compared to other stones but may still require an impregnator. Avoid highly acidic or alkaline cleaners.

[Possibly Ceramic?](#)[What's Mohs Hardness?](#)[Pictures](#)[Maintenance & Troubleshooting](#)



# Mohs Hardness Scale<sup>1</sup>

The Mohs Hardness Scale is a tool that was developed to test how hard, or resistant to scratching, a mineral is. This is useful for stone identification because all natural stones are made up of certain minerals. A mineral or item of a higher hardness will always scratch one of a lower hardness. For example marble (3-5) will be scratched if either a knife (5.5) or Quartz (7) are used to try and scratch the surface.

Slate (3-5)

Mineral	Hardness
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
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Fingernail (2.5)

Copper Penny (3.5)

Knife (5.5)

Steel Nail (6.5)

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Slate



## Possibly Ceramic?

With advancements in manufacturing processes, porcelain and ceramic are becoming harder to tell apart from natural stone. Below are a few ways to tell the difference:

### Slate

- Pattern on each tile will be completely random
- Tiles are cut and are identically sized, grout lines can be less than 1/8"
- Bare stone is porous and will absorb liquids
- Edges are usually 90°
- Cracks will appear along weak points in tile, usually random or jagged
- Will scratch from scratch test
- May fizz in acid test

**Acid Test**

### Ceramic/Porcelain

- Pattern will often be repeated and seen in multiple tiles
- Tiles are man-made and kiln fired, not identically sized. Grout lines are larger than 1/8"
- Non-porous, will not absorb liquids
- Edges are often rounded
- Cracks will be strait or rounded, but crack cleanly
- Will not scratch from scratch test
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**Scratch Test**

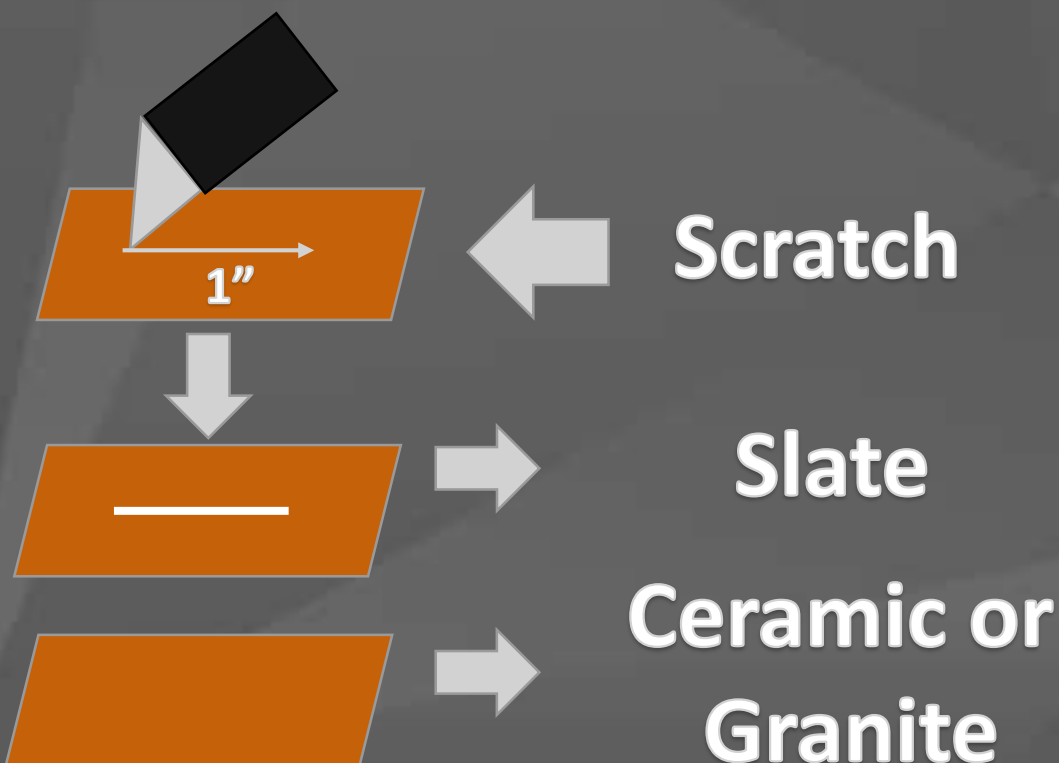


## Scratch Test

The scratch test is performed on bare stone only in order to be effective. A normal pocket or utility knife will have a Mohs Hardness of 5.5, resulting in the knife scratching the stone surface if it's Mohs hardness is lower than 5.5.

- Find an area close to the wall or in an inconspicuous area to perform the test.
  - Grasp the knife and make a 1" line on the stone surface. Use similar pressure as if you were writing with a pen.
  - If the surface scratches and stone dust appears, it is a natural stone with a hardness less than 5.5. If the surface does not scratch, it is most likely a man made ceramic/porcelain or a natural granite.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.



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# 3M FLOOR CARE GUIDE

## Acid Test

Using an acid can be a good way to find out if you are dealing with a calcium bearing stone (marble, limestone, travertine) or not. When placed on the bare stone, acid will react with calcium carbonate ( $\text{CaCO}_3$ ) to create  $\text{CO}_2$ , resulting in the acid to bubble and fizz.

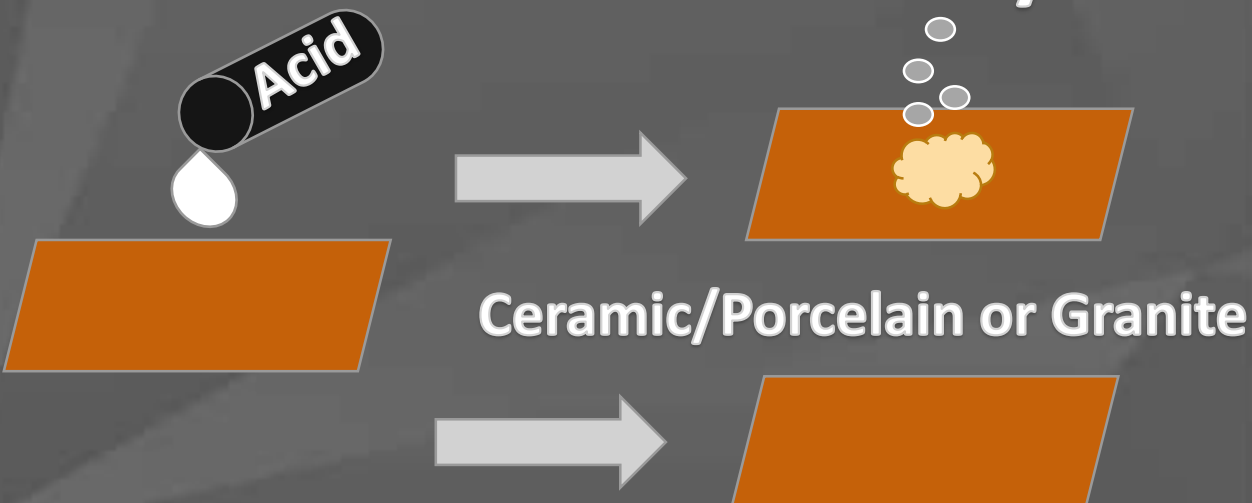
Common acids that can be used to test are:

- Acid bathroom cleaners
- Vinegar

If bubbling or fizzing occurs, the stone is a natural calcium bearing stone (Marble, Limestone, Travertine). Depending on the Calcium content; granite, shale, and sandstone may also fizz. Both ceramic and porcelain will not react when acid is applied.

The scratch and acid test can be helpful tools when trying to distinguish between natural stone and ceramic/porcelain.

### Slate may fizz



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## Slate

Uncoated/Bare

Coated

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Rectangle / Smaller than 12"x 24" / Textured

## Slate-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Issues:

Dulling/scratching

Soiling/soil build-up

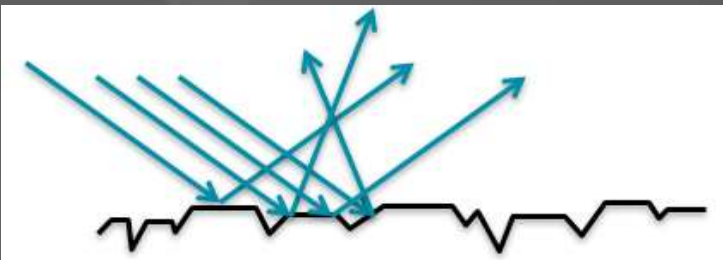




## Slate-Uncoated/Bare

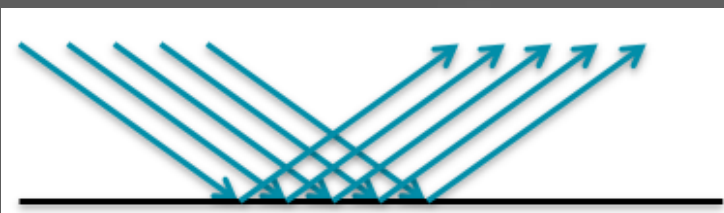
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Slate-Uncoated/Bare

Dulling/scratching



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## Slate-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Slate-Uncoated/Bare

Soiling/soil build-up





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# Slate-Coated

## Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

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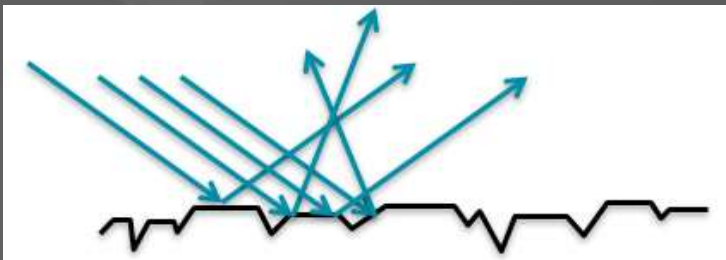
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## Slate-Coated

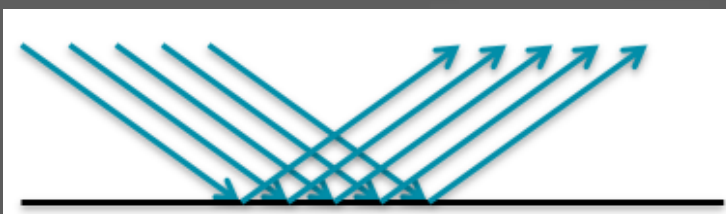
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The two most common ways to fix this are:

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- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Slate-Coated

Dulling



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# Slate-Coated

## Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Slate-Coated

Soiling



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# Slate

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.





# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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# Powdering

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Extremes in temperature and humidity (low humidity in particular).</li></ul>	<ul style="list-style-type: none"><li>• Ideal is 70°F &amp; 50% RH. Make sure HVAC is on. Use fans carefully.</li></ul>
<ul style="list-style-type: none"><li>• Old or very porous floor.</li></ul>	<ul style="list-style-type: none"><li>• Use of a sealer is recommended.</li></ul>
<ul style="list-style-type: none"><li>• Finish applied to a freshly stripped floor.</li></ul>	<ul style="list-style-type: none"><li>• Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.</li></ul>

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## Scuffing/Black Marking

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Coats are too heavy inhibiting proper curing.</li></ul>	<ul style="list-style-type: none"><li>• Wring mop head more to apply light-medium coats.</li></ul>
<ul style="list-style-type: none"><li>• Applying too many coats in 24 hour period.</li></ul>	<ul style="list-style-type: none"><li>• No more than 3-4 coats a day.</li></ul>
<ul style="list-style-type: none"><li>• Insufficient cleaning program in place.</li></ul>	<ul style="list-style-type: none"><li>• Change to a better suited pad or chemical for removal.</li></ul>

## Fish Eyes

Potential Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).</li></ul>	<ul style="list-style-type: none"><li>• Floor needs to be completely cleaned (stripped) and rinsed.</li></ul>

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# 3M FLOOR CARE GUIDE



## Terrazzo

Terrazzo can be classified into two main types: cement terrazzo and resin (often epoxy) terrazzo:

**Cement Terrazzo** – Made of 70% crushed stone chips (most often marble) and 30% cement. The stone chips and cement are mixed together and formed into precast tiles, polished, and packaged into sets. The tiles are then installed like other natural stone tiles, usually with a  $\frac{1}{4}$  -  $\frac{1}{2}$  grout line. Common sizes include 12"x 12", 24"x 24", 24"x 48"

**Resin(Epoxy) Terrazzo**- Made of 70% crushed aggregate (marble, granite, glass, sea shells) and 30% resin matrix. The stone chips and epoxy are mixed together and formed into precast tiles, polished, and packaged into sets. The tiles are then installed like other natural stone tiles, usually with a  $\frac{1}{4}$  -  $\frac{1}{2}$  grout line. Common sizes include 12"x 12", 24"x 24", 24"x 48"

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Epoxy





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Cement



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## Terrazzo

Uncoated/Bare

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## Terrazzo-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up



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## Terrazzo-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Terrazzo-Uncoated/Bare

Staining/etching



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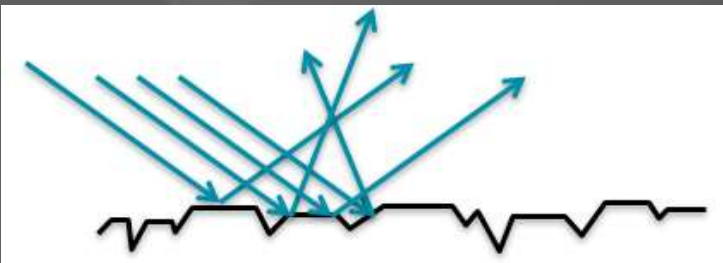


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## Terrazzo-Uncoated/Bare

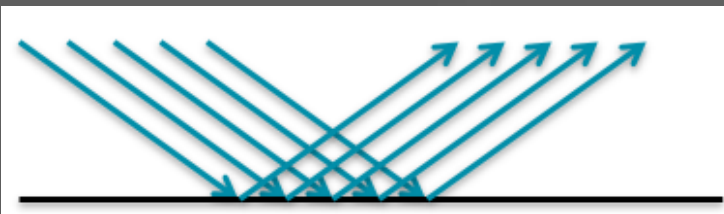
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Terrazzo-Uncoated/Bare

Dulling/scratching





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## Terrazzo-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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# Terrazzo-Uncoated/Bare

Soiling/soil build-up



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# Terrazzo-Crystallization

## Crystallization

- Crystallization is a process in which a steel wool pad is used in combination with a floor machine and acid solution to bring a polish to stone floors. The most common ingredients of crystallization chemicals are acid, a fluorosilicate, and water.
- In the crystallization process, acids react with calcium carbonate in the stone leaving calcium ions. Fluorosilicate molecules then react with these calcium ions forming a new surface layer composed of calcium fluorosilicates. The layer that is walked on is now bonded to the underlying stone. The surface of the stone has been chemically altered and there is no way to reverse the process. Note that this new surface of the stone is not a coating but is now part of the stone itself.
- The only way to remove a crystallized layer is through mechanical action such as diamond honing. Chemical strippers commonly used to remove acrylic coatings will not remove crystallization. The resulting layer of crystallization formed on the surface of the stone is harder, more glossy, and more stain resistant than the original stone surface.

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# Terrazzo-Crystallization

## Crystallization

A proper matting system is important to keep as much possible sand/grit off the crystallized stone to prevent scratching.

Daily Maintenance:

- Dust mop or vacuum daily
- Damp mop or autoscrub with neutral cleaner.

Periodic Maintenance:

- Re-crystallize

Restorative Maintenance:

- Diamond pads or grinding machines may be done in house or contracted out in order to prep the surface for a new series of crystallization.

## Issues:

Dulling

Spalling

Over-Crystallization



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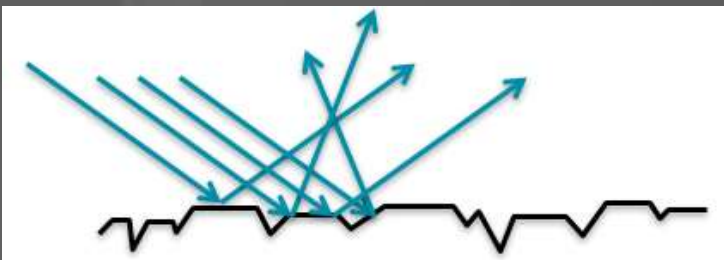


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## Terrazzo-Crystallization

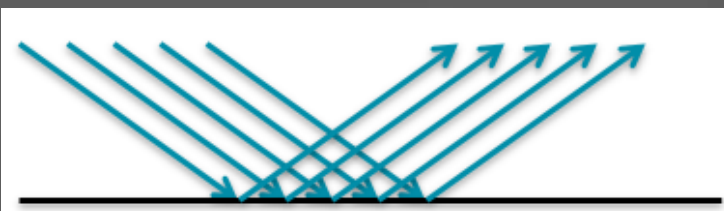
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Terrazzo-Crystallization

Dulling



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## Terrazzo-Crystallization

### Spalling

Spalling or flaking is a term used to describe when the surface of a natural stone cracks, flakes, and breaks apart. The top layer of crystallization does not allow ambient moisture in the stone to release, instead trapping it between the stone and the crystallization layer. As the moisture collects, pressure builds up until the stone can no longer hold, causing the surface to crack. If the damage is not too extensive, diamond grinding may be used to restore the damage. However, most often the damage is too extensive and the floor must be replaced.

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# Terrazzo-Crystallization

Spalling





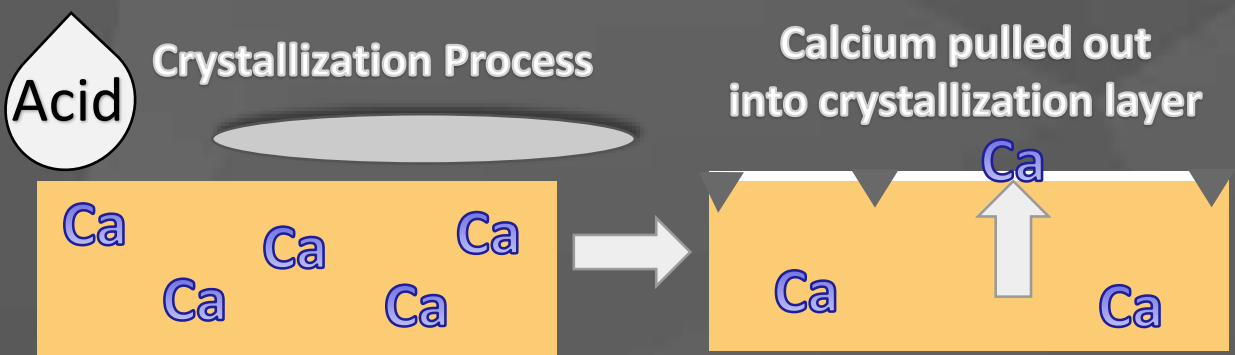
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## Terrazzo-Crystallization

### Over-Crystallization

Over-crystallization occurs when a floor is subjected to series after series of crystallization without any diamond honing in between. Each time crystallization is done, some of the calcium in the stone is drawn out and used to create the top crystallization layer. This combined with the damage from the acid will cause the stone to deteriorate over time. This will most often happen at the edges of tiles which is the most susceptible to cracking and breaking down. It may also happen in the calcium rich portions of marble, resulting in pitting or raised areas of veins. This damage can be lessened by regular intervals of diamond grinding in between crystallizations, but will not fully eliminate the possibility of damage. Often times the only way to repair the damage is to replace the floor/tiles entirely.

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# Terrazzo-Crystallization

Over-Crystallization



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## Terrazzo-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

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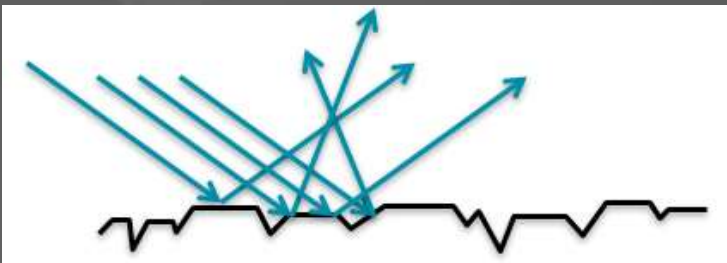
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## Terrazzo-Coated

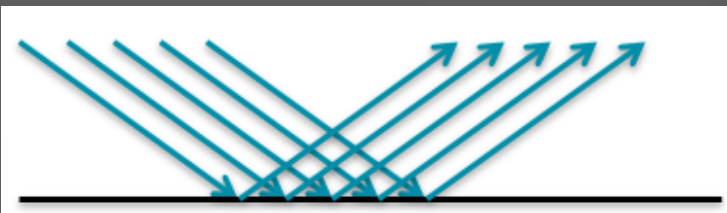
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# Terrazzo-Coated

Dulling



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# 3M FLOOR CARE GUIDE



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## Terrazzo-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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**Terrazzo-Coated**

Soiling





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# Terrazzo

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes





Slab/Pour / Not Textured

# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied

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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.



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# 3M FLOOR CARE GUIDE



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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.
- Applying too many coats in 24 hour period.
- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.
- No more than 3-4 coats a day.
- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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# 3M FLOOR CARE GUIDE



## Concrete

Concrete is a mixture of cement, aggregate, and water that has been combined into a slurry and poured. Once dry, it creates a very hard and durable floor. Concrete is very common and requires relatively low maintenance to maintain when compared to other natural stones. Can also have color stains mixed throughout the concrete or applied just to the top surface. Other options are to acid stain which can create a mottled look.

Physical traits: Light gray-gray-dark gray-white in color. May sometimes have visible round aggregate surrounded by a gray matrix if ground down. Because concrete varies so much (age, aggregate, matrix, additives) the hardness can widely vary. Uncoated concrete will scratch and powder if not properly protected.

Chemical traits: Acids will cause cement matrix to react (will fizz and possibly etch surface) due to a chemical reaction involving calcium.

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## Concrete



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**Concrete**

Uncoated/Bare

Coated

Densifier



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## Concrete-Uncoated/Bare

### Uncoated/Bare

When dealing with uncoated stone, a proper matting system is important to keep as much possible sand/grit off the bare stone to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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# 3M FLOOR CARE GUIDE



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## Concrete-Uncoated/Bare

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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## Concrete-Uncoated/Bare

Staining/etching





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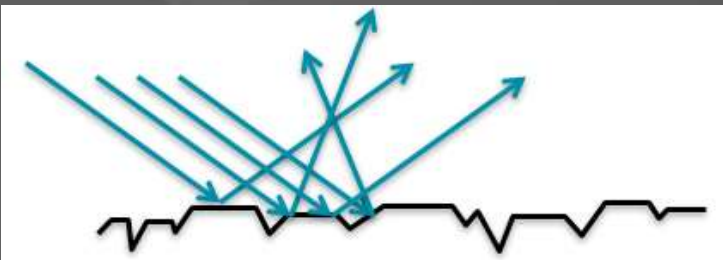


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## Concrete-Uncoated/Bare

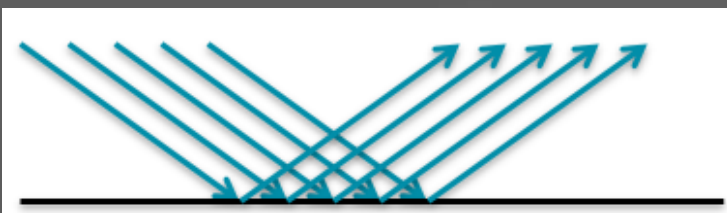
### Dulling/scratching

Dulling is often due to a large amount of small scratching that causes incoming light to reflect off the surface in random directions. This will often be seen as a lightening/whitening of the surface, less visible reflection of images, and visible scratching up close. This can be seen in the image below as light randomly reflects off of the scratches in the floor:



The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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## Concrete-Uncoated/Bare

Dulling/scratching



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# 3M FLOOR CARE GUIDE



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## Concrete-Uncoated/Bare

### Soiling/soil build-up

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Concrete-Uncoated/Bare

Soiling/soil build-up



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# 3M FLOOR CARE GUIDE



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## Concrete-Coated

### Coated

A proper matting system is important to keep as much possible sand/grit off the floor coating to prevent scratching.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Periodic:

- Burnish the floor coating with an appropriate pad
- Scrub the coating with the appropriate scrubbing pad and water. Apply 1-3 coats to scrubbed area.

#### Restorative:

- Chemically strip with the appropriate chemical and pad. Recoat the floor with the required number of coats for full protection.

## Issues:

Dulling

Soiling

Common Coating Problems



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# 3M FLOOR CARE GUIDE

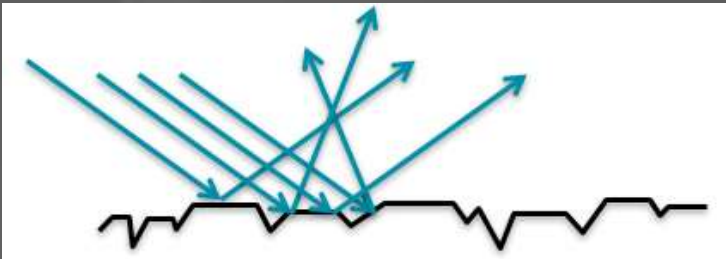


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## Concrete-Coated

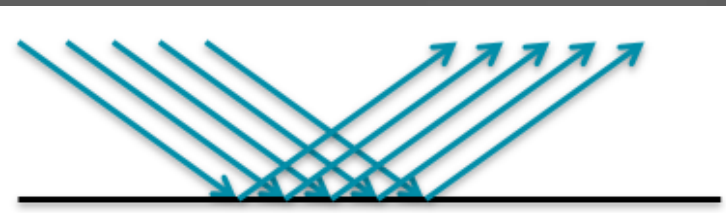
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The two most common ways to fix this are:

- 1.) Coat the stone with a topical coating that can fill in the scratching and result in a final smooth surface
- 2.) Polishing the surface to remove scratching resulting in a smooth final surface



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# Concrete-Coated

Dulling



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# 3M FLOOR CARE GUIDE



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## Concrete-Coated

### Soiling

Soiling is most often due to a current maintenance program that is not comprehensive enough to keep up with the incoming soil.

Common identifiers:

- Widespread brown/yellow soil color on the floor
- Smearing on the floor, often after cleaning
- Dust build up, especially along the baseboards
- Excessive marking and scuffing
- Grease build up from food soil

Solutions and possible causes:

Often the chemical being used is not strong enough or is not the correct type of chemical for the soil in the facility. In this case there will need to be an increase in either chemical or pad aggressiveness.

- Aggressiveness of chemicals as follows:
  - Water → neutral cleaner → general purpose cleaner → high alkaline cleaners
  - If there is grease or food soil present, a degreaser will often need to be used.
- Aggressiveness of the pad:
  - In some accounts, a white or red pad is not aggressive enough and a more aggressive pad may be needed to keep up with cleaning.

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## Concrete-Coated

Soiling





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# Concrete

## Common Coating Problems

Low Gloss/Poor Gloss

Streaking/Mop Lines/Poor Leveling

Finish Discolored/Yellowing/Sticky Floors

Powdering

Scuffing/Black Marking

Fish Eyes



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# Low Gloss/Poor Gloss

## Potential Causes

- Finish applied too thick.
- Not enough top coats applied.
- Additional coats applied too soon.
- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Dirty mop and/or bucket.
- Ammonia or bleach used in damp mopping.
- Fan used to dry finish.
- Extremes in temperature and humidity.

## Possible Solutions

- Wring mop head more to apply light-medium coats. Switch to flat mop.
- Scrub, rinse, recoat.
- Wait for each coat to dry completely.
- Floor needs to be completely cleaned (stripped) and rinsed.
- Use clean finish only mop, lined bucket. Strip, rinse well and apply new finish.
- Use only cleaners that are designed for the floor.
- Make sure fan is not blowing directly at floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.



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# Streaking/Mop Lines/Poor Leveling

## Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).
- Finish applied too thick.
- Dirty mop and/or bucket.
- Additional coats applied too soon.
- Fan used to dry finish.
- Extremes in temperature and humidity.
- Finish was old, contaminated, exposed to temperature extremes.

## Possible Solutions

- Floor needed to be completely cleaned (stripped) and rinsed.
- Wring mop head more to apply light-medium coats.
- Use clean finish only mop, lined bucket. Use separate mop for stripping and applying finish.
- Wring mop head more to apply light-medium coats. No more than 3-4 coats a day.
- Make sure fan is not blowing directly at the floor finish.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Examine finish (partially used, storage conditions, etc.). Strip, rinse well and apply new finish.



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# Finish Discolored/Yellowing/ Sticky Floors

## Potential Causes

- Solvent based cleaner.
- Damp mopped with dirty water and/or mops.
- Wrong cleaner, too much cleaner, or improperly diluted cleaner used.
- Build up of disinfectant cleaner.
- Extremes in temperature and humidity.
- Additional coats applied too soon.
- Too many coats applied in 24 hours

## Possible Solutions

- Switch to water based neutral cleaner.
- Use only clean mops and buckets. Change water frequently.
- Use only cleaners that are designed for the flooring according to manufacturing specifications.
- Periodically clean floor with neutral cleaner to help remove any buildup.
- Ideal is 70°F & 50%RH. Make sure HVAC is on. Use fans carefully.
- Wait until 15 minutes after coat is dry to the touch to recoat. No more than 3 to 4 coats a day.
- Reduce number of coats applied



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# 3M FLOOR CARE GUIDE



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## Powdering

### Potential Causes

- Extremes in temperature and humidity (low humidity in particular).
- Old or very porous floor.
- Finish applied to a freshly stripped floor.

### Possible Solutions

- Ideal is 70°F & 50% RH. Make sure HVAC is on. Use fans carefully.
- Use of a sealer is recommended.
- Allow adequate time to dry a stripped floor and make sure floor is water rinsed after stripping.

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## Scuffing/Black Marking

### Potential Causes

- Coats are too heavy inhibiting proper curing.

- Applying too many coats in 24 hour period.

- Insufficient cleaning program in place.

### Possible Solutions

- Wring mop head more to apply light-medium coats.

- No more than 3-4 coats a day.

- Change to a better suited pad or chemical for removal.

## Fish Eyes

### Potential Causes

- Floor contaminated and/or not properly cleaned and rinsed (greasy floor, soap film).

### Possible Solutions

- Floor needs to be completely cleaned (stripped) and rinsed.

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## Concrete-Densifier

### Impregnator

Using a chemical densifier will provide some protection by filling the surface pores, resulting in an increased surface density/hardness which in turn increases abrasion resistance. It however provides no protection against staining or acid etching. A proper matting system is important to keep as much possible sand/grit off the stone to prevent premature wear.

#### Daily Maintenance:

- Dust mop or vacuum daily, like matting this step is very important.
- Damp mop or autoscrub with neutral cleaner. Clean up any spill as soon as possible.

#### Restorative:

- Diamond pads or grinding may be done in house or contracted out in order to restore shine. The chemical densifier must be re-applied after.

### Issues:

Staining/etching

Dulling/scratching

Soiling/soil build-up

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## Concrete-Densifier

### Staining/etching

**Staining:** Staining can occur when any substance, usually liquid, penetrates into the stone and leaves behind a pigment or dye once it dries. [Common stains include: Wine, coffee, fruit juice, ink...etc.]. Once this occurs, there are only two ways to remove the stain.

- The surface must be abraded to high enough degree to remove all of the stone surface that holds the stain. By removing all of the stone that holds the stain, the stain is also removed.
- Sometimes the stain may be pulled out of the stone through the poultice process. This is a mix of a chemical and an absorbent material to form a paste that is then applied to the stain. This is left on the stain in an attempt to pull the stain out into the poultice.

**Etching:** Etching occurs when an acid comes in contact with the bare stone. The acid will begin to react with the stone, most often the calcium, causing damage. This damage can only be fixed by removing the damaged stone surface through grinding or honing. [Common acids include: Coffee, vinegar, acidic cleaners, bathroom cleaners...etc.]

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# Concrete-Densifier

Staining/etching



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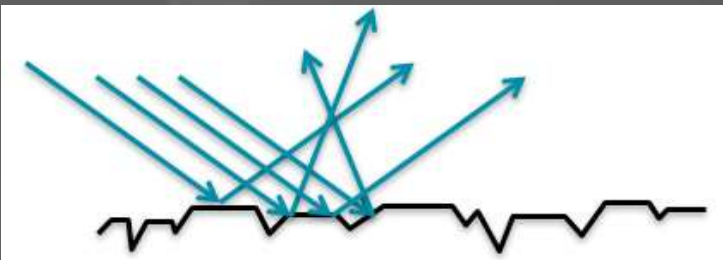


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## Concrete-Densifier

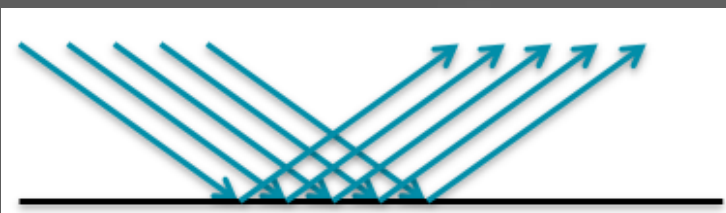
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# Concrete-Densifier

Dulling/scratching





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# 3M FLOOR CARE GUIDE



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## Concrete-Densifier

### Soiling/soil build-up

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## Concrete-Densifier

Soiling/soil build-up



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March 2020

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**3M™ Scotchgard™  
Stone Floor  
Protector Plus**

**3M™ Scotchgard™  
Stone Floor  
Protector**

**3M™ Trizact™  
Diamond TZ  
Abrasive**

**3M Floor Pads**



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**Scotch-Brite™  
Purple Diamond  
Floor Pad Plus**

**Scotch-Brite™  
Sienna Diamond  
Floor Pad Plus**

**Scotch-Brite™  
Surface  
Preparation Pad  
Plus**

**Scotch-Brite™  
Clean & Shine  
Pad**

**Scotch-Brite™  
Surface  
Preparation Pad**

**3M™ Tan  
Burnish Pad  
3400**

**3M™ High  
Productivity  
Pad 7300**

**3M™ Black  
Stripper Pad  
7200**

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## Citations

- <sup>1</sup> The Editors of Encyclopaedia Britannica. “Mohs Hardness.” Encyclopædia Britannica, Encyclopædia Britannica, Inc., 19 Apr. 2017, [www.britannica.com/science/Mohs-hardness](http://www.britannica.com/science/Mohs-hardness).