Fond du Lac Natural stone
BUILDING & LANDSCAPE STONE
fdlnaturalstone.com

Installation Guide & Helpful Tips 2024

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FDL Natural Stone highly recommends the installer read this document in its entirety before installing Natural THIN Stone Veneers. The information contained is provided to explain the most commonly asked questions about stone installation. The instructions, tips, and hints serve as general guidelines. FDL Natural Stone has neither liability, nor can be held responsible, to any person or entity for any misunderstanding, misuses, or misapplication that would cause loss or damage of any kind. Review and adhere to local building codes, and follow safety guidelines. If questions arise, please attempt to contact your local dealer first. If the dealer cannot answer your question, call FDL Natural Stone Technical Support: **920-251-2434**

AIA Continuing Education

ASID INDUSTRY PARTNER

ASTM International Organizational Member

Member NAHB National Association of Home Builders

Getting Started

*FDLNS recommends having at least 5% - 10% additional material on-hand to ensure ideal color, size, and texture distribution. **

- ## Material Calculations for FLATS

  Area $_{(SqFt)}$= Length$_{(ft)}$ x Height$_{(ft)}$

  Subtract area covered by windows & doors.

  *Products in the **Ledgestone and Dimensional Ledgestone Collection** are packaged/marketed for tight-fit or "dry-stacked" applications, that is, **no mortar joint**. All other products are packaged assuming 1/2" mortar joint.*

- ## Material Calculations for CORNERS

  Measure length or height$_{(ft)}$ of corner to be covered with stone.

  One linear foot of corners will cover approximately 1/2 square foot of flats which can then be subtracted from the total square footage of flats calculated above.

  *For **Virginia or Silver Ledgestone** corners, measure linear footage and divide by two. Then see "Corners", Pg. 6. (Integrate 1—2 flats for every corner.)*

  ***Hudson** & **Diamond Ridge** corners: 50% are ninety degree corners, and 50% are flats with one snapped "natural" end, and an irregular end.*

  ***Dimensional Ledgestone** corners: 100% flats with snapped "natural" squared off ends.*
  No Full Returns for: Bronze, Copper, Platinum, Nickel

  Refer to website for corner installation of the following:
  Virginia / Silver / Hudson / Diamond Ridge / Bronze / Copper / Platinum / Nickel Ledgestone.

  https://www.fdlnaturalstone.com/installation-instructions/

- ## Material Calculations for Panelized Products:

  Virginia Ledgestone-Panel *Silver Ledgestone-Panel* *Ironwood-Panel* *London-Panel*

  https://www.fdlnaturalstone.com/wp-content/uploads/2023/02/Panel-Project-Calculations-d.pdf

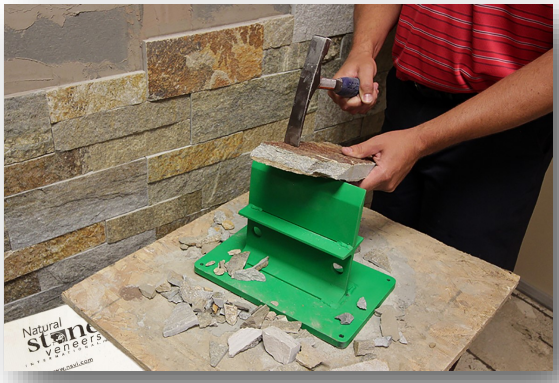
- ## Tools & Equipment to Consider

FDLNS highly recommends using a King Cutter™ to efficiently cleave stone while leaving a natural edge !

Very low dust Faster than sawing | Highly mobile 100% solid steel | No power source needed Indoors or Outdoors

Please visit: https://fdlnaturalstone.com/wp-content/uploads/2021/10/KingCutterPromo.pdf for a demo video & more information.

Call: **877-923-2800** or send an email to: **order@fdlnaturalstone** to order yours today!



- **NIOSH N-95 Dust Mask**
- **Safety Glasses**
- **Ear Plugs**
- **Masonry Hammer**
- **Wet Saw** w/Masonry/Diamond blade
  Circular, 4" Grinder
  Chop
- **Levels**
  Torpedo
  2-ft Level
  4-ft Level
- **Tape Measure**
- **Chalk Line**
- **Staple Gun or Pneumatic Fastener**
- **Brush or Wisk Broom**
- **Grout Bag**
- **Wheel Barrow**
- **5-Gallon Buckets**
- **Tuck-pointer**
- **Trowels:**
  Notched
  Mason's Trowel
  Margin

Environmental Considerations

In HOT, or dry conditions, FDLNS recommends to dampen the scratch coat or masonry substrate where the stone is about to be applied. Otherwise, the stone will absorb moisture from the mortar too quickly, resulting in a weaker bond. It should appear damp without any pooling.

When air temperature falls below 50 degrees F (10 degrees C), heat mortar mixing water.

In temperatures less than 40 degrees F., mortar will not set properly. Keep the mortar and work area at, or above, 40 degrees.

Store mortar under cover in area where air temperature is maintained between 40 and 110 deg F (4 - 43 degrees C).

(For minimum requirements, see: ACI 530.1/ASCE 7/TMS 602)

Getting Started *(continued...)*

Preparation

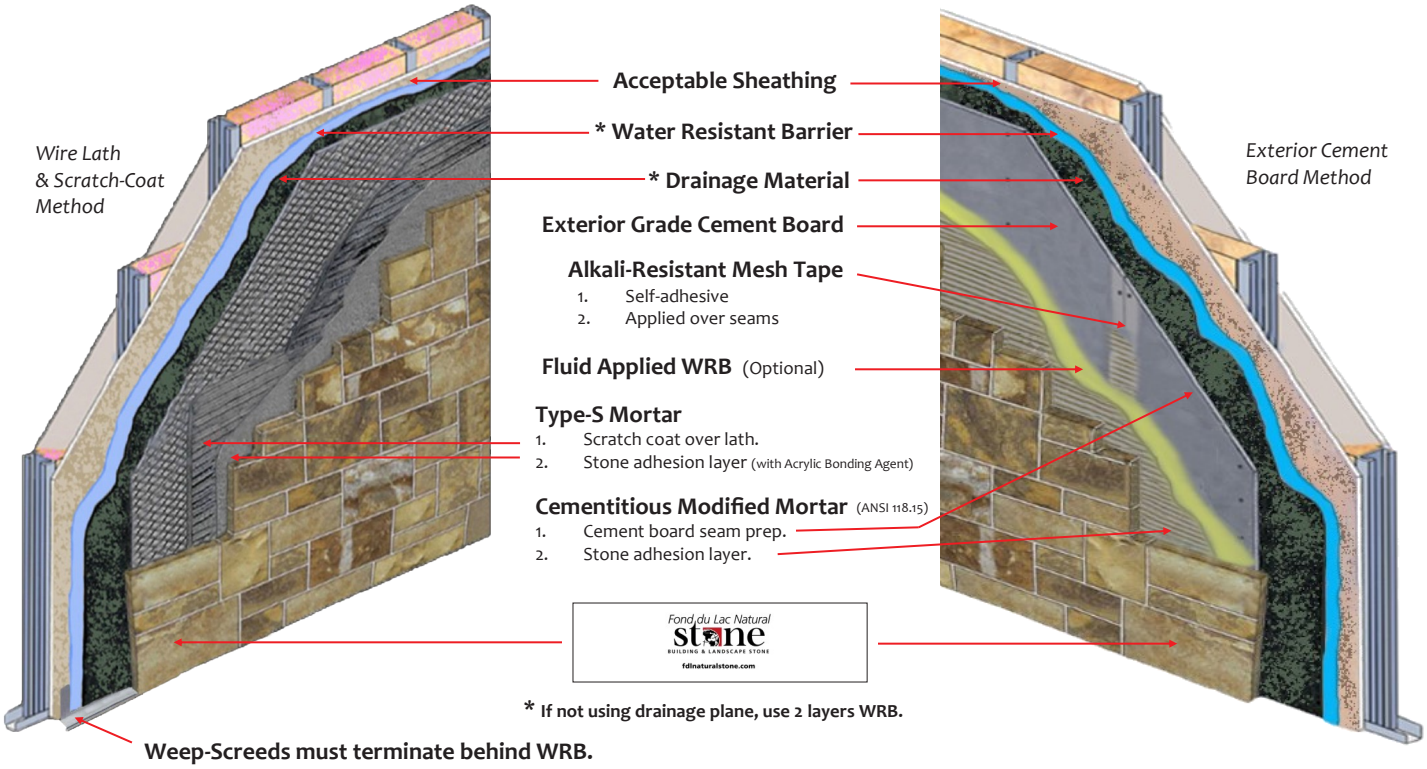
Common Substrates

Wood Studs: Use corrosion resistant fasteners ensuring 1 inch of stud penetration. Space 16" horizontally on-center and every 6" - 8" vertically.

Metal Studs: Use appropriate corrosion resistant fasteners ensuring 1/2" of stud penetration. Space 16" horizontally on-center and every 6" - 8" vertically.

Lath: If using wire lath method, use appropriate fasteners and spacing in accordance with ASTM C1063.

Wood or Metal Studs



* If not using drainage plane, use 2 layers WRB.

Weep-Screeds must terminate behind WRB.

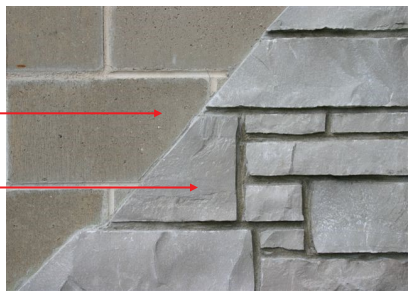
Concrete Masonry Unit (CMU)

If CMU surface is untreated (no paint or other coatings), neither wire lath/scratch coat nor cement board is required.

Ensure surface is clean and free of debris.

When necessary, dampen CMU surface before applying stone (see "*Applying...*", Pg. 5).





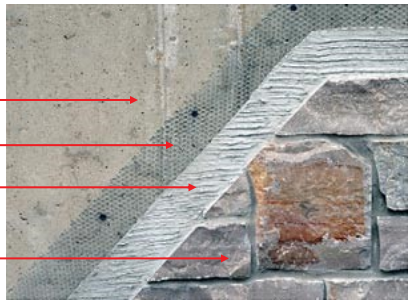
Poured Concrete

Best Practice: Use wire mesh & scratch coat as pictured (right).

If paint or other protective coating is present, FDLNS recommends the use of galvanized diamond wire lath, 2.5 lbs per sq yd min gauge.

Alternative: If concrete wall appears smooth, and clean, there could still be release agents present. Surface should then be sand-blasted or etched with muriatic acid and allowed to thoroughly dry.





Getting Started *(continued...)*

Preparation

Work Area

- Protect surfaces that could be damaged during the stone installation process, such as hardwood flooring, window trim, and other areas that have already been finished.
- Stage material close to the installation area. Layout stones so they can be easily viewed and reached. It is important to ***obtain stones from multiple packages*** (*boxes* and/or *crates*) and organize them by size, color, and texture. Opening all boxes and crates will facilitate random distribution.

Moisture Control

- **Flashing:** Verify flashing is properly installed (roof, chimney, windows, door openings, etc.); should integrate with Water Resistive Barriers (WRB)
- **WRB:** At least one layer followed by rainscreen or drainage plane. Install from bottom up, overlapping min. 4 inches, horizontally and vertically.
- **Weep Screeds:** Should be applied per manufacturer's specifications. Depending on product, may need additional fabric layer to ensure product from getting filled with scratch coat. Must be corrosion resistant, and terminate behind WRB.
- **Drainage Plane:** A drainage wall system can be a design choice or a requirement of the local building code.
- **REFER TO LOCAL BUILDING CODES**

Wire Lath/Mesh

- Use expanded, galvanized, self-furring diamond-mesh meeting requirements of ASTM C847-18 (min 2.5 lb/yd^2).
- Install tightly, cups up (smooth when felt from bottom to top, rough when felt top to bottom.)
- Overlap sections of lath approximately 1 inch.
- Fasten lath with corrosion resistant fasteners every 16" horizontally on-center, and every 6" - 8" vertically.
- Wrap corners minimum 16" (inside and outside corners.)

WOOD STUDS: If anchoring to wood studs with screws, use washers, and ensure 1 inch of stud penetration. If anchoring with wide-crown staples, ensure staples will penetrate 1 inch deep.

STEEL STUDS: If anchoring to steel studs, ensure 1/2 inch of steel penetration beyond inside surface.

Scratch-Coat

- Ensure surface is clean and free of any debris.
- Use Type-S mortar.
- It is important to ***not*** leave the scratch-coat surface smooth. Groove *scratch-coat* horizontally with a notched trowel or mason's "comb".
- *Scratch-coating* can be done in its entirety before adhering stone, but it is also acceptable to "*scratch-as-you-go*".

Interiors (Over Drywall)

If drywall is used as the substrate, follow guidelines for *Wire Lath/Mesh* and *Scratch-Coat* as seen on this page. Then see, "***Applying FDLNS Stone Veneer***" on page 5.

Cement Board—(For exteriors, use cement board rated for exteriors, and refer to moisture control section on this page.)

- Instead of using moisture resistant barrier and wire mesh system, cement board products can be used for interiors. (***Exception:*** *Interior water features require WRB.)*
- Apply cement board per manufacturer's specifications over studs (drywall is not necessary if using min. 1/2" thick cement board), but can be left in place).
- Fasten cement board using corrosion resistant screws every 16" horizontally on center, and minimum 6" vertically, ensuring minimum 1 inch of wood stud penetration, or 1/2" penetration if applied over metal studs.
- Tape cement board seams with fiberglass tape and seal seams with polymer modified mortar meeting ANSI 118.4, or ANSI 118.15.
- Use mortar meeting ANSI 118.4 or 118.15 specifications for adhering stone to cement board.
- Ensure surface is clean and free of debris.



Mortar Setting Bed (Adhesion Layer)

Type-S (ASTM C270) or polymer modified mortar should be used for Natural Stone Veneer products unless tight-fitting for no visible mortar joints (i.e. *Ledgestone, or Dimensional Ledgestone Collections*.)

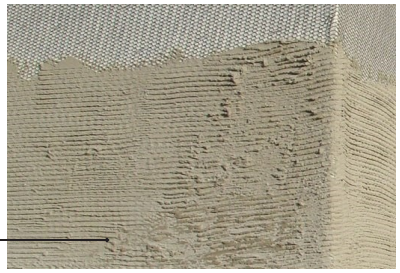
- Consistency of mortar mix is important. If too wet or too dry, mortar will not adhere to stone or substrate surface properly. It should stick to the trowel.
- FDLNS recommends adding ***acrylic bonding agent*** to Type-S mortar. This enhances the flexural, adhesion, compressive, and tensile strength qualities.

Polymer Modified Mortar

Thinset (ANSI 118.4, or ANSI 118.15) when tight-fitting NSVI stone (also see Pg. 6).







Installation

Trimming & Cutting

Diamond Blade Wet (or dry) Saw

Some stones may require custom fitting. A diamond masonry blade saw is the preferred means for precision cutting. Wear proper safety gear.





Along with dry saws, 4 inch grinders with diamond blades can be used to trim stones as needed.

Masonry Hammer

Shaping and texturing edges for custom fitting stone is often done using a masonry hammer. This is very efficiently carried out when combined with the **King Cutter** —>





Care should be taken to ensure safety and minimal waste.

https://www.fdlnaturalstone.com/wp-content/uploads/2023/03/King-Cutter-Promo-and-Safety-2021.pdf

Applying FDLNS Stone Veneer

- Begin installation at the bottom.
- It is helpful to install a temporary ledge to keep stone off of the floor (usually 1/2 inch above floor for interior walls), or 4 inches above grade for exteriors.[1] This will create a level starting point, and aid in speed of installation. Also, horizontal chalk-lines are beneficial every 12"- 16" for the same reason.
- Install some corner stones before flats. [2]
- Spread approximately 1/2 inch of mortar to entire back of stone (leave no air pockets).
- With firm pressure, press stone into place with a slight wiggle, allowing mortar to ooze around the outer edges of the stone. Take care to prevent mortar from getting on surface of stone. (See ***Care, Cleaning, & Maint***. this page.)
- Hold in place for a few seconds or until stone feels relatively secure in its wet mortar bed.
- Small stone chips or wood wedges can aid in immobilizing stones. (Removed before filling joints.)
- Remove excess mortar from around stone using trowel or tuck pointer.
- Once placed—***Do Not Disturb***. If stone loosens, it must be removed. Mortar must be completely cleaned off of the stone ***and*** the area where the stone was located. Then, reinstall stone per steps above.

[1] See Pg. 7 ***"Grade Level Finishing"***.
[2] See Pg. 7 ***"Stone Patterns"***.

Filling & Finishing Joints

(Grouting & Tuck-pointing)
Use Type-S or N mortar.

Two Methods for Filling Joints—

- ***Fill-As-You-Go*** *
  Mortar is applied to top of previously placed stone ("bed-joint"), and to adjacent stones ("head joint") then a new stone is placed on top of (or next to) the mortar joint bed, and tuck-pointed into remaining joints around the stone, sealing it to substrate.
- ***Grout Bag*** *(a.k.a. "cake-bag")* *
  Injecting mortar into joints after stone has been installed.



* If used, remove stone chips and/or wood wedges prior to filling in joints.

Finishing—

When mortar joints become firm, or *thumbprint hard*, the finishing process can begin. Temperature and relative-humidity will affect the time it takes the mortar to get *thumbprint-hard*.

Mortar joints are typically raked back and brushed smooth dependent on the joint style specified:

Overgrout— Mortar joints are filled in, flush to the surface of adjacent stone(s), then smoothened with a soft bristle brush.

Standard— Mortar joints are raked back to reveal the edge of the stones, then swept smooth with the brush. Joints should ***not*** be raked *too deep* as this could impact the integrity of the installation.

Key: *Do Not Give Reason for Water To Get Behind Stone.*





Care, Cleaning & Maintenance

If mortar gets on the face of the stone, let it dry slightly, brush off, and then sponge off any residue left behind. The best cleaning method for natural stone is a diluted, mild, detergent, 2—3 days after stone is set. Try an inconspicuous test area before attempting to clean an entire stone surface.

Do Not Use Metal Brushes or Acids!

Application Tips

Arches

With or Without Corners

- For a full-veneer look, use corners as shown in the photo (right).
- For a more uniform appearance, a *soldiers-course* can be installed using only flats as shown (below).
- Bracing is generally not required, but mortar consistency is important.


Sydney™ (Overgrout) shown


Concord™ shown

Columns

CMU or Wood Substrates are Typical

CMU — (Preferred)

- Begin with corners, staggering the lengths.
- Follow instructions for CMU on Pg. 3.

Wood Substrate —

- Column should be of sturdy, sound construction, and internally braced to prevent twisting and to minimize movement.
- Columns should be designed so that stone does not bear the load of other structural or aesthetic elements.
- Apply weather resistant barrier as needed (see Pg. 4)
- Wire lath must be wrapped 16 inches min. around the corners.
- Lath should wrap around and meet at or near center of one of the column sides, overlapping by at least 1 inch.
- Follow remaining procedures on Pages 4 and 5.


Aspen™ shown


Palmer™ shown

If capping top of exterior column(s), caps should extend 1—2 inches beyond the surface of the installed stone to help facilitate water run-off.


Camelback™ shown


Concord™ shown

Corners (Outside, 90 Degree Only)

- Start at the bottom.
- Stagger return lengths.
- Maintain level returns (excluding irregular stone, i.e. fieldstone & mosaic).

Virginia & Silver Ledgestone

- For every corner, integrate 2—3 flats above it to avoid a vertical jagged line.


Virginia Ledgestone™ shown

All downloadable ***Corner Installation*** guides: ***https://www.fdlnaturalstone.com/installation-instructions/***

Drystacking (*Tight-Fit joints*)

- Ledgestone is typically installed with *tight-fit* joints. FDLNS recommends ***Polymer Modified Mortar*** meeting ANSI 118.4 or 118.15 for all tight-fit applications. (See also Pg. 4, "Mortar")
- Fully cured and dry mortar joints are usually white or gray, however, a color additive can be mixed in to compliment the natural stone hues. Follow instructions on manufacturer's label to ensure proper and consistent proportions.


Virginia Ledgestone™ shown


Juneau Ledge™ shown

Fireplaces

Make Over: Installing Stone Over Existing Brick


Before...

Brick surface texture and coatings (if present) must be evaluated to determine if wire mesh and scratch coat is needed. If too smooth or painted, wire mesh and scratch coat is required. If surface is porous, unpainted, and mortar joints are in good shape, clean surface, ensure it is debris free, then butter back of stone, and firmly press stone into place.


After...


Wire Mesh applied over drywall.


Scratch-coat of mortar applied.


Keeping stones level.


Finished project.

Hearths







Building a new hearth out of plywood, followed by wire mesh, anchoring to floor, scratchcoat, then stone.

Application Tips *(continued)*

Flashings

Consult your local building codes, and review FDLNS drawings at the following link: https://www.fdlnaturalstone.com/architects-specifications/

Floors, Walks, & Patios

Natural Thin Stone veneers can be installed over untreated concrete walks and other substrates. NSVI recommends travertine stone tiles for horizontal surfaces, but high density sandstone or limestone flats can also be used. ***Prevent tripping hazards*** by selectively choosing flats with consistent depth and surface texture before installation, and consider full mortar joints (overgrout). ***Surface options:***

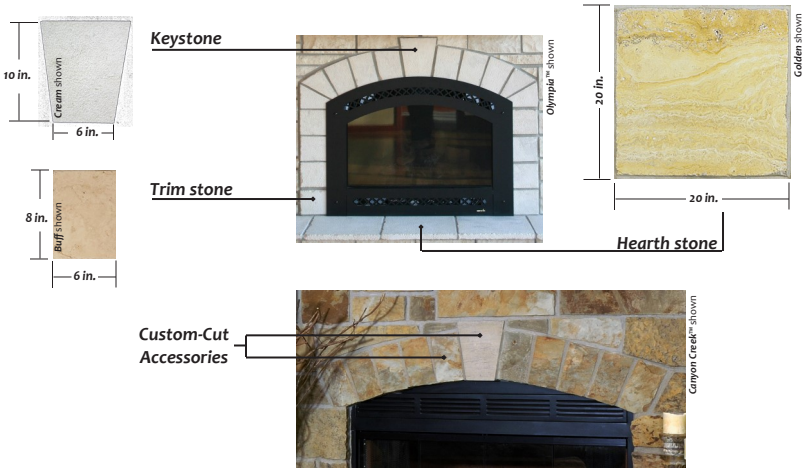
- **Interiors— Over Concrete**
  Over Wood Subfloor
- **Exteriors— Over Concrete**
  Over Decking **(Additional consideration to deck design may be required.)**

Grade Level Finishing

- **Over Concrete—Stone is to remain 2" above (i.e. garage front).**
- **Ground Level—Stone is to remain 4" above.**

Hearth, Trim, & Keystones

NSVI accessory stones have the dimensions shown below, or can be *custom-cut* onsite using the same stone type as the project:



Sills & Windows

Sills should be installed at a slight downward angle for water run-off.



Sill: *Indiana Rockface Grey*



Stone Patterns... *With or Without Corners:*

FDLNS recommends the following patterns & layouts. Please view FDLNS website photo slideshows in each Collection for representative installations.

Note that it is not necessary to strictly follow these recommended configurations:

Dimensional— 2:1 pattern, specified heights

FDLNS Collection:
- *Dimensional*



Dimensional Ledgestone— *Tight-fit*, 1:1 & 2:1 pattern

FDLNS Collections:
- *Dimensional - Ledgestone*



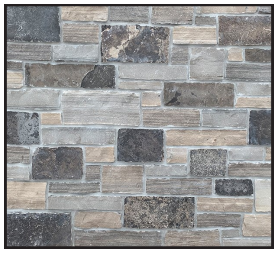
- *Ledgestone Panels*

https://fdlnaturalstone.com/wp-content/uploads/2021/10/Panel-Project-Calculations-c.pdf



Random Ashlar— Combination 1:1 & 2:1 pattern

FDLNS Collections:
- *Biltmore*
- *Country*
- *Falls*
- *Traditional*
- *Tuscan*



Ledgestone— Typically *tight-fit*, 1:1 pattern

FDLNS Collection:
- *Ledgestone*



Mosaic— Irregular, randomly sized material

FDLNS Collections:
- *Fieldstone*
- *Mosaic*
- *Old World*



Fond du Lac Natural stone
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Concord shown

Codes & Standards

ASTM

- **C 847** Metal Lath
- **C 270** Mortar for Unit Masonry
- **C1063** Installation of Lathing & Furring

ACI 530/530.1-13 | ASCE/SEI 7-22 | TMS 402/602-22
Building Code Requirements
for Masonry Structures

ANSI 118.4 & 118.15
Polymer Modified Mortars


Fieldstone shown
New England




Split Fieldstone shown

CONTACT INFORMATION

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Dealer Info & Tech Support: 920-251-2434
Email: info@fdlnaturalstone.com

Warranty

Fond du Lac Natural Stone, Natural Stone Veneers International, Inc. & Fond du Lac Stone —Limited Warranty

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CONTINUING EDUCATION

INDUSTRY PARTNER

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