OVERVIEW

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2 | Required Tools

3 | Preparing Door and Window Openings
   Properly seal and flash all openings to window and door manufacturer’s specifications to ensure thermal and water resistance.

4 | Installing the Panels
   Ensure a stable substrate and attach the premolded insulation panels to wood studs or other suitable framing member using the stainless steel anchors and approved fasteners that have been provided.
5 | Inserting the Masonry Units
Insert masonry units into place within the insulation panel.

6 | Mortar Installation
Mix and apply EnduraMax mortar using a grout bag, manual mortar gun or mortar pump.

7 | Tooling the Joints
Tool the joints when mortar is “thumbprint hard” using a wooden, plastic, or metal striking tool.

8 | Cleaning
Follow our cleaning tips to minimize mortar stains during construction.

Check Local Building Code Requirements
Always check with local authorities for applicable requirements in your area. Carefully read all instructions and local building codes before proceeding with installation.
EnduraMax Insulation Panels
Panels for stone are made of closed cell expanded polystyrene (EPS). Meets ASTM C578

EnduraMax Insulation Panels
Panels for clay brick and concrete brick are made of closed cell expanded polystyrene (EPS). Meets ASTM C578

EnduraMax Masonry Units
Manufactured Stone: various sizes and shapes of stone. Meets ASTM C1634
Concrete Brick: multiple lengths of concrete brick. Meets ASTM C1634
Clay Brick: engineer-size (1 ¾” thick x 2 ¾” high x 7 ¾” long). Meets ASTM C1088

EnduraMax Mortar
This pumpable mortar is available in bags or supersacks. Meets ASTM C270 Type S

Note: The EnduraMax Warranty requires the use of all/only EnduraMax materials.
EnduraMax Anchors & Fasteners
For every 2.14 ft\(^2\) of wall coverage, one anchor and one 3½” fastener is required. Contact your local EnduraMax representative for alternate fasteners.

Shelf Angle/Lintel (sold separately)
Minimum 3\(\frac{3}{8}\)” x 3 \(\frac{1}{2}\)” x \(\frac{1}{4}\)” support angle is required at the base of walls, when structural foundation is not present, and tops of openings to facilitate moisture control and contain the mortar joint. Additional flashing is typically required by local codes.

Flashing (sold separately)
A membrane, installed in a masonry wall system, that collects water that has penetrated the exterior wythe of masonry and facilitates its drainage back to exterior. (minimum .019 metal or .025 elastomeric or other approved material).

Adhesive (sold separately)
Adhesive compatible with EPS insulation may be used to temporarily hold masonry units in place where needed, such as where insulation panel or masonry units are cut. Expanding foam insulation (such as “Great Stuff”) is also useful for sealing foam corners, penetrations, and edges of openings between the frame and the EPS.

Temporary Spacers (Masonry Unit Support)
Foam spacers (included with insulation package) can be used as a wedge to support masonry units in damaged or incomplete EPS pockets.

Weep Hole Material
Weeps, spaced a maximum of 32” o.c., can be formed by utilizing the polymer mesh cubes (included with the hardware kit) or leaving gaps (open head joints) in the mortar between the metal flashing and the masonry unit.

Note: Packaging/sizing varies by product. Check with your local supplier. Flashing and Lintel may vary per local building code. Always follow the most stringent code that applies.
2 | REQUIRED TOOLS

Essential Tools

- Grout bag or mortar gun to install mortar
- Drill with #2 square head and Phillips head bits to fasten anchors (if supplied)
- Mixing drill (½ in.) to mix mortar
- 5-gallon buckets (at least 3) to mix mortar/measure water
Circular saw with fine-tooth blade installed reversed
to cut insulation panel

Long blade utility knife (min. 2” blade preferred)
to cut insulation panel

Grinder
to cut masonry units

Stiff bristle (non-metal) brush
to brush off semi-dry mortar

4-ft. (or larger) level
to level insulation panels

Jointer/Dowel Rod
to finish mortar joints and compact the mortar while creating the desired finished joint profile (wood, metal or plastic)

Optional Tools

Small splitter or masonry/tile saw
to cut stones

Hot knife
to cut insulation panel

Oldcastle mortar pump
To install mortar for larger projects (in place of grout bag/quick point gun)

Mortar mixer
to mix mortar for larger projects (in place of ½-in. drill)

Drywall square
as a guide for cutting foam

Mesh Screen
to screen larger particles from mortar
Flashing Above Openings

Lintel must be installed above all openings and should extend beyond the end of the window frame. The weather resistant barrier and flashing must overlap the lintel.

Always refer to window and door manufacturer’s specifications when setting lintels and flashing.

Always refer to local building code for flashing WRB and Lintel requirements.
Flashing Around Openings

Cut the insulation panels at the frame opening. Upon completion, the insulation at these edges must be covered by masonry or window/door trim.

For new construction: When installing doors and windows, the trim for the opening can extend beyond the visible edge of the insulation panel. The trim must overlap the base wall by 2½ in order to completely cover the insulation panel.

For renovations: A “J” or “C” channel can be installed to cover the edge of the insulation panels.

Warning: Always confirm that the wood framing of openings larger than 4 feet (including garage doors, large windows, etc.) are capable of supporting the weight of the EnduraMax wall that will be installed above. Always refer to NCMA recommendations (www.ncma.org), BIA recommendations (www.bia.org) and local building code regarding sills, masonry surrounds and corners. All EnduraMax masonry veneers require support over openings. Support may include 3 1/2 x 3 1/2 x 1/4 minimum Lintel, precast concrete, wood or other material designed for the purpose. When in doubt, consult an engineer.

Using Window Sills

To prevent water penetration, window sills are required for all EnduraMax applications. A variety of materials are available for this, including stone, brick, and precast metal.

Be sure to slope the sill a minimum of 15°. As with any masonry veneer, flashing should be installed at the base of the sill per local building code to prevent moisture penetration to the interior.

Leaving space for a sill
We recommend cutting insulation panels at the base of the window to create the opening required for a sill.
Getting Started

EnduraMax must be installed over stable, structurally sound, and properly prepared substrates. Exterior applications should begin a minimum of 6” above grade and a minimum of 2” above hard surfaces (driveways, patios, etc.). If necessary, and when supported by concrete or masonry, mortar, concrete or grout may be used to fill the gap between the back face of the EnduraMax masonry units and the backup wall or foundation. Be sure to flash above grade to prevent moisture from wicking up the wall.

Warning: Unstable substrate may result in cracking or poor performance.
Check Wall Alignment and Surface
Substrate surface imperfections may be reflected at the masonry surface and should be corrected before installation.

Marking Studs
Mark stud locations by tracing vertical lines onto the foundation (or soffit condition) to indicate stud locations before foam insulation is attached and the sheathing is no longer visible.

Ensure Required Weather Resistant Barrier and Shelf Angle is Properly Installed
If a shelf angle is required at the base of the wall. It should be properly flashed. The flashing should be tucked behind the weather resistant barrier to ensure any moisture that may penetrate the veneer flows to the weep holes at the bottom of insulation panels.

Note: EnduraMax is a veneer system and should not be included in the load bearing capabilities of any wall. It is designed to be attached to a back-up stud wall, with studs placed at 16-in. centers. Alternate stud spacing must be approved by a structural engineer.
Choosing a Starting Point

We recommend working left to right, so that the shiplap edge is easily slid into place. Do this by installing the first insulation panel on the bottom left side of the elevation and adding panels toward the right until installation is complete.

If EnduraMax will be installed on all elevations, start and stop at a window or door opening or an inside corner.

* See video on EchelonMasonry.com for additional information.

Determine Panel Orientation

Panel placement depends on whether you’re using stone or brick masonry. Install panels as indicated in the following recommendations.

Install insulation panels vertically for stone and horizontally for brick.

If panel does not end on stud, place adhesive bead on panel joints to ensure proper sealing. Always ensure all anchors are placed at stud locations.

Install and Anchor the First Insulation Panel

When possible, the first panel should be installed in the lower left-hand corner of the wall to allow the edge (shiplap) mating. Be very careful to ensure this first panel is level before anchoring so the successive panels remain level.

Note: Panels must be kept 3/8” above flashing angle to allow for the installation of foam weep holes and finished installation of mortar joints.

Note: If installing panels right to left, leave foam fasteners loose until the next piece to the left is secured behind the shiplap. Otherwise, it will be difficult or impossible to move it into place.
Install and Anchor the First Insulation Panel

When possible, the first panel should be installed in the lower left-hand corner of the wall to allow the edge (shiplap) mating. Be very careful to ensure this first panel is level before anchoring so the successive panels remain level.

Insulation panels must be attached to wall studs, or other suitable framing member, with an average of one anchor for every 2.14 ft² (typically every 16” horizontally and no more than 19.25” vertically). Attach the anchors at the cell edges using EnduraMax anchors and fasteners. Provide additional anchors around openings larger than 16 in. in either dimension. Space anchors around perimeter of opening at a maximum of 2 ft on center. Place anchors within 12 in. of openings as well as the perimeter of the EnduraMax Wall System.

Place the anchor tightly against the bottom of the cell edge, as shown in the photo above to ensure the masonry unit fits into the pocket and the legs of the anchor will be surrounded by mortar.

Note: While these instructions are intended for conventional wood-frame structures with studs spaced at 16 in. on center, EnduraMax can also be installed on other substrates when paired with alternate fasteners. Contact your EnduraMax representative for recommendations.

Warning: EnduraMax can be used on structures other than wood, including concrete masonry units and steel. However, always check with your local EnduraMax rep to source approved, alternative screws and fasteners.
Continue Installing Panels

Each subsequent panel fits into the shiplap edge groove of the preceding panel. Check each panel with a level.

Weep holes can be added at the base of the wall after the panels are installed.

For manufactured stone applications, each panel should be stepped upwards from the preceding one in order to avoid repetition of the stone pattern. There are reference numbers on the front of each panel and key holes within the shiplap edges to help the installer position panels faster (see illustration).

For concrete and clay brick applications, it is preferred (though not essential) that panels be installed in staggered rows. By starting every other row with a half board (a 4' x 4' piece of brick foam cut in half vertically) the seams will not line up with one another, which typically assists in keeping the insulation against the backup prior to installation of the masonry.

Remnants trimmed from the top of the wall can often be used at the bottom and vice versa.

The top of the back face of the uppermost insulation panel (drainage channels) should be sealed with caulking or expanding insulation (like “Great Stuff”) to achieve the best thermal performance.

Outside Corner Installation

To install the insulation at a 90° angle, make two vertical 45° miter cuts. The cuts must be 45° to hold the corner masonry units firmly in place while helping to ensure the coursing aligns.

**Tip:** Gaps in the 45° miter, if they occur, can be filled with expanding insulating foam.
General Installation

For Manufactured Stone

Individual pockets are designed to receive differently-sized stones.

The top of each stone includes small protrusions and a bevel. Insert the top of the stone first, pushing firmly upward, and then hinge (rotate) the stone bottom into the pocket.

The protrusions on each stone are located on one side only, which should always face the top of the insulation pocket.
For Clay Brick
As in standard bricklaying, start at a lower corner of the wall, install a few bricks in the first row, and then install the next row, making sure the joints are offset to produce the desired bond pattern (e.g. ½ running bond).

Insert the top of the brick first, pushing firmly upward, then insert the bottom, by rotating the bottom of the unit into place.

For both stone and brick, the back face of the unit must fit flat against the insulation panel. If it does not, remove the unit, remove any material preventing the proper installation, check the foam ribs to ensure they are not blocking proper unit installation (correcting as necessary) and reinstall the masonry unit.

Special Applications

Installing Masonry Units into Incomplete Insulation Pockets
Incomplete pockets occur at the bottom of every panel, as shown, and they usually also occur at doors, windows, tops of walls, and corners. To insert a masonry unit into incomplete pockets, proceed as follows:

• Place a small dab of foam friendly adhesive, such as Mason Bond or PL Premium in each of the upper corners of the incomplete pocket.
• Insert the stone unit, wedging it in place using spacers as needed. (The spacers are included with the EnduraMax insulation panels.)
• In most instances, cutting units is not required, as the pockets can be broken to allow a larger unit to be installed.
• A masonry or tile saw, or grinder, can be used to cut units to fit incomplete pockets as required.

Movement Joints
Typical locations for movement joints, as with other masonry veneer, include the following:

Typical Spacing
• Concrete Units: 1½ times the height of the wall, not to exceed 20 feet OC
• Completely surrounding windows, doors and other openings
• Clay Units: Not to exceed 25 feet OC

Other Locations
• At interior corners
• At changes in wall height
• At changes in building materials (such as where stone meets other siding)
• All movement joint recommendations should conform to NCMA and BIA requirements for, respectively, concrete or clay masonry
• Movement joints are required in the masonry wythe only any and do not need to continue through the insulation panel.

(For additional information on movement joints, refer to technical drawings at EchelonMasonry.com)
Sills
Sills allow you to create the look of a full thickness wainscot or finished window and protect walls from moisture penetration. They are designed to create approximately $\frac{1}{2}$" to 1½" of overhang over the EnduraMax wall system. Sills can be adequately supported using a galvanized metal angle (minimum 12 gauge) or 2 galvanized metal support brackets (with a minimum holding capacity of 5 lbs/LF) per sill, fastened with corrosion-resistant nails or screws to studs or blocking.

Construction adhesive may also be used to bond the stone/brick sill at bracket locations. Flashing should be installed immediately below the sill and supports and extend to the face of the exterior wall. The sill should always slope away from the building to facilitate water runoff.

If stone sills are not installed, appropriate trim materials that prevent water penetration and finish the top of the EnduraMax wall should be used, and precautions should be taken to properly flash the opening.

Weep Holes
Open head joints (at least $\frac{1}{2}$" high) or mesh cubes can be used as weep holes and should be placed no further than 32" OC along the base of the wall and over openings. These weep hole openings allow the wall to drain.

Above and Below Openings
Above openings, the same principle applies as at the base of the wall, namely to properly flash and weep the wall and to provide support with a lintel while allowing the veneer to move separately from the structure.

The sill must be installed to shed water away from the wall system and properly anchored to the substrate, with flashing installed to prevent moisture from penetrating the wall system below. Sills must be installed per manufacturers recommendations.
**Soffits and Eaves**

Insulation panels may extend into the space above the soffit. This is often easier than cutting stone to match the soffit trim. The top of the wall should be properly attached with anchors no further than 12 in. from the top of the masonry and movement joints to prevent transfer of differential movement between the masonry and the soffit or eave above.

**Corners**

In general, the masonry units follow the insulation panel pattern up to and around corners. However, this is not always the case due to wall lengths.

Units may have to be re-sized to fit incomplete insulation pockets, or the insulation pocket edge can be removed to fit a different (usually larger) unit.

It may be helpful to use adhesive (polystyrene compatible) on the back of the corner units. These units are often installed in incomplete insulation pockets. The adhesive will temporarily stabilize these units prior to adding mortar.

*Note: Always place cut edges of stone or brick units towards a mortar joint rather than on visible side of an outside corner.*
General Principles

The EnduraMax system includes a pre-blended, proprietary mortar that meets ASTM C270. It’s designed specifically to increase bond and pumpability (flow) with EnduraMax veneer using a variety of installation techniques.

While a grout bag can be used to fill joints on smaller applications, the following two tools allow faster installation of mortar:

- Mortar Drill Gun

Tip: Using other mortars will void all Oldcastle warranties.

- Pump and Mortar Gun: A portable electric pump and injector gun complete with refillable hopper. Additional accessories such as a mortar mixer are also available.
Mixing and Batching

Mix mortar according to the instructions included on the bag. Mortar may be mixed in a bucket or a conventional mixer.

Pouring the dry mortar through an 8 mesh screen as it is poured into the mixing container helps remove larger particles that may clog the grout bag or pump. Combine cool, clean water with mortar according to instructions on the mortar bag. Mortar should be mixed to a lump-free, paste-like, non-pourable consistency. Periodic mixing during application keeps the mortar workable, but do not add additional water once mixed. Consistency of mixing ratio between batches helps to maintain color shade uniformity. Discard mortar when too stiff to work, or after approximately two hours.

Injecting Mortar

All head and bed joints must be completely filled, ensuring anchors are fully embedded in the process. Apply mortar working from the top down or bottom up.

It is typically easier to fill bed joints in a small area (approximately 4 square feet, or slightly larger, when using mortar pumps) and then fill head joints. Slightly overfill the joints to ensure the joint will be full and well compacted when tooled.

Any mortar that accidentally falls onto the masonry units should be allowed to dry until “crumbly” and then brushed off with a dry, stiff bristle brush or broom. Attempting to remove the mortar when wet may smear the mortar onto the surface.
Tooling the mortar joints helps compact the mortar against the surface. A concave or grapevine finish helps to compact the mortar against adjacent masonry units, while ensuring a uniform and finished moisture-resistant surface. Finished joints can be formed with a wooden, plastic, or metal striking tool that is slightly larger than the width of the joint thickness. Raked joints must not be used with the EnduraMax Wall System.

Tool the joints when they are “thumbprint hard” — dry enough to fall cleanly away from the wall without smearing, but wet enough to allow the concave or grapevine surface to be formed without excessive pressure. The curing time prior to striking can vary significantly with temperature and humidity and wind.

Loose or excess mortar along the joint surface or masonry units that was not removed earlier should be removed using a stiff bristle brush. Never use a wet or wire brush. Mortar is much easier to remove if cleaned from the wall within 24 hours after application.

Note: Excess mortar should not be allowed to harden on the masonry overnight.
Follow these tips to minimize mortar and grout stains during construction:

- Water content of mortar mix should be carefully controlled to prevent wet mixes from flowing onto the surface of the masonry. Adding too much water often results in additional and difficult cleaning.
- Keep masonry units dry and be careful to prevent mortar falling on the surface from smearing.
- Mortar that does land on or smear the surface of the masonry unit should be removed after initial set.
- Using a stiff bristle or fiber brush, brush walls clean at the end of the day and before raising scaffolding. Raised mortar droppings can be rubbed with a trowel, chisel, or loose masonry unit after being allowed to harden.
- Protect the base of the wall from splashing mud, mortar, and grout droppings by spreading plastic sheets, straw or other protection on the ground adjacent to the wall and 2’ to 3’ up the face of the wall.
- Protect newly constructed masonry when adjacent construction procedures may splatter or otherwise stain it. For example, place plastic over masonry when concrete or hot asphalt is poured nearby and when curing agent is sprayed.

Note: Cleaning methods, in addition to the precautions listed, may alter the appearance of the finished masonry; typically, some of the cement paste is removed from the surface of the units exposing more aggregate and potentially altering the finished color of the masonry.

Note: Cleaning methods may have varying results based on the specific procedures used. Only, the mildest cleaning method that will satisfy should be chosen. Apply recommended cleaning agent and procedures to a sample panel or inconspicuous location first and assess the effectiveness only after allowing the sample to dry completely.

Do not pressure wash or use muriatic acid to wash the masonry.

Concrete Masonry Units
If mortar residue is still present after drying, use a concrete masonry cleaner, such as Concrete Brick Cleaner by ProSoCo, or equal, according to the manufacturer’s instructions. Do not use muriatic acid products.

Clay Brick
If any mortar residue remains on the stones once the mortar has dried, use Vanatrol by ProSoCo or equal according to the manufacturer’s instructions. Always test a sample area and allow it to dry completely before assessing effectiveness and using the cleaner and procedure on the remaining masonry.
Safety /Warnings
Stones inserted into the EnduraMax insulation panel are not 100% secure until the mortar has been injected and cured.

For the best safety, EnduraMax units should be mortared as soon as possible. Depending on project size, masonry should not be installed higher than 10 ft prior to installing mortar.

The EnduraMax veneer system is a masonry veneer, similar to concrete and clay veneer systems. In most instances, typical BIA and NCMA veneer recommendations may be followed with regard to moisture and movement concerns. Always refer to local building codes to determine substrate suitability and requirements for masonry veneers.

In this guide, the system is applied to a conventional wood wall frame (studs spacing at 16" centers). Installation on any other type of structure or stud spacing should be reviewed and approved by a licensed engineer or reviewed by EnduraMax technical services representative. EnduraMax walls must be properly supported horizontally and laterally. A brick ledge or shelf angle is required at the base of the wall with a maximum continuous height of 30 ft (38 ft. at gables). Intermediate support (shelf angle) may be installed at floor levels to allow taller EnduraMax installations.

For more information, call EnduraMax support at 844-495-8211.

Warranty
We back the performance of the EnduraMax Wall System with a 25-year Limited Warranty on all components. Limitations may apply. See Limited Warranty for details. A copy of the Limited Warranty can be obtained at EchelonMasonry.com.

Glossary
Caulk bead: band of caulking (must be compatible with polystyrene)
Cell (or Pocket): a pre-molded cavity in the polystyrene panel into which a stone is inserted
EnduraMax anchor: a stainless-steel part that allows the polystyrene panel to be fastened to the wall so that the stone’s cladding can be attached to the structure
Flash:Thin metal (minimum 0.016 stainless steel, copper) or flexible flashing (minimum 0.030 rubberized asphalt) used to prevent water from penetrating the wall (e.g. at tops of walls or sills) or to collect water that has penetrated the wall and drain it to the exterior through weepholes (e.g. base of walls or heads of openings).
Jamb: the vertical side of an opening (doorway or window)
Lintel: a structural element placed above an opening to support and distribute the weight of the masonry above the opening
Mortar Batch: a unit of EnduraMax-approved mortar and water mixed together
Opening: a general term used to designate a window or doorway
Shiplap: the strip along the side of the polystyrene panel that allows one panel to be inserted into another
Sill (window support): a horizontal element installed at the base of a window or door
Steel support angle: a 3 ½” x 3 ½” which contains the bottom-most mortar joint. It can also be used at the base of the wall when a concrete or masonry brick lege is not available or to support window sills & headers.
Weep hole: a vertical opening at the bottom of masonry work through which water that accumulates in the wall can escape.

Technical Documents & Resources
Technical documents and resources for the EnduraMax System, including an Evaluation Report with specifics, can all be found at EchelonMasonry.com.

Customer Service
For assistance, call: 844-495-8211 or visit www.EchelonMasonry.com.
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