

Boral Stone Division

Supplemental Guide

Best Practices for Installing Manufactured Stone Veneer

 CULTURED STONE.
culturedstone.com

 ELDORADO STONE.
eldoradostone.com

 DUTCH QUALITY STONE.
dutchqualitystone.com

 STONECRAFT
INDUSTRIES.
stonecraft.com

BORAL
STONE DIVISION



Contents

Estimation/Take Off	3
Importance of a Mock Panel	3
Flashing/Water Management	4
Scratch Coat	4
Achieving Bond	4
Setting Stones for Desired Joint Style	7
Creating a Realistic Appearance	8
Grouting/Finishing Joints	8
Installation Over Stucco	9
SKU Specific Installations	10
Clean-Up	12
Performance Risk	12
General Information	13
Tools	14

This document is intended to be used in conjunction with, and not a replacement for, the **NCMA-MSV Installation Guide**. We are providing this information to help grow your business and improve your installations beyond minimum code requirements in **ASTM C1780**.

Document Modified 07.20.2021

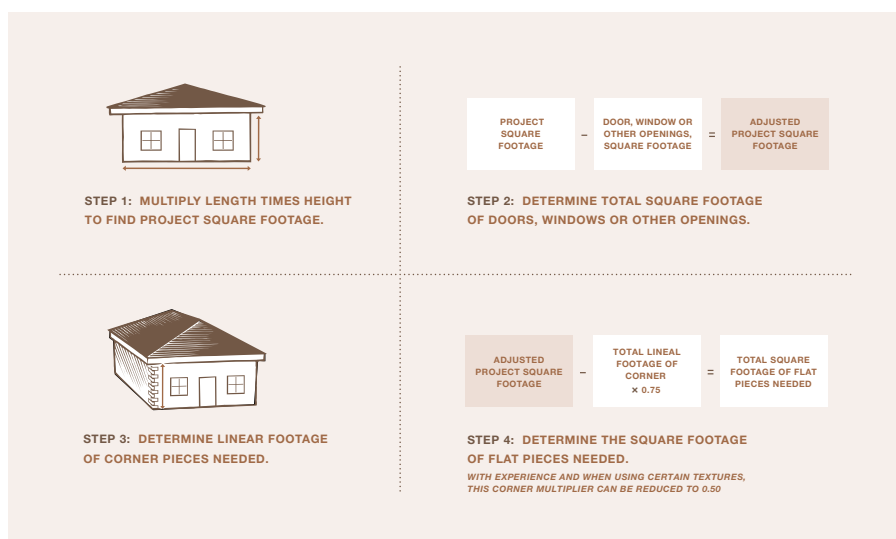
In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Estimation/Take Off

Determine the amount of Boral Stone Division manufactured stone veneer products needed by measuring the area that will be covered. Measure length \times height to arrive at the gross area square footage of flat stone needed. Subtract square footage area for any windows, doors, and any other openings.

Measure the linear feet of outside corners to determine the amount of corner pieces needed. One linear foot of corner pieces covers approximately $\frac{3}{4}$ of a square foot of flat area. Coverage will range from $\frac{1}{2}$ sq. ft. to $\frac{3}{4}$ sq. ft. depending on texture. Calculate using $\frac{3}{4}$ sq. ft. Subtract the flat area, covered by the linear feet of corner pieces, from the square footage of flat stone required.

You may wish to order some extra stone to allow for cutting and trimming, or for tight fit joints. In addition, be sure to verify whether the texture chosen is sold based on coverage with a $\frac{1}{2}$ " mortar joint or tight-fitted.



Importance of a Mock Panel



Building a mock panel for commercial or residential projects is an important step in avoiding a potential disagreement during construction or after completion. A small 3' \times 3' area that is later incorporated into the finished work may be enough. Larger or more complex projects may require a larger mock up that include all claddings, openings, penetrations, terminations and transitions. This is a great place to work out contractor sequencing, confirm proper materials, water management and flashing responsibilities.

The importance of a mock-up cannot be understated—as it provides the place for final consensus on the aesthetic of the install. This provides opportunity to evaluate stone spacing and color distribution along with mortar color and joint type.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Flashing/Water Management

Terminations, Transitions & Penetrations

Good practice and building code require flashing at terminations, transitions, and penetrations. Inspect the previous trade's work with a special focus on proper flashing. Plan ahead for the flashing application you are responsible for. Compare project details to the *NCMA-MSV Installation Guide*.



Sill Stones, Wainscot Caps & Wall Capping

The cap or sill material you select should allow for 1" to 2" of overhang past the thickest stone. This provides adequate run off so that water sheds to the ground rather than the face of the stone. Additionally, a field saw cut drip kerf on the underside of the cap will assist by breaking water surface tension.

Scratch Coat

Why Is the Scratch Coat So Important?

The scratch coat, in framed construction, is the base for your stone installation. It is the method used to transfer the cladding weight to the structural substrate. The nominal ½" scratch coat gives a firm substrate to install your stone to. Scratch coats that are too thin or not cured could lead to cracking or weaker bonding surface. You should not see any of the lath through your scratch coat. Embedding the lath in the scratch coat mortar is what minimizes the corrosion in metal lath. After the mortar begins to set up, the scratch coat is textured with a scarifying comb or notched trowel to create horizontal lines. Cure the scratch coat for sufficient time to allow scratch coat mortar to shrink. A cured scratch coat provides better opportunity for mechanical bond in addition to chemical bond. Curing time for scratch coats will vary based on weather conditions. Moist curing is a method commonly used in stucco applications to reduce cracking and strengthen the scratch coat. Basically, moist curing is the simple mist application of water during the curing period. For more information on moist curing scratch coats, consult your local stucco trade association.

Achieving Bond

It Starts with Selecting a Quality Mortar, Mixing it Properly & Then Understanding When Not to Use it

Common causes of bond failure include improper mortar selection and improper mixing. Some less expensive mortars are high in inexpensive materials, like sand, which decreases performance. Follow the mortar manufacturer's instructions for water amounts, mix time, slake time, consistency guidance and other tips regarding their products. The manufacturer's recommendations may vary based on conventional mortar or modified mortar.

Make sure you address the hot or cold temperature requirements from the mortar manufacturer and building codes.

Avoid the temptation to design your own mix of multiple materials.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Achieving Bond

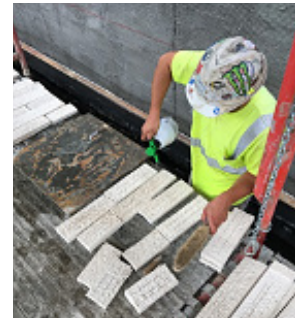
HIGH-IMPACT RECOMMENDATION:

* Hydration of Scratch Coat & Stone

Don't sacrifice a good bond because you didn't account for a thirsty scratch coat or stone. Critical mortar hydration water can be robbed because of this. When using Type S or Type N mortar, wet both the scratch coat and stones prior to bonding with a garden sprayer, misting sprayer, or a garden hose on a mist setting. The bondable surfaces should be fully hydrated but free of standing surface water at the time of installation. Free standing surface water increases the water cement ratio at the bond location, causing a weaker bond.



While this is a requirement for installation in hot weather, this method is also beneficial in cool or dry climates. Polymer modified or modified mortar manufacturers may recommend eliminating this step. Please contact the specified modified mortar manufacturer for their recommendations on scratch coat and stone hydration steps.



Impact of Dirt, Debris & Cutting Dust on Bond

Bond issues can be caused by dirt, cutting dust, or anything left on the back of the stone or scratch coat. In new construction, rain can cause dirt to splash onto the scratch coat creating a bond break risk. To reduce this risk, clean the scratch coat with brush and water multiple times each day or as needed.

Other Jobsite Considerations

The vibration and weight of installing an interior finish (drywall) or roof, during a stone installation, can cause lumber compressions or structural movement, leading to a compromised bond or crack risk. To minimize this risk, time your installation to follow the installation of these materials.

HIGH-IMPACT RECOMMENDATION:

* Setting Bed Technique

Boral Stone Division MSV relies on 100% mortar contact with the units and substrate. Methods like the “perimeter,” “donut” and “spot” bonding are not effective. One way to achieve method A as described in the *NCMA-MSV Installation Guide* is to firmly apply a thin layer of mortar to fill stone voids, then followed by the heavier application of back butter setting bed mortar. While that ½" to ¾" setting bed mortar is wet, press and work the unit onto the prepared backing with enough pressure to force the mortar to squeeze out around the entire perimeter of the unit. This method assures coverage with minimal voids in the mortar.



Large Format Stone Installation

Installation of large format stone units require a few key differences which will be outlined in this addendum. This addendum is intended to be used in concert with the standard *NCMA-MSV Installation Guide* available online at www.NCMA.org. All wall preparation requirements, material requirements, cautions, disclaimers and general information should be reviewed and followed. A Large Stone Unit is defined by NCMA as a stone with greater than 1 sq. ft. area or one dimension at 24" or greater, requiring additional skill and attention.

Large Format Stone Units provide the installer with a couple challenges related to wall preparation and setting the units. These units can be more challenging to install than conventional units. Proper bonding materials and techniques are essential. A key to good bond is achieving a full setting bed of quality mortar with ample squeeze out.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Achieving Bond

Large Format Stone Installation *Continued*

Large format stone units tend to telegraph any irregularities in the wall/scratch coat through to finished surface. Take time to make sure scratch coat is level, plumb and straight, even adding a second coat if required. Alternatively, install cement board as a replacement for lath and scratch coat. The cement board method may appear to add cost, but the advantages of this planar surface will increase install speed and improve final appearance. Cement board applications must be installed with modified mortar as discussed next.

Modern textures, with a tile or limestone look, often have a flat face. When installed, the unit must be level on top and plumb on the sides, but also checked for plumb on the face. To achieve an even face plane and avoid odd shadows, start with thicker stones to set face plane and then use mortar setting bed thickness to even face plane of thinner stones. This will minimize edge to edge shadowing. Setting bed mortar will also help absorb variations in the substrate surface.

The **NCMA-MSV Installation Guide** recommends any unit 1 sq. ft. or larger, or a unit with a single dimension 24" or longer, be installed using modified mortars. Modified mortars meeting **ANSI A118.4** or **118.15** mortar provide three characteristics that aid in the installation of large format units:

1. Increased bond strength;
2. Increased flexibility compared to standard mortar;
3. Minimal sag/slip; and
4. Ability to "re-position" a unit for up to 5 minutes after setting it.

By comparison, if using a building code minimum mortar, **ASTM C 270** Type N or Type S, any disturbed unit must be removed and re-set. No "re-positioning" is allowed after setting.

Modified mortars, when used as setting bed, will typically be applied to a prepared surface by notched trowel in vertical ribbons. In addition, the units are back buttered and then pressed into the ribbons with a back and forth sliding motion. This minimizes sag and increases initial grab.

Large format installations also benefit from use of a temporary straight and true starter board. This provides a solid and level starting point without having to rely on a chalk line. Where required, be sure to install weep screed and maintain proper clearance.

Extra care should be taken to avoid mortar droppings and smears as modified mortar is difficult to remove. You may choose to spray/apply a silane-siloxane repellent to the stone face prior to installation. This will simplify the job of removing mortar-staining on the stone's exposed face. Do not apply to the bonding surface.

Many of these large format stones are laid with a mortar joint. It is extremely critical to maintain consistent head and bed joints. While a joint can be as small as $\frac{3}{16}$ ", that dimension is difficult to completely fill with mortar. For that reason, consider a $\frac{3}{8}$ " minimum joint gap. To maintain uniform mortar joint gap during installation and curing, spacers are often used. Add spacers for all 4 sides and use caution removing spacers and do not disturb the bonded units. Soaking wooden dowel stock in advance will make the dowel smaller/easier to remove when dry. Hard/wedge shaped shims should be avoided. Since these shims will not actually support weight, even foam shim/spacer materials can be used. Once shims are removed be sure to completely fill joints with mortar. Voids or half filled joints will potentially crack or prematurely fail.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Achieving Bond

Large Format Stone Installation *Continued*

Finish Corners Out with Flat Stones

As an alternative to using corner stones, flat stones can be used to create attractive outside corner applications. There are three options for this application:

1. **Straight Butt Joint**—Where the flats on one wall plane all extend past the corner and the flats on the adjacent wall butt into the back of them (Fig. A).
2. **Bonded Corner**—Similar to a straight butt joint, however the extending course is alternated between the two meeting walls (Fig. B).
3. **Quirk-Miter Corner**—Start with a factory end or clean straight cut stone. Miter the end of each stone at a 45° angle. The miter cuts end ¼" short of the stone face to create the quirk notch as shown in Fig. C.

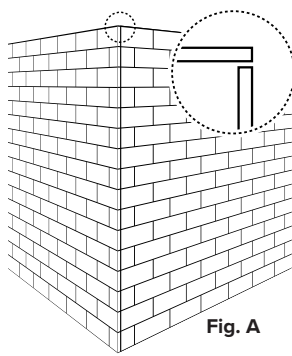


Fig. A

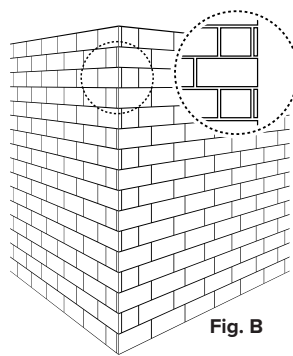


Fig. B

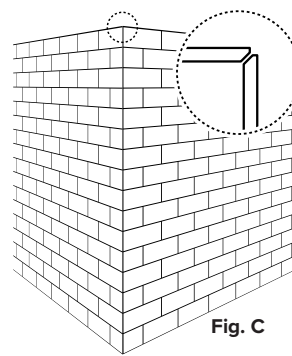


Fig. C

Summary

1. Use modified mortar compliant with **ANSI A118.4** or **A118.15** to provide significant installation advantage and increased bond.
2. Consider a mortar joint ⅜" minimum.
3. Utilize spacers to hold joint gap.
4. Spray application of a silane-siloxane repellent on the stone face prior to installation will simplify the removal of any mortar or smears.
5. A new masonry saw blade will reduce chipping of stone unit edges.

Setting Stones for Desired Joint Style

In Preparation for Grouting, Keep in Mind the Following Recommendations While Setting Stones.

When setting the stones, maintain a consistent joint spacing to achieve your selected joint style. Because you covered the entire back of each unit with ½" to ¾" of mortar, and firmly pressed it to the scratch coat, you will have excess squeeze out. Before the excess setting mortar has time to harden, go back through with a jointing tool and compact the excess mortar far enough back so that it doesn't interfere with your grout joint. Take special care not to disturb the bond of the stone. A broken bond at this point will require the stone to be reset.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Creating a Realistic Appearance

Cutting & Covering Cuts

With Boral Stone Division manufactured stone textures, a saw cut really sticks out. Start by selecting a thinner stone for the cut, apply mortar to the cut edge to conceal the aggregate, and place it on the wall next to a thicker stone. Utilizing nippers or a brick hammer to modify the stone size provides a more natural cut edge and makes the cut less noticeable. When possible, point cut and covered edges away from walkways, porches, or other traffic patterns that make the cuts more visible.

Blending Material

Always work from multiple boxes. Lay out enough material (approximately 40 sq. ft.) to represent all colors, textures, and sizes. Check your material against a mock-up sample board or mortar board. You should do the same layout for corners also working from multiple corner boxes. Select stones from your laid-out material to achieve an even mix of all sizes, colors and degree of texture. Avoid wasting time searching for the right stone and frequently replenish your laid-out material to maintain a good selection.

Corner Installations—Avoid Joint Alignment

Boral Stone Division products come with 90° corners made with long and short legs of varying sizes. When possible alternate long and short legs as you work up the corner. You can create even more corner sizes by cutting pre-made corner long or short legs. This provides more length options to blend into the corner and avoids the risk of a “zipper” appearance. Don’t forget to apply mortar to any cut edges.

Installing a Foundation Weep Screed to Mirror a Grade/Slope

Did you know that weep screeds may be applied at an angle that follows grade/slope? To do this, the water resistive barrier (WRB) must be continuous down to and lap over the weep screed attachment flange. Please see the **NCMA Detail Foundation Wall Base—AMSV Overlapping Foundation** document for methods on how to isolate and minimize crack risks in this application.

Grouting/Finishing Joints

Grout Options

There are many grout options available for your Boral Stone Division manufactured stone veneer. Grout selection will have a big impact on the overall look of your project. Make sure the stone units are sufficiently cured before you begin grouting so as to not disturb the bond when bagging or tooling.

Standard Joint Technique

The standard joint is achieved by laying each piece of veneer roughly 0.5" apart (one finger width). Use a grout bag to fill joints with mortar. Keep the tip of the grout bag as deep in the joint as possible, filling any voids or air pockets as you work towards the surface. When the mortar becomes thumbprint hard return and tool the joints to compact mortar and rake out excess mortar to the desired look.

Full Joint Technique

A full joint is done the same way as a standard joint; however, the grout level is flush with the face of the veneer.



In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Grouting/Finishing Joints

Overgrout Joint Technique

Overgrout applications are done the same way as a full joint technique, with the exception of mortar overlapping the face of the veneer, widening the joints and making them very irregular. This is an increasingly popular way to achieve an old-world appearance. It is a technique that tends to make the masonry work appear rustic and aged. The time to tool this joint will depend on the desired look and will require softer tools, like wood or burlap bag, instead of a metal striker to finish.



Tight-Fit/Dry-Stack Joint Technique

When installing products with tight-fit (also known as dry-stack) joints, it is recommended to install corners first then the remaining from the bottom up. Strive to maintain level courses and install the stones in courses back and forth across the wall. Generally, components should be placed butting each other and aligned for level and plumb. When installing, the backs of all these components must be hydrated—meaning they should be noticeably damp, but free from surface water.* For the best finished appearance, the tight-fit mortar color should blend with the veneer base color to help conceal the joint lines. In an effort to achieve a good tight-fit application, there is an increased chance of disturbing the bond of the previously installed stone. If the bond is compromised, the stone must be removed, cleaned and re-installed.



**If using a modified mortar, follow the manufacturer's recommendations regarding wetting of stone and scratch coat.*

Refer to the **NCMA-MSV Installation Guide** for mortar selection, setting mortar application, and application methods. It is highly recommended, and potentially code required, to use a modified mortar for tight-fit applications.

General Grouting Tips

- Only grout as much as you can manage at one time.
- Selection of joint tool and timing of tooling will affect surface appearance of joint. Joints can be tooled with a stick, striker, jointer or other blunt masonry instruments.
- Overgrout joints can be tooled (somewhat) earlier than raked joints.
- Tooling joints should be done once mortar has become thumbprint hard. Don't allow joints to fully harden. Mortar should be pliable and crumbly; not too wet and not too dry.
- Using a grout bag is much easier than hand "tucking" joints.
- A plastic grout bag can work into tight gaps between stones easier than a canvas bag.
- **Caution:** Modified mortars are not recommended for joints. Modified mortar manufacturers typically offer a separate mortar for grouting.

Installation Over Stucco

Manufactured stone veneer can be installed over clean stucco surfaces that have not been slicked or burned and are free of debris and paint or sealers.

Over New Stucco

Stucco installation must meet the requirements of **ASTM C 926**. If applying veneer over a stucco color (finish coat), verify with the mortar/stucco manufacturer that their product is able to achieve a 50 psi shear bond strength over these surfaces. This does not apply to a topically painted stucco finish. If the above conditions are not met, the stucco will need to be removed before installing veneer.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Installation Over Stucco

Over Existing Stucco

There are many unknown variables in an existing stucco application. It is highly recommended that an engineer evaluate the wall and its capability to accept new veneer, as well as whether the materials behind the stucco meet the current building code requirements.

SKU Specific Installations

Hearthstone Installation

HIGH-IMPACT RECOMMENDATION:

* Best Practices for Installing Hearthstones

For professional appearance, if hearthstones require cutting to fit your application, each hearthstone should have an equal portion removed.

Free water in the grouting mortar can leach into the hearthstone and leave a water stain along the edges that will be impossible to remove. To minimize the risk of staining in the hearthstone, seal the hearthstone prior to installation on the top and side surfaces only. Never seal on the bonding surface.

An alternative method to sealing would be saturating the hearthstone with clean water prior to installing the grout. This method minimizes the hearthstones opportunity to absorb the mortar water.

Using a slightly dryer mortar for grouting can also minimize this risk.

SETTING HEARTHSTONES

Place mortar $\frac{3}{4}$ " deep in 3" wide strips 1" apart on prepared surface (Fig. D).

INSTALL HEARTHSTONES

Place the first hearthstone onto the mortar bed and level (Fig. E). Place adjacent hearthstones, aligning and leveling with the first piece. If joints need additional mortar, fill joints using a grout bag. Tool and finish joints following previous instructions under **Grouting/Finishing Joints** (page 8-9). Ensure hearthstones are set in a complete bed of mortar.

Note: Boral Stone Division hearth products are made from non-combustible materials. Mortar joints must not exceed $\frac{1}{2}$ " in width and the mortar must be even with the top of the hearth surface.

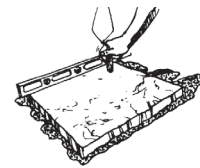
RAISED HEARTH

Do not cantilever or extend hearthstones more than $1\frac{1}{2}$ " beyond direct support. When grouting the extended portion of a cantilevered hearthstone, bring the grout to the front edge. Masking tape can be used to support mortar at the edge.

Fig. D
Place Mortar for
Hearthstone Installation



Fig. E
Place Hearthstone



In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

SKU Specific Installations

Electrical Box/Light Box Installation

Electrical and light box stones must be installed in accordance with **NCMA-MSV Installation Guide**. Extension boxes, light fixtures and receptacle plates must be attached in accordance with manufacturer's instructions and any local building codes.



Attach UL-listed extension box to pre-wired and mounted electrical box.



Apply mortar to back of electrical box stone or prepared substrate.



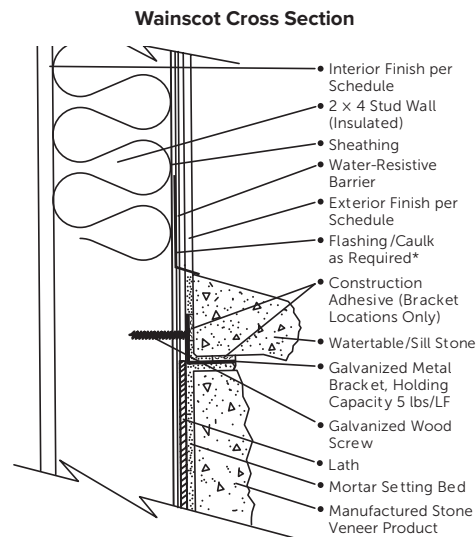
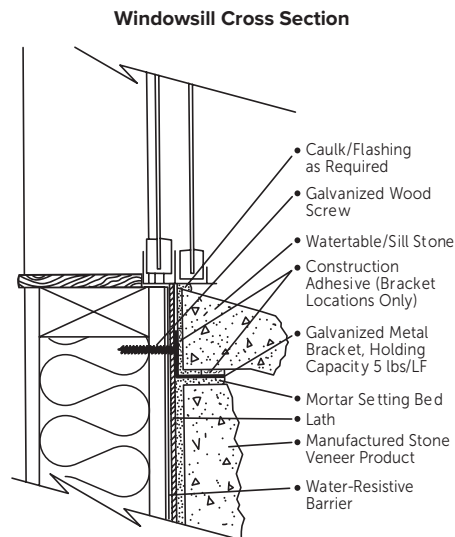
Center electrical box stone over the extension box; level and plumb. Use removable shims if required.



Complete placement of manufactured stone veneer or other exterior material around electrical box stone.

Watertable/Sill Installation

Watertables/sills provide a transition surface for water runoff between a stone wainscot and other exterior finishes. They can also be used as a windowsill. Install using galvanized metal support brackets (**Simpson Strong-Tie® A21** or other galvanized right-angle bracket with holding capacity minimum 5 lbs./LF) fastened with galvanized nails or screws penetrating studs 1" at a minimum of 16" on center. Two brackets per sill is preferred if blocking is present. Use construction adhesive to bond stone at bracket locations. Caulk and flash as required at watertable/sill locations using an approved corrosion-resistive flashing that extends to the surface of exterior wall finish and is installed to prevent water from re-entering the exterior wall envelope. This bracket installation technique should be utilized with any accessory piece (for example lintels) that exceed 15 lbs./sq. ft.



Manufactured Brick Veneer Installation

The installation and material systems for brick are similar to a manufactured stone veneer installation and are addressed in the **NCMA-MSV Installation Guide**. Here are a few additional tips that may be helpful when laying out and installing a manufactured thin brick.

Choose the type of wall pattern desired and layout brick pattern. Allowing for a mortar joint of approximately 1/2", calculate and mark off the number of courses required. Adjust joint size to minimize horizontal cutting. Run level guide lines to ensure proper placement of bricks.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Clean-Up

Minimizing Clean-Up

In most new construction projects, the installation will terminate near uncovered soil until the landscaping is completed. Roof run-off and rain can cause the soil to splash onto the stone. Save yourself clean-up time by spreading straw or cardboard over the soil to minimize the splashing.

If landscaping is present, protect the customer's landscaping from mortar droppings and cleaning detergents.

Best Cleaning Practices for Dirt & Debris

Dirt and debris can be removed with a soft bristle brush by using a solution of granulated soap or detergent and water. Do not use a wire brush as it will cause damage to the surface. Rinse immediately with fresh water. Do not attempt to clean using acid or acid-containing products, power-washing (at any pressure), sandblasting or wire-brush cleaning. See the following instructions for cleaning specific mortar types.

Cleaning Excess Type S or Type N Mortar

Multiple times throughout the day, as the mortar becomes thumbprint hard, completed work should be broomed or brushed to remove loose mortar. This will allow you to clean the face of the stone before the mortar has a chance to setup and stain. A wet brush or sponge should never be used to clean mortar during installation as this will cause staining that is difficult, maybe impossible, to remove. Do not use acid-based products.

Cleaning Excess Modified Mortar

Use caution with modified mortars while providing exceptional bond characteristics, as they are harder to clean. Modified mortar on the face of stone is tenacious, can smear and permanently stain the stone. The best strategy is to keep modified mortar off the face of the stone. Brush methods are typically not successful on modified mortars. Contact the mortar manufacturer for assistance on how to clean their product. Consider working from the top down, covering previous work to protect it. Using a protective coating, like **Craftshield**™, on the stone prior to installation may make it easier to clean a modified mortar. If you choose this strategy you must keep the coating off the bondable surface (the back of the stone).

Performance Risk

Do Not Install Manufactured Stone Veneer on Stair Risers

Installing Boral Stone Division MSV on stair risers is not recommended. This area is subject to increased surface abrasion from foot traffic. Stair risers are often exposed to de-icing chemicals that can damage manufactured stone and are not covered under terms of product warranty. Avoid installing in any area where the units may be kicked, scraped, or scuffed.



In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Performance Risk

Retaining Wall Water Management

Boral Stone Division MSV installed on a retaining wall has risks that other installations do not. First is the water pressure created by planter water traveling through the retaining wall. The second is mineral loading created by minerals picked up by water from the soil. These minerals create an efflorescence risk. It is good practice to provide a waterproofing on the soil side of the wall. For additional protection, consider utilizing a rainscreen such as Boral's **Drain-N-Dry™ Lath** on the cladding side of the wall. This provides an alternative path for salt latent water and dries the veneer faster, providing less time for the water to dissolve salts.

General Information

Protective Treatments or Sealers

While not required, you may choose to use a protective treatment to help minimize water penetration into the stone and make the finished installation easier to clean. Protective treatments will not make the stone waterproof or stop leaks.

If you choose to apply a sealer, consider using **Craftshield™**. Use only a penetrating and breathable silane or siloxane-based sealer intended for manufactured stone. Test product on a few veneer pieces first to determine if there will be any undesirable effects. Some protective treatments may alter the color of the veneer by making the surface darker or by changing the sheen. Refer to the manufacturer of the treatment for recommended application, coverage, maintenance and reapplication.

Efflorescence

Efflorescence is a water-soluble salt that is deposited on the surface of stucco, concrete, brick and other masonry products. This is the result of salts being dissolved by water and being moved through the system. Once at the surface, the water evaporates leaving the salt deposited on the surface of the stone. This can appear white and chalky or brown and yellow. Three factors play a part in this chemical reaction. First, there must be a contributor of salt like block, mortar, and sometime soils. Second, there must be water movement through the system to pick up and redistribute the salt. Third, the environmental conditions must be just right for the moisture migration/evaporation to occur, leaving salt deposits on the surface. While we cannot control the environment, there are things we can control:

1. **Salt sources**—The Boral Stone Division utilizes concrete technology additives to tie up the salt within our stone. Some mortar and block manufacturers do the same.
2. **Choose quality materials**—High quality CMU block and mortar manufactures also produce materials to minimize efflorescence.
3. **Water management**—Design to installation of flashings that immediately move water to the exterior, beyond the face of the masonry. The faster water is removed the less it has opportunity to dissolve the salts.

Addressing Efflorescence

If you discover efflorescence on your stone, allow the wall system to dry thoroughly, then scrub with a soft bristle brush and clean water. Rinse thoroughly—do not use a wire brush or power washer.

For more difficult efflorescence problems, scrub thoroughly with a solution of 1 part white household vinegar to 5 parts water. Rinse thoroughly. **Caution:** *Using a stronger vinegar solution will remove the color.*

If the efflorescence reoccurs, this is an indication that the contributor of the salt has not exhausted its salt and/or you may need to address water management.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.

Tools

Tools of the Trade

Choose the tools required for your installation:

- Safety Glasses & other personal protective equipment
- Staple Gun or Hammer
- Wheelbarrow & Hoe
- Hock & Trowel
- Mason's Trowel
- Margin Trowel
- Dust Mask[‡]
- Level
- Metal Jointing Tool or Wood Stick
- Grout Bag
- Whisk Broom
- Cutting Tool(s)[‡]—When cutting, follow regulations for mitigation and collection of dust. Cutting with power tools should utilize a fresh Carbide or Diamond Blade to minimize chips in the stone.
- Non-power tool options include Wide-Mouth Nippers or Hatchet

TOOLS REQUIRED			
 <p>Staple Gun/Hammer (Applying water-resistive barrier and/or metal lath)</p>		 <p>Metal Jointing Tool/Wood Stick (Finishing joints)</p>	
 <p>Mason's Trowel (Applying mortar)</p>	 <p>Margin Trowel (Applying masonry adhesive)</p>	 <p>Grout Bag</p>	
 <p>Wheelbarrow & Hoe (Mixing mortar)</p>		 <p>Hock & Trowel</p>	
		 <p>Level</p>	
 <p>Masonry, Circular, Table, Wet Cut Saw or Grinder with Carborundum or Diamond Blade</p>			 <p>Whisk Broom (Cleaning finished work)</p>
 <p>Wide-Mouth Nippers/Hatchet (Trimming stone)</p>		 <p>Dust Mask[‡]</p>	 <p>Safety Glasses[‡]</p>

Note: Cutting dust mitigation steps include but are not limited to: wet saw, dust vac systems and respirator systems. Consult **OSHA requirements** and possible job site testing.

‡Caution: Boral Stone Division manufactured stone veneer products contain Crystalline Silica. Dust from cutting or sawing may create possible cancer hazard. Dust may cause irritation of the nose, throat and respiratory tract. Avoid prolonged or repeated inhalation of dust. A properly fitted, particulate-filtering disposable **NIOSH Approved N-95 Series** face piece respirator should be used when mechanically altering this product (e.g., sawing, cutting, drilling or similar dust generating processes). Wear a long-sleeved shirt, long pants, gloves and safety glasses with side shields when handling and installing material. Wash hands and face with soap and warm water immediately after handling.

In the event of any conflict or inconsistency between the tips, recommendations and installation techniques set forth in this guide with the NCMA-MSV Installation Guide and any local code requirements, the NCMA-MSV Installation Guide and local code shall prevail. The tips and recommendations provided here are meant to improve the aesthetics and efficiency of the installation and do not replace required practices as defined in the NCMA-MSV Installation Guide. This guide does not, is not intended to, and shall not be construed to create or establish any additional product warranties including, but not limited to, any with respect to the Boral Stone Division products referenced herein.