SECTION 04700 – MANUFACTURED STONE VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manufactured stone masonry veneer and application materials.

B. Related Sections:
   1. Include in this area any sections that relate to your project
   2. Section 05 and/or 06 specifying weather resistant barrier over framed walls
   3. Section 07 specifying flashing materials
   4. Section 09 specifying Portland cement plastering
   5. Section 10 specifying fireplaces and stoves

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM C39: Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
   2. ASTM C91: Standard Specification for Masonry Cement
   3. ASTM C144: Standard Specification for Aggregate for Masonry Mortar
   4. ASTM C150: Standard Specification for Portland Cement
   5. ASTM C270: Standard Specification for Mortar for Unit Masonry
   6. ASTM C979: Standard Specification for Pigments for Integrally Colored Concrete

1.3 SUBMITTALS

A. Product Data: Manufacturer's product sheet for specified products and manufacturer's installation instructions.

B. Samples: Furnish one (1) sample measuring at least 12" x 12" for verification of finish, color, and texture.

1.4 QUALITY ASSURANCE

A. Qualifications of Manufacturer:
   1. **Experience:** Minimum production experience of eight consecutive years.
   2. **Capacity:** Adequate plant capacity to furnish quality, sizes, and required quantity of manufactured stone without delaying progress of the project.
   3. **Scope:** Documented evidence of successfully manufacturing stone for projects requiring more than 10,000 feet of flats and corners.
   4. **Documentation:** Customer references available to confirm that products have been used, are of sufficient quality, and have been exposed to normal weather conditions without inordinate deterioration.

B. Installer's Qualifications:
   1. Minimum experience: Five years, in similar types of work of similar scope.
   2. Documentation: Able to furnish a portfolio of completed projects and customer references.

C. Mock-Ups: Erect field sample(s) to illustrate field pattern of stone, cutting of units where required, and color and tooling of joints.

1.5 WARRANTY

A. Provide minimum 50-year Warranty against manufacturing defects.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect manufactured stone materials from damage and staining.

B. Store clear of the ground on non-staining pallets or planking.

C. Store mortar and other moisture-sensitive materials in protected enclosures.

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Maintain materials and ambient temperature in installation area at a minimum of 40 degrees Fahrenheit prior to, during, and for at least 48 hours following installation.

B. Cold Weather Requirements: IMIAC (International Masonry Industry All-Weather Council) Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Impressions in Stone: 1415 South Joplin Avenue, Tulsa, OK 74112; Contact: Dagan Heaps; Phone: (918) 828-9745; FAX: (918) 384-0695.

2.2 STONE MATERIALS

A. Manufactured Stone Product Specifications:
1. Texture: *This is where you will insert the selected stone style, such as "Ledgestone". This can include a mix of stone styles if required.*
2. Color: *This is where you will insert the selected color scheme, such as "Tuscany". This can include a mix of custom selected colors if required.*

B. Manufactured Stone Ingredient Materials:
1. Type I or Type III Portland Cement, ASTM C150
2. Light-weight aggregate
3. Iron oxide pigment colors, ASTM C979
4. Clean, clear water, free from deleterious substances

C. Manufactured Stone Physical Properties:
1. Compressive Strength: Not less than 2000 psi per ASTM C39
2. Shipping Weight: Not more than 15 lbs per square foot

2.3 RELATED MATERIALS

A. Job-mixed Mortar Components:
1. Type S Masonry Cement, ASTM C91
2. Masonry sand, ASTM C144
3. Iron oxide pigment colors, ASTM C979
4. Clean, clear water, free from deleterious substances

B. Setting Accessories:
1. Moisture Barrier: Minimum 15-lb asphalt-saturated felt paper
2. Metal Lath: Minimum 2.5 gauge galvanized expanded metal lath
3. Fasteners: Galvanized nails, concrete nails or screws, or corrosion-resistant self-tapping metal screws in accordance with manufacturer's instructions relative to project substrate materials
4. Sealer: High-quality, breathable-type masonry sealer

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify that items provided by other Sections of work are available and properly located.

C. Examine surfaces and adjacent areas in which work under this Section is to be performed. Report in writing to the General Contractor and/or Architect prevailing conditions that may adversely affect satisfactory execution of work. Do not proceed with work until unsatisfactory conditions have been corrected.

D. Starting work constitutes acceptance of the existing conditions. Contractor shall then be responsible for correcting all unsatisfactory and defective work encountered at Contractor's expense.

E. Ensure that no other work is performed on the walls being covered with Manufactured Stone Veneer for at least 48 hours following installation.

F. Protect surrounding areas from possible damage during installation work.

3.2 MORTAR MIX

A. Type S Masonry Cement should be used to attach stones to prepared work surface. Either Type S or Type N Masonry Cement may be used for grout work at Contractor's discretion.

B. Mix materials in accordance with manufacturer's instructions. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270.

C. Do not use antifreeze compounds.

3.3 INSTALLATION

A. Follow manufacturer's printed installation instructions.

B. Surface Preparation:
1. Apply a scratch coat of masonry mortar to the prepared work surface and allow to set overnight. Score the wet scratch coat with a scarifier or similar tool prior to setting.
2. In hot and/or dry work environments, dampen substrate scratch coat and the back of each stone unit with clean water prior to setting the unit.

C. Stone Setting:
1. Plan work to minimize job site cutting of stone units. Perform necessary cutting with appropriate cutting tools utilizing a masonry diamond blade. Angle cuts so as to minimize the exposure of the aggregate within the stone unit. Orient cut stone units so as to minimize the view of the exposed aggregate within the observer's visual field.
2. Apply 3/8 inch of mortar to the back of each stone unit.
3. Press the stone unit firmly into position. Jiggle each piece slightly to ensure firm bonding. This action should cause mortar to extrude slightly around the edges of the stone unit.
4. Remove excess mortar from the joint area.
5. Brush away excess mortar from the face of stone units just after the mortar has set. Do not allow mortar to remain on face of units beyond 4 hours of installation.
6. Install outside corner stone units with short and long legs alternated.
7. Place units with uniform mortar joints not to exceed ¾ inch in width.
8. Fill the joints with mortar using a grout bag or other grouting tool to the desired depth.
9. Point and tool the joints before the mortar has completely set.

D. Cleaning and Sealing:
1. Clean manufactured stone surface in accordance with manufacturer's instructions.
2. Leave surfaces thoroughly clean and free of mortar and other soiling.
3. Protect finished work from damage during remainder of construction period.
4. Apply sealer in accordance with manufacturer's recommendations.

3.4 INSPECTION

A. Color and Texture Acceptance: Equal to approved sample when viewed in daylight at 10 feet.

B. Repair and Imperfection Acceptance: Not discernible when viewed in daylight at 20 feet.

END OF SECTION

PRODUCT SPECIFICATIONS FOR QUICKFIT

Product Description

The QuickFit product is designed to give wall surfaces the look of Ledgestone in an easy-to-install, panelized unit. It is comprised of rectangular units that contain two or more stone "impressions", and they are set in a uniform pattern with no grout line. The product is made by preparing a mixture of Portland cement, lightweight aggregate, water, and iron oxide color pigments. This mixture is then poured into molds and allowed to set overnight. Once the product is removed from the molds, it is allowed to cure for several days prior to shipment.

Product Sizing

Individual flat stone units are sized at 4" in height and either 8", 10", 12", or 14" in length. Individual corner stone units are generally sized 11" along the long leg, 3.5" along the short leg, and 4" in height. Stone units average 1¼" in thickness, but may range from 1" to 1¾" at the extremes.

Available Colors

The QuickFit product style is available in a limited selection of colors. The end-user must specify project-specific color selections.

Mortar Joint Options

The QuickFit product does not require a grout joint. It is always "drystacked". While a mortar joint could potentially be used, it would essentially defeat the purpose of the panelized unit.

Packaging

Stone units are provided via shrink-wrapped pallets containing anywhere from 15 to 160 square feet of finished product. For small orders, color scheme elements may be interlaced at random or may be found in more or less distinct layers on the pallet(s). For large orders, color scheme elements are generally segregated with only one color per pallet.

Installation Tips & Techniques

The installation professional should contact Impressions in Stone prior to beginning work to discuss the color scheme prescribed by the end-user. In particular, the installation professional must learn the ratios of each element of the color scheme to achieve the desired final look. With the QuickFit style, it is important to avoid introducing a "wavy" pattern into the wall surface field. The Installation professional may wish to consider using chalk lines or other methods to ensure a straight, level pattern. If the end-user requires that a sealer be used, the installation professional must select a high-quality, breathable masonry sealer and apply it in strict accordance with the manufacturer's instructions. Be advised that certain impregnating, hydrophobic sealers may actually LEAD to damage from freeze/thaw cycles, so review your options carefully.

The beauty of nature, within your reach.

Impressions in STONE

PRODUCT SPECIFICATIONS FOR SILLS

Product Description

The Sill product is typically used as an attractive way to transition from one building material, such as stone, to another material, such as stucco, on a on wall surface, such as with a wainscot. It is also commonly used as a decorative element beneath window frames. The product is made by preparing a mixture of Portland cement, lightweight aggregate, water, and iron oxide color pigments. This mixture is then poured into molds and allowed to set overnight. Once the product is removed from the molds, it is allowed to cure for several days prior to shipment.

Product Sizing

Sill units are sized at 18” in length and 3” in depth. The units are “beveled” along the top surface, measuring 2½” at the back side and 2” at the front side.

Available Colors

All standard and custom colors can be executed in the Sill product. The end-user must specify project-specific color selections.

Mortar Joint Options

The end-user may request that the Sill units be applied with our without a mortar joint between units, depending upon their aesthetic preference.

Packaging

Sill units are provided via shrink-wrapped pallets containing up to 140 pieces of finished product.

Installation Tips & Techniques

The Sill product should be applied to prepared work surfaces in the same manner as flat manufactured stone products. The Installation professional may wish to consider using chalk lines or other methods to ensure a straight, level outcome. If the end-user requires that a sealer be used, the installation professional must select a high-quality, breathable masonry sealer and apply it in strict accordance with the manufacturer’s instructions. Be advised that certain impregnating, hydrophobic sealers may actually LEAD to damage from freeze/thaw cycles, so review your options carefully.

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The beauty of nature, within your reach.

Impressions in Stone 50-Year Limited Warranty

Impressions in Stone warrants its manufactured stone products for a period of 50 years against manufacturing defects when used on a structure that conforms to local building codes and when installed in accordance with Impressions in Stone's Installation Instructions.

Impressions in Stone will, at its discretion, repair, provide a refund of the purchase price, or provide new materials to replace those that are determined to be defective. This warranty is limited to the original purchaser and may not be transferred to any subsequent owner.

This warranty does not cover damage resulting from:

- Contact with paint or other chemicals.
- Settlement of the building or other surface movement.
- Staining or oxidation.
- Discoloration due to airborne contaminants.
- Improper installation technique.
- Installation on horizontal surfaces.

Impressions in Stone is not responsible for labor costs incurred in removal and/or replacement of defective products.

Impressions in STONE

INSTALLATION INSTRUCTIONS

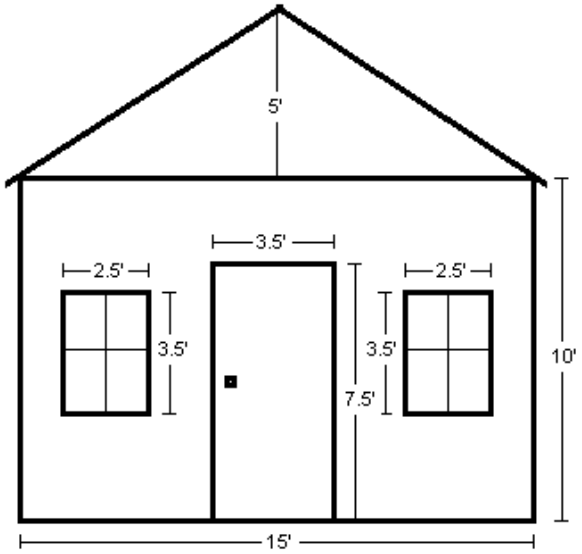
Thanks for allowing Impressions in Stone to fulfill your manufactured stone requirements! With proper installation in accordance with all local Building Code specifications, your stone surface should provide you with many years of gratifying service. In all cases where we make a suggestion, the suggestion should be considered a general guideline and must be superseded by local code requirements. While our stone products are designed to be installer-friendly, you may wish to consider selecting an experienced, skilled installation professional to achieve the best possible results.

STEP 1: ESTIMATE THE REQUIRED QUANTITY OF STONE PRODUCT

Our products are delivered in two basic forms: ❶ Flat pieces, which will be applied to flat surfaces, and ❷ Corner pieces, which are specially designed to wrap around 90° (or "outside") corners.

❶ Our Flat stone products are sold by the *square foot*. To determine the required amount of Flat stone, measure the width and height (in feet) of the surface to be covered, and multiply these two figures together to derive the total square footage amount. For triangular areas, calculate the square footage by multiplying Width x Height x ½. Be sure to deduct from this total amount any areas such as doors or windows which will not be covered with stone.

For example, consider the structure shown in the illustration. The structure measures 15' by 10' (rectangular area) and is capped with a pitched roof (triangular area). The total square footage of the structure is:



Rectangular Area:	15' x 10' =	150 sq ft
Triangular Area:	15' x 5' x ½ =	38 sq ft
Total Area:		188 sq ft

Next, subtract out the square footage represented by the two windows and the door:

Windows (2):	2.5' x 3.5' x 2 =	18 sq ft
Door:	3.5' x 7.5' =	26 sq ft
Total Area:		44 sq ft

Thus, you would need 188 – 44 = 144 square feet of Flat stone product to cover this wall surface. To ensure that you have enough product, you may want to consider purchasing 5% of additional product to account for product breakage, imperfect estimates, etc. Thus, we see that this project would require approximately 144 x 1.05 = **150 square feet** of Flat stone.

❷ Our Corner stone products are sold by the *linear foot*. Let's say you wanted the left and right corners of the structure to be covered with Corner stones. Each corner contains a total of 10 linear feet, so you would need a total of 10 x 2 = 20 linear feet of Corner stones for this project.

Note that Corner stones also cover flat areas in addition to the linear edges. To allow for this, we suggest that you subtract 75% of your total linear footage from your square footage to arrive at the final Flat tally. So, your final Flat count would be 150 sq ft – (75% x 20 ln ft) = **135 square feet**.

STEP 2: ASSEMBLE THE REQUIRED TOOLS & SUPPLIES

Tools You will need the following:

☐ Water supply	☐ Wheelbarrow	☐ Paint brushes	☐ Grout bag	☐ Level
☐ Lath cutters (center snips)	☐ Mason's Trowel	☐ Hawk & flat trowel	☐ Mortar mixing tool	☐ Angle grinder (diamond blade)

Supplies You will need Type S mortar, felt paper or building paper for use as a weather-resistant vapor barrier (in accordance with local code), 2.5 lb. or 3.4 lb. expanded galvanized diamond mesh lath, appropriate fasteners (galvanized nails or lath screws, in accordance with local code), a grout coloring agent to achieve the desired mortar tinting (optional), and Silane- or Siloxane-based breathable-type masonry sealer (optional).

STEP 3: SURFACE PREPARATION

Our stone is an "adhered veneer" which requires no footings, foundations, or wall ties and is therefore ideal for both interior and exterior applications. Our products can be applied to any structurally sound vertical[1] wall surface. Prior to installation, it is your responsibility to assess the structural soundness of the target wall surface. Our product is relatively heavy, so please err on the side of caution should you have any concerns about the wall's structural integrity. Do not assume that our products or suggested installation procedures will add any sort of structural rigidity to your wall surface. Finally, ensure that your wall surface is weatherproof prior to installing our stone. Do not assume that our products or suggested installation procedures automatically provide water-resistant characteristics to your wall surface.

[1] Impressions in Stone products are NOT designed to be used in horizontal applications. Usage in such applications will invalidate the product warranty.

Rigid Backwall This substrate includes such surfaces as sheathing[2], paneling, plywood, sheetrock, and wallboard.

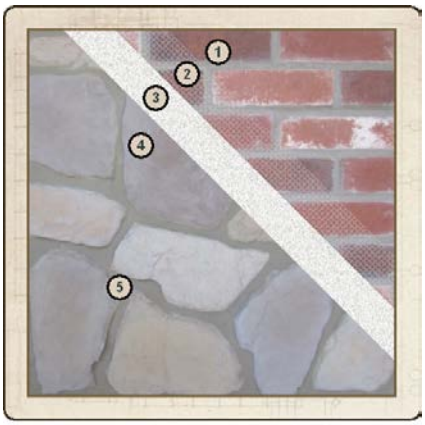
① Rigid backwall (sheathing, in this example), ② weather-resistant barrier, ③ metal lath, ④ mortar setting bed, ⑤ manufactured stone, ⑥ mortar joint.

The surface should first be covered with weather-resistant felt paper, which will serve as a vapor barrier. The paper should be applied horizontally with the upper layer lapped over the lower layer by at least 2 inches. Vertical joints should overlap by at least 6 inches.

Next, 2.5 lb. expanded metal lath should be attached using galvanized nails or lath screws at least 6 inches on center vertically. Fasteners should penetrate the studs by at least 1 inch. The lath should be applied horizontally with the upper layer lapped over the lower layer by at least 3/8 of an inch. Vertical joints should overlap by at least 1 inch.

Both the felt paper and the metal lath should be continuously wrapped around corner surfaces such that each material extends at least 16 inches from the apex of the corner.

Treated Masonry This substrate includes all masonry surfaces such as brick, block, CMU, stucco, and concrete which have been painted, sealed, or treated in some way. It also applies to masonry that is contaminated with form oil or some other release agent. Since some types of cement backer board feature a chemically treated surface, we suggest that you consider the backer board to be “Treated Masonry” until proven otherwise.



① Painted or sealed masonry or concrete, ② metal lath, ③ mortar setting bed, ④ manufactured stone, ⑤ mortar joint.

First, 2.5 lb. expanded metal lath should be attached using corrosion-resistant concrete nails or screws. The lath should be applied horizontally with the upper layer lapped over the lower layer by at least 3/8 of an inch. Vertical joints should overlap by at least 1 inch. The metal lath should be continuously wrapped around corner surfaces such that each material extends at least 16 inches from the apex of the corner.

[2] Do not apply stone products to pressure-treated wood surfaces. Pressure-treated wood shrinks as it dries, which may cause the mortar and/or stone to crack.

Clean, Unpainted Masonry This substrate includes all masonry surfaces such as brick, block, CMU, stucco, and concrete so long as the surface is clean (i.e., free of form oil or other release agents) and has not been painted, sealed, or treated in any way. If there is any question about the surface to be covered, please err on the side of caution and assume it does not meet the above criteria. If you are certain that the above conditions apply, then no other surface preparation is required. However, please note that while technically not required, applying a masonry-mortar scratch coat to the clean, unpainted masonry surface is generally considered to be a good idea.

① Unpainted masonry or concrete, ② mortar setting bed, ③ manufactured stone, ④ mortar joint.

STEP 4: WORK AREA PREPARATION

The overarching goal of the installation process is to create the appearance of a single, uniform surface rather than “areas” of similarly sized, colored, or shaped stones. A bit of planning in the early stages will go a long way toward helping you to achieve a high-quality result.

When you receive your stone order, it is a good idea to spread the products out at the job site so that you will have a variety of stone shapes, sizes, and colors to mix in to your work surface. Laying out small sections on the ground before applying them to the work surface will help you envision how the section will look once it is installed. To achieve the kind of variety and contrast that is the hallmark of a quality installation, you should attempt to use dark stones next to light ones, small stones next to larger ones, heavy textured stones next to smoother ones, and so forth throughout the entire work surface.

STEP 5: MORTAR PREPARATION

Mortar preparation is probably the single most important factor in achieving a high-quality, secure implementation of our stone products. Good mortar preparation will allow the stone to adhere easily and permanently to the substrate. Poor mortar preparation will do neither.

As mortar will not set up properly in very cold conditions, select a period of time where the temperature is expected to be above 40°F throughout the installation process. DO NOT use any sort of antifreeze product in your mortar mix.

Mortar should be the Type S variety. As a general guideline, mortar can be prepared by mixing 1 part masonry cement with 2 parts masonry sand and water. For relatively small jobs, you may wish to use Quikrete’s Commercial Grade Type S Mason Mix (also marketed as Pro-Finish Blended Mortar Mix). This material is already pre-blended, so all you have to do is add water.

Regardless of whether you use a pre-blended or custom mortar mix, you MUST achieve the appropriate consistency when you add water. The best analogy would be something along the lines of the consistency of applesauce—yes, that wet. Manufactured stone mortar must be considerably wetter than standard brick or stone mortar for two reasons:

❶ The high surface tension of water gives the mortar its initial "stickiness". Mortar that is too dry will not adhere properly to the stone surface and may cause the stone to fall off.

❷ A high water content gives the mortar enough time to cure slowly. Mortar that dries too quickly ("flash-dries") is far more likely to fail.

The mortar may also be tinted with a coloring agent, such as Quikrete's Liquid Cement Color, to complement the color of the stone being installed. If you do choose to color your mortar, be sure to write down how much color you use per batch of mortar. This will ensure that your mortar color stays consistent throughout your project.

STEP 6: STONE APPLICATION

If the stone is to be applied in very hot/dry weather conditions, the work surface should be dampened before applying mortar. In addition, each stone should be moistened with water prior to installation. This can be accomplished by spraying the stone with a water hose or by dipping the stone into a bucket of clean water.

There are two ways to apply the mortar to the work surface/manufactured stone interface:

❶ Apply a mortar setting bed approximately ½ inch thick to the prepared work surface using a hawk & flat trowel. Apply only small amounts of mortar at a time to ensure that the mortar does not set up before you apply the stone.

❷ Apply approximately 3/8 of an inch of mortar to the back of each stone with a mason's trowel just prior to setting that stone. This is referred to as "buttering" the stone.

Each method has its advantages and disadvantages. Unless you are a skilled mason, you may find it difficult to apply a suitable mortar bed with the hawk & flat trowel. The mortar bed method also produces more wasted mortar than the buttering method. However, the mortar bed method helps to ensure that enough mortar is used, and the excess provides additional support to newly set stones. It also makes it unnecessary to grout the work surface (although the joints will still need to be dressed). You may wish to experiment with each method to determine which works best for you.

Since this is an adhered veneer, it is not necessary to "stack" upper layers on top of lower layers. Consequently, the stone may be applied in either top-down or bottom-up fashion. The top-down method helps keep any previously applied stone clean, so it may offer a slight advantage over bottom-up.

It is a good idea to begin your work by applying the corners first, since they are slightly less forgiving when it comes to fitting them in. Each corner piece has both a long and a short leg, and these should be alternated at every other stone unit. Once the corner stone units are in place, the flat stone units may be applied working toward the wall center.

You must ensure complete coverage between the mortar and the back surface of the stone unit. Set each stone by firmly pressing the stone into the mortar with a "wiggling" action. If you see some mortar squeeze out around all sides of the stone's edges, you are using the correct pressure. It is not necessary to "mash" the stone into the mortar—slightly firm pressure with a little wiggle is all that is required. When you can no longer easily wiggle the stone, the mortar has achieved its initial "set" and

you can remove your hands from the stone. The stone should effortlessly remain securely in place when you release it. If not, remove the failed mortar from the stone and/or wall surface, replace it with fresh mortar, and reapply the stone.

If you are consistently having difficulty getting the stones to stick, consider the following:

❶ Is your mortar mix too dry, or too wet? It is generally better for the mortar to be on the "too wet" side than "too dry", but it can't be runny or soupy either. Shoot for the consistency of applesauce.

❷ Is the mix too sandy? Or, is it too rich (i.e., not enough sand)? The ratio of sand to mortar is very important. Too little of either material can cause problems. Also, the sand should be small grain size—"playground" sand is too big. If there is any question about the quality of your mortar ingredients, try using Quikrete's Commercial Grade Type S Mason Mix (also marketed as Pro-Finish Blended Mortar Mix).

❸ Is the work surface flat and rigid? Work surface irregularities can create high and low points that enable the stone to rock back and forth. This rocking motion will "pop" the stones off of the work surface. If this may be the problem, consider applying a masonry-mortar scratch coat to the work surface and allowing it to dry overnight.

If mortar gets on the face of any stone, DO NOT try to wipe it off while it is still wet—the wiping action will smear and possibly stain the stone. Instead, allow the mortar to set up until it is dry and crumbly, and then use a paintbrush or whiskbroom to remove the material.

It is important to keep the mortar joints consistent across the entire work surface. A typical joint spacing is approximately ½ inch (about the size of your fingertip), but you can choose a smaller or larger grout joint according to your aesthetic preference. Stagger the joint lines both vertically and horizontally to achieve the most natural look. When installing regular rectangular stones, be sure to keep your joint lines level. You may wish to snap a chalk line every so often to help you with this.

You will probably need to cut a number of stones in order to achieve the best possible fit. The stone can be cut using an angle grinder or any other cutting saw with a diamond blade. To achieve a very high level of craftsmanship, consider "rounding over" the cut edges to give the cut a more natural look. You should then cover the edge with mortar to conceal the cut. To further conceal the cut edge, turn it down when applying the stone below eye level, or up when applying the stone above eye level.

STEP 7: GROUTING AND JOINT FINISHING

Once a section has been laid, step back and look for any shallow spots in the joints. Use a grout bag to fill in these areas. Be very careful not to smear the grout onto the stone face. If grout gets on to the face of any stone, DO NOT try to wipe it off while it is still wet—the wiping action will smear and possibly stain the stone. Instead, allow the mortar to set up until it is dry and crumbly, and then use a paintbrush or whiskbroom to remove the material.

Allow sufficient time (anywhere from 30 minutes to an hour, depending upon weather conditions) for the joints to become firm. Then use a paintbrush handle, wood stick, or metal jointing tool to dress the joints and remove any excess mortar above the desired joint depth. Ensure that the mortar in the joints completely seals the stone edges.

STEP 8: FINISHING TOUCHES

After dressing the joints, allow the work surface to set up for a few hours. Then use a clean, dry whiskbroom or paint brush to clean away any loose mortar and dust the face of the stone. After the mortar has set for at least 24 hours, wash the work surface with a water hose to remove any remaining dust or debris.

Because our product is made of concrete, it will absorb water just like any other concrete surface. Over time, the repeated absorption of water in a freeze/thaw cycle may potentially cause permanent damage to the stone. A sealer generally helps to close the pores in the concrete, thereby repelling the water rather than allowing it to be absorbed.

Since manufactured stone is reserved for use in vertical (wall) applications, water and ice usually don't have the chance to sit on the surface long enough to cause a problem. Stone laid at ground level, however, may be at greater risk.

Is a sealer an absolute must? Our experience leads us to believe that it is not. Is it a good idea? In implementations where standing water could potentially cause a problem, it may be a good idea. However, our research indicates that certain impregnating, hydrophobic sealers may actually LEAD to damage from freeze/thaw cycles, so you must be very careful when reviewing your options.

If you elect to use a sealer, industry standards recommend that you always use a high-quality, breathable (i.e., non-filming) masonry sealer in strict accordance with the manufacturer's instructions. And be sure to test your sealer on a small portion of your stone to ensure that the final appearance is what you're looking for.

Finally, give yourself a pat on the back for a job well done!

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Impressions in STONE

MAINTENANCE GUIDE

Our products are designed to be essentially maintenance-free. In general, they are maintained in the same way as brick or natural stone.

CLEANING

To remove light surface dust and debris, brush the surface with a dry whisk broom. You can also use water and a soft bristle brush to remove heavier concentrations.

SEALING

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If you elect to use a sealer, industry standards recommend that you always use a high-quality, breathable (i.e., non-filming) masonry sealer in strict accordance with the manufacturer's instructions. And be sure to test your sealer on a small portion of our stone to ensure that the final appearance is what you're looking for.

EFFLORESCENCE

Efflorescence is a common occurrence in the masonry trade. It is basically salt that migrates out of the cement matrix to the surface when certain ambient conditions are present. We do not recommend "treating" it with any sort of chemical, sealer, or harsh cleaning process in an attempt to permanently eliminate it. Usually, the next good rain shower will wash away the surface salt. If it doesn't go away on its own, we recommend that you take action. If you see a persistent and/or particularly heavy build-up on your stone units, use water and/or a soft bristle brush to remove it.

Phone: (918) 828-9745 • 1415 South Joplin Avenue • Tulsa, Oklahoma 74112 • www.ImpressionsInStone.biz

Material Safety Data Sheet

Section 1 — Company Identification

Company Name and Address:
Impressions in Stone LLC
1415 South Joplin Avenue
Tulsa, Oklahoma 74112
(918) 828-9745

Technical Contacts:
Dagan Heaps, Owner
(918) 828-9745

Emergency Contacts:
Dagan Heaps, Owner
(918) 461-0761

Section 2 — Ingredient Components

Component	Approximate Percent by Weight
Light-weight aggregate	65%
Portland Cement	34%
Iron Oxide Color Pigment	1%
Chemical Admixtures	<1%

Component Regulatory Information:
This product may be regulated, have exposure limits, or other considerations for: Silica (general form).

Non-Hazardous Components:
In its final delivered form, this product is expected to produce minimal if any hazards. When cut, this product produces a fine dust that may be considered hazardous in some circumstances under 29 CFR 1910.1200 (Hazard Communication).

* Amorphous oxides of aluminum, calcium, iron, magnesium, silicon, and titanium

In its final delivered form, the product is essentially fully cured, so exposure to the above listed components is minimal. When cut, this product produces a fine dust that may contain the above listed components.

Material Safety Data Sheet

Section 3 — Hazards Identification

Appearance and Odor:
Cured concrete product in various shapes, sizes, and colors to replicate the appearance of natural stone. No detectable odor.

Emergency Overview:
No unusual hazards or conditions are expected from the intended use of this product. However, when cut or otherwise abraded, this product produces a fine dust that may cause irritation of the respiratory tract.

Potential Health Effects

Inhalation:
Inhaling the dust created when cutting or otherwise abrading the surface of this product may cause irritation of the nose, throat, and respiratory tract. This product contains crystalline silica. Prolonged and repeated inhalation of respirable crystalline silica can cause silicosis, a chronic lung disease characterized by fibrosis and scarring of the lung tissue resulting in a decrease in lung function, breathlessness, wheezing, coughing, and sputum production. Short-term overexposure to extremely high concentrations of respirable crystalline silica can produce acute silicosis, a disease that can rapidly progress within months of initial overexposure and may even cause death within 1 to 2 years.

Skin Contact:
The dust created when cutting or otherwise abrading the surface of this product may cause itching and/or short-term irritation.

Eye Contact:
The dust created when cutting or otherwise abrading the surface of this product may cause slight irritation to the eyes including redness, tearing, and/or blurred vision.

Ingestion:
Accidental or intentional ingestion of this product is extremely unlikely, but may produce gastrointestinal irritation.

Medical Conditions Aggravated by Exposure:
Chronic respiratory or skin conditions may temporarily worsen from exposure to the dust created when cutting or otherwise abrading the surface of this product.

Material Safety Data Sheet

Section 4 — First Aid Measures for Dust Exposure

Inhalation:
Immediately remove the affected person to a clean-air environment. If irritation occurs and persists, seek medical attention.

Skin Contact:
Wash affected area with mild hand soap and plenty of water. If irritation occurs and persists, seek medical attention.

Eye Contact:
Immediately flush affected eye(s) with fresh water for 15 minutes. If irritation occurs and persists, seek medical attention.

Ingestion:
Observe the affected person for several days to ensure normal gastrointestinal function. Do not induce vomiting unless directed to do so by a medical professional. If normal function does not return, seek medical attention.

Section 5 — Fire Fighting Measures

Flash Point:	None	**Flash Point Method:**	Not applicable
Upper Flammability Limit:	Not applicable	**Lower Flammability Limit:**	Not applicable
Flammability Classification:	Non-flammable	**Auto Ignition Temp.:**	Not applicable

Extinguishing Media:
Any extinguishing media appropriate for the fire in question may be used with this product.

Unusual Fire & Explosion Hazards:
None.

Hazardous Combustion Products:
None.

Material Safety Data Sheet

Section 6 — Accidental Release Measures

Containment Procedures:
This product is delivered in solid form and will not change states into a liquid or gaseous form spontaneously.

Clean-Up Procedures:
Dust, chips, and unusable pieces may be allowed to settle on the ground where they may be swept up and placed in any sort of waste container for disposal as a non-hazardous waste. Clean-up procedures may create dust, so use of a particulate respirator is recommended.

Other Special Procedures:
None.

Section 7 — Handling and Storage

Handling Procedures:
No special procedures are required for handling this material. However, when cut or otherwise abraded, this product produces a fine dust that should be avoided as much as possible. When cutting or otherwise abrading this material, the use of safety glasses and a particulate respirator is recommended. Furthermore, the user may wish to consider using equipment designed to control and/or limit dust exposure such as a wet-saw and/or dust removal vacuum systems such as those found in woodworking shops.

Storage Procedures:
This product as packaged is generally very heavy and should therefore be stored only on the ground or on racks specifically designed to accommodate heavy palletized materials. Racks must be installed on level ground surfaces. Use extreme caution when storing materials above ground level.

Section 8 — Exposure Controls / Personal Protection

Ventilation:
General dilution ventilation, local exhaust ventilation, and/or dust collection systems should be provided as necessary to minimize exposure to dust created when cutting or otherwise abrading the surface of this product.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection:
A properly fitted, NIOSH-approved particulate respirator should be used to minimize exposure to dust created when cutting or otherwise abrading the surface of this product.

Material Safety Data Sheet

Section 8 — Exposure Controls / Personal Protection (continued)

Skin Protection:
Wear leather or other appropriate-type work gloves as necessary.

Eyes/Face Protection:
Wear safety glasses with side shields.

Section 9 — Physical & Chemical Properties

Appearance:	Cured concrete product in various shapes, sizes, and colors	Odor:	Not applicable
Physical State:	Solid	pH:	Not applicable
Vapor Pressure (mm Hg @ 20 C):	Not applicable	Vapor Density (Air = 1):	Not applicable
Boiling Point:	Not applicable	Solubility (H_2O):	Not applicable
Specific Gravity (Water = 1):	Not applicable	Freezing Point:	Not applicable
Evaporation Rate (n-Butyl Acetate = 1):	Not applicable	Viscosity:	Not applicable

Section 10 — Chemical Stability & Reactivity Information

Stability:
As delivered, the product is in stable, solid form.

Conditions to Avoid:
Avoid dispersion of dust into unventilated areas.

Incompatible Materials:
None expected.

Hazardous Decomposition Products:
None identified.

Hazardous Polymerization:
Will not occur.

Material Safety Data Sheet

Section 11 — Toxicological Information

Acute and Chronic Toxicity:
Dust created when cutting or otherwise abrading the surface of this product may cause mechanical irritation to eyes and/or skin. Dust inhalation may cause coughing, nose and/or throat irritation, and sneezing. Higher exposures may cause difficulty breathing, congestion, and/or chest tightness.
Ingestion may cause transient irritation of throat, stomach, and/or gastrointestinal tract.

Carcinogenicity:
CRYSTALLINE SILICA: The International Agency for Research on Cancer (IARC) recently reviewed existing epidemiological data and concluded that crystalline silica inhaled in the form of quartz from occupational sources is a known human carcinogen (Group 1). In making the assessment, the IARC noted that carcinogenicity was not detected in all industrial circumstances studied. However, IARC reported that a majority of studies indicated an elevated mortality for lung cancer among silica-exposed workers. IARC noted that increased rates of lung cancer were reported among some workers in ore-mines, quarries, foundries, ceramics, granite, and stone cutting industries. The workers in some of these occupational studies were exposed to other potential respiratory carcinogens such as arsenic, radon, diesel exhaust, polycyclic aromatic hydrocarbons, or cadmium. The IARC reviewed animal studies and concluded that there is sufficient evidence in experimental animals for the carcinogenicity of quartz. Silica-crystalline quartz has resulted in liver, blood, and lung tumors in rats by inhalation, intraperitoneal and intravenous injection, intratracheal and intraplerual administration.

Section 12 — Disposal Considerations

US EPA Waste Number & Descriptions:
No components are identified as hazardous wastes. No EPA Waste Numbers are applicable for this product.

Disposal Instructions:
Consult appropriate authorities before disposing of this product.

Section 13 — Transportation Information

US DOT/TDG Information:

Shipping Name:	Not regulated for transport	**Packing Group:**	None
Hazard Class:	None	**Required Labeling:**	None
UN/NA #:	None	**Additional Information:**	None

Material Safety Data Sheet

Section 14 — Regulatory Information

Component Analysis:
None of this product's components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

SARA 311/312:

Acute Health Hazard:	Yes (if dust is generated)
Chronic Health Hazard:	Yes (if dust is generated)
Fire Hazard:	No
Sudden Release of Pressure Hazard:	No
Reactive Hazard:	No

Clean Air Act:
None of this product's components are listed on the Clean Air Act-1990 Hazardous Air Pollutants list.

Section 15 — Other Information

HMIS and NFPA Hazard Ratings:

Category	HMIS	NFPA
Health	1	1
Flammability	0	0
Reactivity	0	0

NFPA Unusual Hazards:
None.

Disclaimer:
Reasonable care has been taken in preparing this document, but the manufacturer makes no warranty with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental, or consequential damages resulting from the use of this product.

This is the end of MSDS