

MATERIAL CONSIDERATIONS

IMPERFECTION? OR PERCEPTION?

All materials – natural materials in particular – are perfectly imperfect.

Materials will have a wide range of characteristics (i.e. factory-repaired holes, cracks and fissures). There will be variation from piece to piece. Materials will stain, scratch, etch, patina and/or effloresce. And there's no such thing as a "perfect" installation.

ALL OF THIS IS PERFECTLY NORMAL AND IS PART OF THE INHERENT BEAUTY OF THE MATERIALS; THESE ARE NOT MATERIAL DEFECTS.

Our goal is to minimize surprises and help set realistic expectations. Our experience tells us that when clients know exactly what to expect, they are perfectly satisfied with their materials after installation. When they haven't been properly educated about what to expect, they perceive many characteristics as defects. This guide is designed to help you – the architect, designer, contractor, sub-contractor or client – understand and appreciate these inherent characteristics.

- **ACID ETCHING**

Surface erosion of natural stone.

- **CRACKING**

Tiles are cracking following installation.

- **EFFLORESCENCE**

A white or dark film appears on the surface of a material, generally found in exterior applications or wet areas.

- **FACTORY-FILLED HOLES**

Holes in the stone appears to have been filled with some kind of putty that is discolored.

- **FACTORY-REPAIRED CRACKS + FISSURES**

The stone appears to have a crack running across the surface, though it is smooth to the touch.

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- **LIPPAGE**

The floor appears to be uneven after installation.

- **PICTURE-FRAMING**

There appears to be a halo around the edge of the stone.

- **SCRATCHING**

Scratch marks and abrasions appear on the surface of the material.

- **STAINING**

There are wine, oil or grout stains on the surface of the stone.

- **VARIATION**

The final installation doesn't look like the sample.

- **SETTING EXPECTATIONS FOR NATURAL STONE**

IT'S CRITICAL TO KNOW WHAT TO EXPECT WITH NATURAL STONE PRIOR TO MAKING A SELECTION.

- **SETTING EXPECTATIONS FOR GLASS TILE**

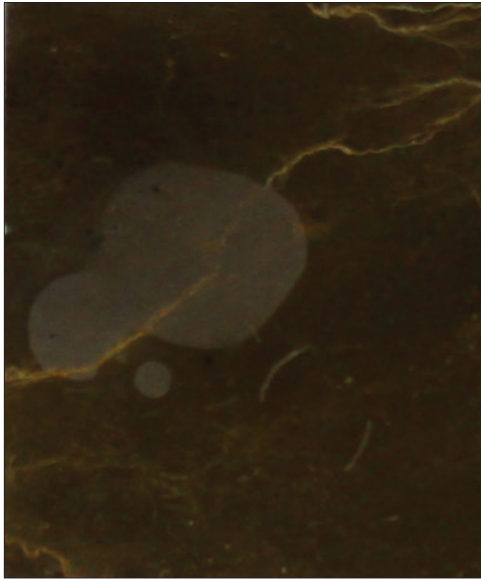
IT'S CRITICAL TO KNOW WHAT TO EXPECT WITH GLASS TILE PRIOR TO INSTALLATION

NEW YORK
BOSTON
CHICAGO
LOS ANGELES
NEW JERSEY
WASHINGTON DC

NATURAL STONE
PORCELAIN TILE
GLASS TILE
ENGINEERED STONE
RECLAIMED WOOD



MATERIAL CONSIDERATIONS



ACID ETCHING

Surface erosion of natural stone.

CAUSE:

Marble, travertine, limestone and onyx will react to acidic foods (i.e. lemons or tomatoes) and acidic liquids (i.e. some cleaners or acid rain). This reaction will result in a dulling in surface sheen and change in texture, otherwise referred to as “acid etching”.

HELPFUL TIPS:

- If etching is a concern, select a material with a Minimally Sensitive acid resistance rating, such as a quartzite.
- If etching is a concern, specify a light, honed surface which diminishes the visibility of acid etching.
- To remove an acid stain from a polished stone surface, use Fila Marble Restorer.



CRACKING

A split in the surface of the tile or slab.

CAUSE:

All hard surfaces are prone to cracking, but steps can be taken to minimize the likelihood of cracking and to ensure the longevity of the installation. Cracks in flooring applications are typically due to material being installed on an uneven sub-floor, the sub-floor shifting after installation, or due to the material not being able to withstand the traffic conditions in the space.

HELPFUL TIPS:

- A proper setting specification is imperative. For setting specifications, adhere to the TCNA Handbook for Ceramic, Glass and Stone Tile Installation and the MIA Handbook for all other stone installations and their allowable tolerances. Refer to these trade manuals for information pertaining to anti-fracture membranes, etc.
- Download the Product Spec Sheet from [STONESOURCE.COM](https://www.stonesource.com) prior to selecting a material to help anticipate the performance of the material in a space.

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EFFLORESCENCE

A white or dark film appears on the surface of a material, generally found in exterior applications or wet areas.

CAUSE:

Materials that are exposed to moisture may, over time, develop a white or dark film on the surface. Efflorescence in natural stone is caused by water carrying mineral salts from below the surface of the stone rising to the exposed face. In porcelain tile efflorescence appears on the surface of grout joints or unglazed tiles and is caused by moisture reacting with impurities in the mortar.

HELPFUL TIPS:

- Choose a material that is suitable for wet areas. Refer to the Usage Guide.
- For natural stone, if the installation is new, dust mop or vacuum the powder. You may have to do this several times. Do not use water to remove the powder; it will only temporarily disappear. If the problem persists, contact your installer to help identify and remove the cause of the moisture.
- For porcelain tile and natural stones with a Minimally Sensitive acid resistance rating, use Fila Deterdeck to clean the tiles.



FACTORY-FILLED HOLES

Holes in the stone appears to have been filled with some kind of putty that is discolored.

CAUSE:

Factories will often fill especially porous materials such as Basalt or Travertine with resin or cement. Exposure to UV rays in exterior applications will change the color of resin.

HELPFUL TIPS:

- Expect to see factory-filled holes in materials rated as Highly Absorbent as well as any Basalt or Travertine. The quality of the repair is dependent upon the factory of origin, the fabricator of the stone and the installer.
- If factory-fill is a concern, choose an unfilled material as an alternative.
- Do not use resin-filled material outside, as the resin will discolor over time. If materials must be filled for an exterior application, choose cement-filled as an alternative.

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FACTORY-REPAIRED CRACKS + FISSURES

The stone appears to have a crack running across the surface, though it is smooth to the touch.

CAUSE:

Factories will repair natural breaks in the material prior to crating it for shipment. Slabs are infused with resin which reinforces the strength of the stone.

HELPFUL TIPS:

- Expect to see factory-repaired cracks and fissures in nearly any natural material. The quality of the repair is dependent upon the factory of origin, the fabricator of the stone and the installer.
- Do not use resin-filled material outside, as the resin will discolor over time. If materials must be filled for an exterior application, choose cement-filled as an alternative.



LIPPAGE

The floor appears to be uneven after installation.

CAUSE:

Some tile installations will show lippage, or a difference in height from one installed tile to the next. This is often caused by uneven sub-floors or improper installation. It's important to note that all hard surfaces have allowable tolerances (i.e. a certain amount of lippage is to be expected in every installation). Lighting schemes can either accentuate or diminish the appearance of lippage. Lighting at oblique angles will make lippage more visible.

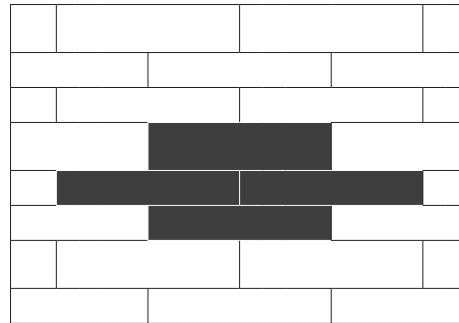
HELPFUL TIPS:

- A proper setting specification is imperative. For setting specifications, adhere to the TCNA Handbook for Ceramic, Glass and Stone Tile Installation and the MIA Handbook for all other stone installations and their allowable tolerances.
- Some patterns, such as a 50% off-set (or brick joint), accentuate the effects of material warpage and result in more lippage.

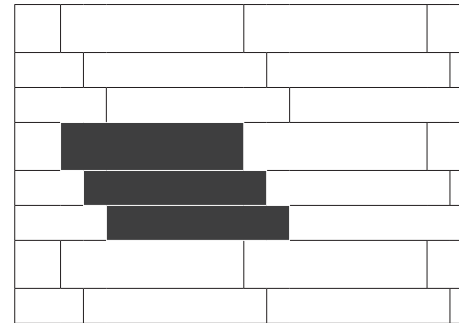
MATERIAL CONSIDERATIONS

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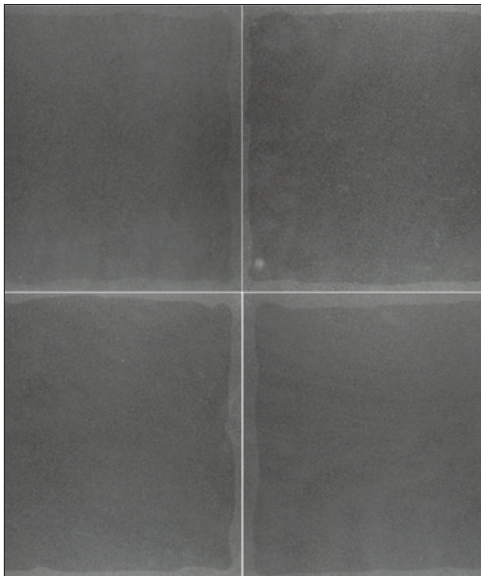
- A running bond pattern (with the offset not exceeding 33%) as well as widening the grout joint will make lippage less noticeable, though it won't eliminate it entirely.



BRICK JOINT



RUNNING BOND PATTERN



PICTURE-FRAMING

There appears to be a halo around the edge of the stone.

CAUSE:

Materials with Moderately or Highly Absorbent ratings are prone to the pigment of the grout leaching in from the edge of the stone. This creates a halo, otherwise referred to as "picture-framing".

HELPFUL TIPS:

- Always seal porous materials prior to grouting or use.
- Always use a grout that is similar in color to the stone to avoid a picture-frame effect.

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SCRATCHING

Scratch marks and abrasions appear on the surface.

CAUSE:

Light scratching occurs over time with exposure to sand and other abrasives. The finish will patina or dull over time as a result of this scratching.

HELPFUL TIPS:

- Choose a material with a Moderate to High Abrasion Resistance rating.
- If a material with a Low Abrasion Resistance rating is used, use walk-off mats at entrances and expect the material to patina rapidly.
- Always use a cutting board for countertop applications.
- Slight surface scratches may be buffed with dry lowest grit (0000 grit) steel wool.
- Deeper scratches and nicks in the surface of the stone should be repaired and re-polished by a professional.



STAINING

Wine, oil or grout stains on the surface of the stone.

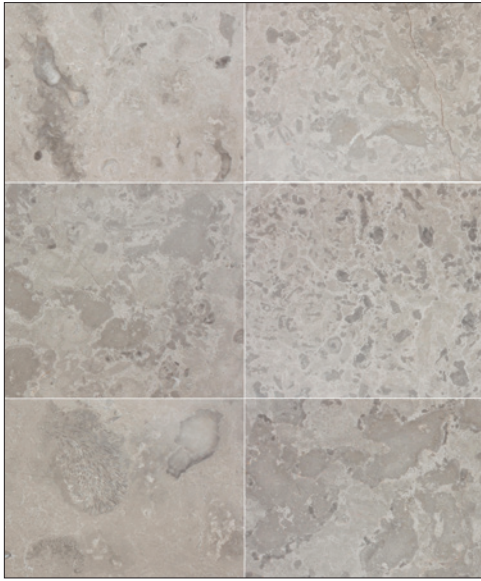
CAUSE:

Staining often occurs when the stone has high absorption rate and/or it has not been properly sealed. Staining is the residual effect of a spill that cannot be removed with dishwashing detergent.

HELPFUL TIPS:

- Choose a material with a Minimally Absorbent rating.
- Always seal stone prior to use.
- To reduce the appearance of staining, always wipe up spills immediately. Oil and highly-pigmented liquids can penetrate and stain the stone and may need poultice to remove the stain.
- For more detailed instructions on removing a stain, see the Care + Maintenance Guide.

MATERIAL CONSIDERATIONS



VARIATION

Materials vary in appearance from original sample and from piece to piece upon installation.

CAUSE:

As with any natural material, no two pieces of natural stone will be exactly alike. Color, as well as percentage, size and shape of markings, will always vary. Variation is not a material flaw.

HELPFUL TIPS:

- It is imperative that the end user understand the range for any given material. Prior to placing an order, ask your Stone Source Sales Consultant for approximate range samples. These are generally larger pieces and give a better idea of the color and veining typically found in the material.
- Prior to installation, and particularly with materials that feature a wide range of variation, Stone Source strongly suggests laying out stone and blending the variations from different crates.

MATERIAL CONSIDERATIONS: SETTING EXPECTATIONS FOR NATURAL STONE

IT'S CRITICAL TO KNOW WHAT TO EXPECT WITH NATURAL STONE PRIOR TO MAKING A SELECTION.

1. All natural stone has inherent characteristics; it is natural; and therefore always imperfect. (Or perfectly imperfect, depending upon your view.)
2. Some materials are easier to maintain than others. Be careful to consider these details prior to choosing your material. (Don't worry – your sales rep will help you.)
3. The appearance of natural stone will always patina over time. Without exception.
4. All natural stone should be set properly, sealed and maintained. This requires a well-researched setting, sealing and maintenance specification in order to avoid surprises.

BASALT

Basalt is a porous material with naturally-occurring holes that may remain unfilled or be factory-filled with resin or cement. Basalt will stain when exposed to oil and highly-pigmented liquids.

HELPFUL TIPS

- Do not use resin-filled material outside, as the resin will discolor over time. Choose cement-filled or unfilled materials as an alternative.
- Always seal this material prior to grouting or use.
- Always use a grout that is similar in color to the stone to avoid a picture-frame effect.
- To reduce the appearance of staining in kitchen countertop applications, always wipe up spills immediately. Oil and highly-pigmented liquids can penetrate and stain the stone and may need poultice to remove the stain.

GRANITE

Some granites have higher absorption and/or lower abrasion resistance than may be expected. Some granites are resin-treated to enhance the color and fortify the surface of the stone.

HELPFUL TIPS

- Always check the absorption rating.
- Always check the abrasion resistance rating.
- Always seal this material prior to use.
- Do not use resin-filled material outside, as the resin will discolor over time.
- Fabricators will often need to resin-treat the exposed edges to match the surface of the material.

MATERIAL CONSIDERATIONS: SETTING EXPECTATIONS FOR NATURAL STONE

LIMESTONE

All limestones will acid etch when exposed to acidic foods such as lemons or tomatoes. Most limestones have high absorption ratings and low abrasion resistance ratings. In general, light-colored limestone is difficult to maintain in flooring applications with heavier traffic, gray limestone tends to effloresce in wet areas, and black limestone tends to show more scratching.

HELPFUL TIPS

- Do not use limestone for kitchen countertop applications.
- Always seal limestone prior to grouting or use.
- Always check the absorption rating.
- Always check the abrasion resistance rating. For limestone with a lower abrasion resistance rating, use walk-off mats at entrances and expect the material to patina rapidly.
- Always use a grout that is similar in color to the stone to avoid a picture-frame effect.
- To better understand which limestones may be used in wet areas, refer to the Usage Guide.
- Always use a neutral detergent to clean limestone.
- If maintenance is an issue, choose a limestone with a lower absorption rating and higher abrasion resistance.
- To reduce the appearance of staining, always wipe up spills immediately. Oil and highly-pigmented liquids can penetrate and stain the stone and may need poultice to remove the stain.

MARBLE

All marble will acid etch when exposed to acidic foods such as lemons or tomatoes. Most marble has a moderate absorption rating and will stain when exposed to oil and highly-pigmented liquids. Most marble has a low abrasion resistance rating; it is likely to scratch. Most marble has naturally occurring cracks and fissures. In general, light-colored marble is difficult to maintain in flooring applications with heavier traffic and dark marble tends to show more scratching.

HELPFUL TIPS

- Always seal marble prior to use.

- To reduce the appearance of etching in kitchen countertop applications, choose a honed, white marble with a low-moderate absorption rating.
- To reduce the appearance of staining, always wipe up spills immediately. Oil and highly-pigmented liquids can penetrate and stain the stone and may need poultice to remove the stain.
- Always use a neutral detergent to clean marble.
- Always check the abrasion resistance rating. For marble with a lower abrasion resistance rating, use walk-off mats at entrances and expect the material to patina rapidly.
- If acid etching is an issue, choose a material with minimal acid sensitivity rating, such as quartzite or granite.
- Expect to see factory-repaired cracks and fissures. The quality of the repair is dependent upon the factory of origin, the fabricator of the stone and the installer.

ONYX

All onyx will acid etch when exposed to acidic foods such as lemons or tomatoes. Most onyx has a moderate absorption rating and will stain when exposed to oil and highly-pigmented liquids. All onyx has a very low abrasion resistance rating; it will scratch, stain and crack. All onyx has naturally occurring cracks and fissures.

HELPFUL TIPS

- Onyx must be handled with extreme care in both fabrication and installation.
- Onyx is suitable for interior wall applications, not for floors. Onyx is sometimes used on vanities and other non-food service countertops; in these instances, the end user must be made aware of its acid sensitivity and fragility.
- Always use a neutral detergent to clean onyx.
- Expect to see factory-repaired cracks and fissures. The quality of the repair is dependent upon the factory of origin, the fabricator of the stone and the installer.

MATERIAL CONSIDERATIONS: SETTING EXPECTATIONS FOR NATURAL STONE

QUARTZITE

Due to the incredibly high abrasion resistance of quartzite it can be difficult to quarry and fabricate. This affects availability, fabrication lead times and cost. Some quartzites have high absorption ratings and will stain when exposed to oil and highly-pigmented liquids. Most quartzite has naturally occurring cracks and fissures.

HELPFUL TIPS

- Always seal quartzite prior to use.
- Always check the absorption rating.
- Expect to see factory-repaired cracks and fissures. The quality of the repair is dependent upon the factory of origin, the fabricator of the stone and the installer.

SANDSTONE

All sandstones have high absorption ratings and medium abrasion resistance ratings; it will stain when exposed to oil and highly-pigmented liquids. Due to its absorbency and mineral make-up, sandstone has a tendency to warp during installation.

HELPFUL TIPS

- Always seal sandstone prior to grouting or use.
- Always check the absorption rating.
- Always use a grout that is similar in color to the stone to avoid a picture-frame effect.
- To reduce the appearance of staining, always wipe up spills immediately. Oil and highly-pigmented liquids can penetrate and stain the stone and may need poultice to remove the stain.
- To prevent warpage, use a rapid setting adhesive such as GraniRapid from Mapei or similar.

SCHIST

All schists have a moderate absorption rating and will stain when exposed to oil and highly-pigmented liquids. All schists have a low abrasion resistance rating and are likely to scratch.

HELPFUL TIPS

- Always seal schist prior to grouting or use.
- Always use a grout that is similar in color to the stone to avoid a picture-frame effect.
- To reduce the appearance of staining, always wipe up spills immediately. Oil and highly-pigmented liquids can penetrate and stain the stone and may need poultice to remove the stain.
- Use walk-off mats at entrances and expect the material to patina rapidly.

SLATE

All slates have a moderate absorption rating and will stain when exposed to oil and highly-pigmented liquids. All slates have a low abrasion resistance rating and are likely to scratch.

HELPFUL TIPS

- Always seal slate prior to grouting or use.
- To reduce the appearance of staining, always wipe up spills immediately. Oil and highly-pigmented liquids can penetrate and stain the stone and may need poultice to remove the stain.
- Use walk-off mats at entrances and expect the material to patina rapidly.

MATERIAL CONSIDERATIONS: SETTING EXPECTATIONS FOR NATURAL STONE

TRAVERTINE

Travertine is a porous material with naturally-occurring holes that may remain unfilled or be factory-filled with resin or cement. All travertines will acid etch when exposed to acidic foods such as lemons or tomatoes. All travertines have high absorption ratings and low abrasion resistance ratings.

HELPFUL TIPS

- Do not use resin-filled material outside, as the resin will discolor over time. Choose cement-filled or unfilled materials as an alternative.
- Fabricators will often need to resin-fill the exposed edges to match the filled surface of the material.
- Do not use travertine for kitchen countertop applications.
- Always seal travertine prior to grouting or use.
- Use walk-off mats at entrances and expect the material to patina rapidly.
- Always use a grout that is similar in color to the stone to avoid a picture-frame effect.
- Always use a neutral detergent to clean travertine.
- To reduce the appearance of staining, always wipe up spills immediately. Oil and highly-pigmented liquids can penetrate and stain the stone and may need poultice to remove the stain.

MATERIAL CONSIDERATIONS: SETTING EXPECTATIONS FOR GLASS TILE

GLASS TILE

All glass tiles will crack if not properly installed. Material will expand and contract when exposed to different temperatures found in shower areas. Movement (due to building sway, settling foundations, vibrations occurring in areas near elevator shafts, etc.) can also cause cracking. Larger-format glass is more prone to cracking than smaller-format.

HELPFUL TIPS

- Be sure that the wall has the proper gauged support studs and that they are braced correctly.
- Set the appropriate grout joints. Wider grout joints must be used with large format glass tiles. Tiles will crack if the grout joints are not wide enough.
- Refrain from putting glass in contact with metal (i.e. faucets, handles, shower frame). Any glass to metal contact will cause the tiles in contact with the metal to crack.
- Use the proper adhesive. Different applications require different adhesives. Installers should refer to the TCNA handbook.
- Backs of tiles must be fully covered in adhesive (back-buttered) during installation. Otherwise, tiles will crack.
- Level and plumb the wall prior to installing glass. An unlevel surface will create tension across the wall, which will cause tiles to crack.
- Installers should always refer to the Tile Council of North America (TCNA) Handbook.
- In addition, each series of glass tile available through Stone Source has specific manufacturers' guidelines. Please be sure to refer to the appropriate page for Installation & Maintenance instructions.