



MANUFACTURER'S INSTALLATION INSTRUCTIONS

1.0 CAREFULLY READ ALL INSTALLATION INSTRUCTIONS BEFORE PROCEEDING WITH YOUR CENTURION STONE VENEER PROJECT

Codes may vary from area to area. Centurion recommends you review your local codes for special requirements that may apply to your area.

Centurion Stone's 50 Year Limited Warranty applies only when installation is in accordance with codes and the manufacturer's instructions. The following construction details are options for stone veneer installations; they will not apply to all circumstances you may encounter. For additional information, refer to our ICC-ES Evaluation Report No. ESR-2239.

SURFACE PREPARATION

2.0 TECHNICAL INFORMATION FLASHING FOR STONE VENEER INSTALLATION

A quality framing, sheathing, flashing and lathing job will not guarantee a trouble free stone job, but will go a long way in improving the odds the job will be successful, durable and beautiful for generations to come.

2.1 FLASHING: HOW IT AFFECTS THE TOTAL JOB Flashing must be in place prior to the weather barrier installation. It is very important that the contractor be aware that poor or nonexistent flashing could cause deterioration to the stone job.

To maintain the weather-resistance of the exterior wall on which the stone is installed, a means of drainage should be installed at all wall penetrations and terminations of the stone veneer. Flashing type and locations shall be in accordance with the building code.

Flashing should be installed by trained flashing personnel.

2.2 WEEP SCREED INSTALLATION – The application of a foundation weep screed should be considered part of the flashing and drainage system. The screed is installed after the flashing is in place. ASTM defines foundation weep screed as an accessory used to terminate Portland cement base stucco at the bottom of all framed exterior walls. Flashing should be in place at the floor line, where the wall is supported by a floor or foundation and the foundation weep screed is applied over flashing. (REFER TO FLASHING ASTM C1063) Water that might make its way past the cementitious membrane hits the paper and flows to the bottom of the assembly to the weep screed. The screed facilitates the ability of this moisture to escape the system and drip away from the surface. (Centurion Detail J.0.1)

2.3 CASING BEAD INSTALLATION – The next step is the installation of all casing beads, also known as plaster stops. The casing bead is used at all termination points, except at the bottom of the framed walls which receive a weep screed. Casing bead installation is normally on commercial installations and may not be required on single family homes, see detail. (Centurion Detail E.0.3)

3.0 WEATHER RESISTANT BARRIERS – A cement scratch coat is a breathable water resistant system. This remains true if none of the system components compromise or impedes the movement of moisture vapor through the wall cavity. There are several weather barriers available in the market today. The most popular is the grade "D" building paper. When looking at these products one must choose from the following:

3.1 FELT PAPER: Felt is a rag material saturated with asphalt. Some designers specify the use of #15 Type 1 felt paper complying with ASTM D226 as a water resistant backing. Felt papers are highly water resistant, and have very low vapor permeability.

3.2 CLASS "D" BUILDING PAPER: The lath industry generally recommends the use of grade "D" building paper that meets IBC Section 2510.6 & IRC Section R703.6.3 which is water resistant, yet retains a high degree of vapor permeability. The perm rating on grade "D" paper offers 35 perms in a 24 hour period. "D" paper or equivalent are required over wood based sheathing.

3.3 HOUSE WRAPS (SPUN BONDED VAPOR BARRIER)

Codes require 2 layers of moisture barrier complying with ICC-ES AC38. A combination of barriers is acceptable.

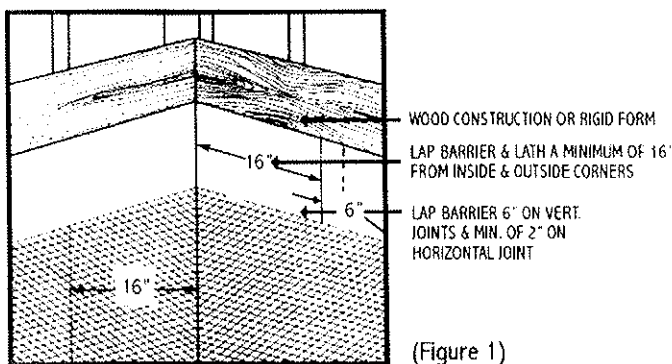
When felt paper or class "D" building paper is chosen as the vapor barrier the paper is attached in ship lapped style, lapping the horizontal joints 2" and 6" on the end joints.

While discussing building papers it is important to mention that all openings must be flashed with waterproof paper or specifically designed metal flashings. One alternative to metal flashing is the rubberized asphalt self-adhered flashings, preferably one that is self-sealing when penetrated with fasteners.

When vapor barrier and lath is applied correctly and flashed properly any incidental moisture that flows along the paper surface will exit the assembly.

4.0 LATH INSTALLATION & PRECAUTIONS

Attachment of lath depends on many factors, such as the type of construction, the substrate, type of lath and other factors. Proper installation includes staggering all joints and avoiding alignment that will create weaker joints. Do not lap sheets to save cuts. Lath ends must terminate on a framing member. If the framing member is missed it may cause a separation in the sheets and cracking could occur. Using small pieces may also cause cracking and should be avoided.



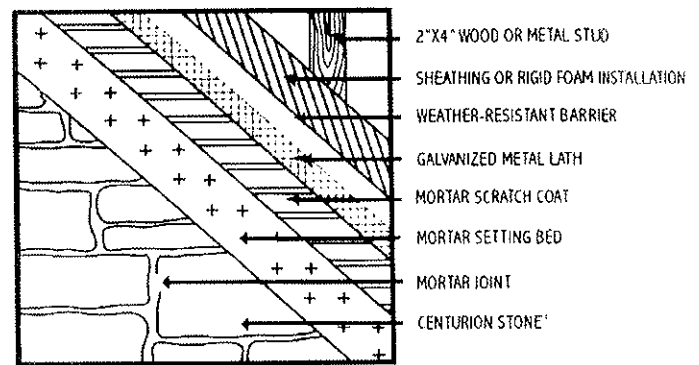
(Figure 1)

4.1 OVER WOOD PRODUCTS

(plywood, drywall, paneling, etc.) Cover the wall surface with a weather resistant barrier. Lap joints by applying moisture barrier horizontally with the upper layer lapped over the lower layer not less than 2" and end laps not less than 6". Barrier to be equal to IBC Section 1404.2 & 2510.6 or IRC Section R703.2 & R703.6.3. Install 3.4

lbs diamond expanded metal lath. Use galvanized lath for exterior and black metal lath (non-galvanized) may be used for interior. Lap lath sides not less than 1/2" and end laps not less than 1". (It is important to attach lath with the small diamonds pointing upwards.) On inside and outside corners turn the corner 16" minimum each way. (This is an important step). (Figure 1) Lath to comply with ASTM C-847 or No. 18 gage galvanized woven wire mesh conforming to ASTM C1032.

Attach wire lath using galvanized nails on 6" centers vertically and 16" centers horizontally penetrating studs a minimum of 1" nails to comply with ASTM F-1667. Wide crown staples may be used for lath attachment. After attaching lath, apply an adequate mortar scratch coat over the lath and allow it to set before applying stone veneer.

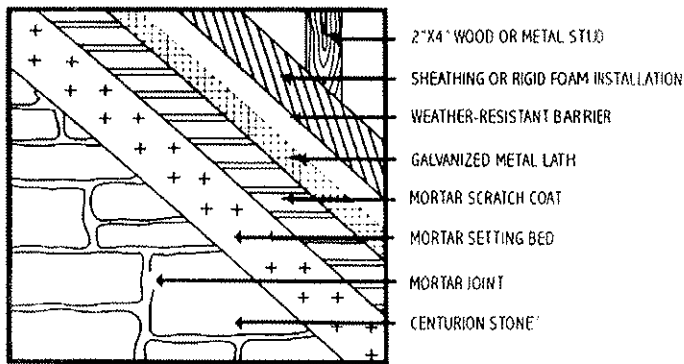


4.2 METAL STUDS OR PANELS

Surface preparation is the same as over rigid wood sheathing. For steel studs, fasteners must be minimum No. 8 gage, Type S, galvanized self-tapping screws with minimum 3/8 inch diameter (9.5mm) heads, complying with ASTM C 1002 and sufficient length to penetrate the studs a minimum of 3/8 inch (9.5 mm).

4.3 OVER RIGID INSULATION BOARD

Surface preparation is the same as over rigid wood related sheathing with the following exceptions: Nails should be 4" on centers vertically and 16" centers horizontally, penetrating studs a minimum of 1".

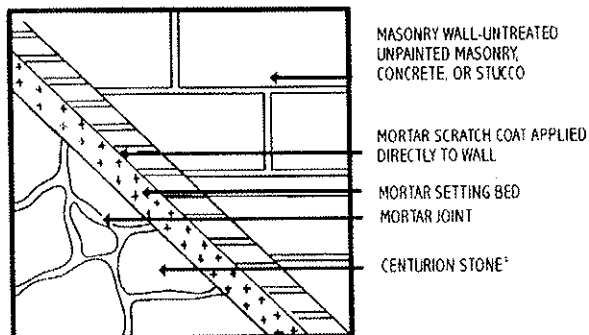


4.4 **OVER OPEN STUDS**

Over Open Studs: The cement plaster backing must be installed over a water-resistant barrier, flashing and weep screeds as described in Section 4.1. Studs must be spaced no more than 16 inches (406 mm) on center. Lath must be a corrosion-resistant 3.4-pound-per-square-yard (1.8 kg m²), 3/8 inch (9.5 mm) rib lath complying with ASTM C 847. The lath must be fastened to wall framing and the scratch coat applied as described in Section 4.1 or 4.2.

4.5 **CLEAN AND UNTREATED MASONRY**

No surface preparation is needed. Note: On newly poured concrete examine the area for release agents (form oils). If present, etch surface with muriatic acid and rinse thoroughly. You may need to score surface with a wire brush to ensure a good bond.

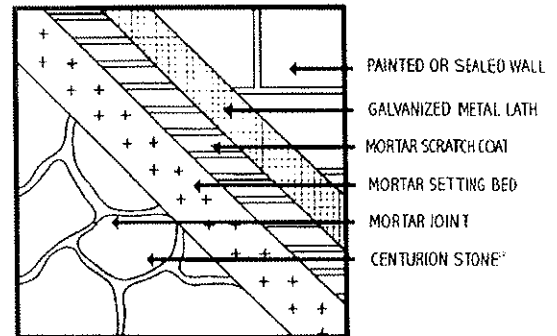


4.5.1 **PAINTED, SEALED, OR DIRTY MASONRY**

You must clean the surface back to the original masonry surface by sandblasting, water blasting, acid etching or wire brushing before installing stone veneer. If you are unable to use the above methods you may elect to attach metal lath without a vapor barrier.

Attach lath with corrosion-resistant concrete nails or other approved fasteners.

NOTE: If sandblasting is used wash wall area to eliminate any dust before applying stone.



5.0 **PREPARING MORTAR**

Mix mortar to a firm, moist consistency. If mortar is too wet it will be messy to work with and weak in strength. If too dry, mortar will not provide a proper bond. Mix all ingredients thoroughly to obtain the best workability and desirable properties of masonry mortar. Mortar should have an "oatmeal-like" consistency. (See Table 2 for Mix Design)

Note: Jointless or drystack series

A concrete bonding agent should be used to ensure additional bonding and adhesion. Check with your local dealer for a recommended brand in your area. When installing a jointless or drystack series, color can be added to the mortar to compliment the base color of the stone. Tinting of mortar will greatly enhance the finished appearance.

Some contractors use additives such as a calcium chloride to accelerate the scratch/setting coat mixes. These accelerators allow for shorter durations between the scratch coat and bedding coats and are generally used in colder climates. They save time but cause havoc on the galvanized coatings on lath and accessory pieces by accelerating corrosion. Tempering of the mix should also be avoided in very hot, dry, or windy conditions. Mix smaller batches which can be applied prior to the need for re-tempering. The additional water needed in tempering will reduce the strength of the bonding coat.

5.1 **SCRATCH COAT INSTALLATION**

There are numerous mix designs used for the scratch coat and all may be good. The cement mixture is troweled over the lath

using the hawk & trowel method to the desired thickness, making sure a full and level coat is applied around all lath accessory pieces. As material sets, a scoring tool is used to groove the surface to provide a key for the setting coat.

MORTAR MIX DESIGNS				
GROUTED JOINT INSTALLATION				
PARTS BY VOLUME	PORTLAND CEMENT OR BLENDED	MASONRY CEMENT TYPE (N)	HYDRATE LIME OR LIME PUTTY	SAND
MORTAR TYPE				
-----	1	-----	1	2 to 3
S	1	-----	-----	2 to 3
N	-----	1	1 ½ to 1 ¼	2 ¼ to 3
N	-----	1	-----	2 ¼ to 3

MIX FOR DRY-STACK SERIES				
PARTS BY VOLUME	PORTLAND CEMENT OR BLENDED			SAND
MORTAR TYPE				
-----	1	FOLLOW BONDING AGENT MFGS RECOMMENDATION FOR MIX AMOUNT NEEDED		2 to 2 ½
S	1	FOLLOW BONDING AGENT MFGS RECOMMENDATION FOR MIX AMOUNT NEEDED		2 to 2 ½

APPLYING CENTURION STONE

6.0 STARTING POINT

You may start your installation from the top down or bottom up. Working from top down may help to avoid splashing or dripping mortar on previously applied stones. Care must be taken to avoid smearing the mortar. If this occurs it should be removed after mortar has dried to a crumbly state.

6.1 PREPARE WORK AREA

It is recommended to lay out a reasonable amount of stone pieces so you can see how the pattern looks assembled. Determine the desired pattern by mixing stones from several boxes. Plan for variety and contrast in your overall design by using small pieces next to large pieces, thick next to thin, textured next to smooth. Mix colors from several boxes to ensure a good blend of color shades.

6.2 SETTING COAT

Select mortar type to be used from Mortar Table 2. Mix per instructions and apply to wall in areas not to exceed 10 square feet or in areas that will not setup before stone is applied. Application method is the same as scratch coat.

6.3 SETTING THE STONES

Completely cover the entire back surface of each stone. Press each stone into the mortar setting bed firmly enough to squeeze mortar out around the stone's edges. Apply pressure to the stone and wiggle the stone left and right to ensure a good bond. Using a margin trowel, strike off the excess mortar around the stones edges before placing the next piece. If stones back has dust, dirt or loose particles, brush off prior to applying mortar to stones back then proceed with application.

6.3.1 INSTALL CORNERS FIRST: If installation requires corner pieces apply these first. Notice that the corners have a long, and short leg. Alternate these in opposite directions as you apply them. (CENTURION DETAIL M.0.1 & M.0.2)

6.3.2 INSTALLING FLATS: After corner pieces, and window and door trim pieces are in place, install flats working toward center of wall. Cut and trim pieces as required to maintain joint consistency. Select and mix stones from different boxes throughout the installation to give a balance to shapes, sizes, color, thickness, and textures.

6.3.3 SHAPING STONES: When trimming or cutting stones to fit you may use a mason's hammer, wide mouth nippers, or a mason's trowel edge. Straight cuts are best done using a small grinder or circular saw with a masonry blade. Cutting should be done out-side as dust will occur. Safety glasses and dust mask should be worn when cutting a masonry product. To conceal cut or broken pieces cover the edges with mortar when grouting. Cut edges are installed so they are not visible. Broken or cut pieces are used in filling gaps between larger stones. Install the cut edges down when below eye level and up above eye level.

7.0 GROUT JOINTS

Joints will vary in width depending on pattern being installed or customer preference. Install stone with uniform size grout joints. Avoid long straight lines. When installing patterns that are coursed or laid in a horizontal style, special attention should be given in keeping the pattern level and plumb. It is of particular importance to stagger the joint lines both vertically and horizontally.

After stone is in place grouting may be necessary depending on stone pattern. Grout with a grout bag. Fill a bag half full

with mortar and insert into joint area. Squeeze bag while moving bag down joint line until area is filled. Avoid smearing mortar on surface of stone. If accidental smears occur allow mortar to dry and brush off.

Never use a wet brush or wire brush to remove a mortar stain.

7.1 **FINISHING JOINTS**

When the mortar joints become firm (normally 30-60 min.) or thumb print dry they should be pointed up with a jointing tool. Rake out excessive mortar to obtain desired depth. While raking mortar joints, compact and seal mortar around each piece of stone. To obtain a professional looking finish, maintain proper and even joints. Brush away all smears and mortar spots within a few hours of finishing. Never allow mortar to set up over night, as it will cause staining that will be almost impossible to remove.

It may be necessary to do touch up grouting on dry stack patterns such as void areas between stone pieces, and around windows, doors, and openings to conceal cut or broken edges.

8.0 **INSTALLING HEARTH STONES**

Hearthstones are not recommended or warranted for exterior use or as a surface subject to foot traffic. Hearths at floor level or raised hearths are normal use for hearth pieces. We recommend when used in these installations the mortar joint area be filled to the top of each hearth piece.

8.1 **RAISED HEARTH**

Do not cantilever a hearth piece out more than the stone below, usually 1 ½". Grout under the hearth piece to fill the void between the hearth pieces and the flats. This will give direct support to the hearth piece.

8.2 **MORTAR BED FOR HEARTH PIECES**

Place mortar approximately ¾" thick where hearth pieces are to be placed. Place hearth pieces on mortar bed and tap down to level and align. Place additional pieces and level to each other. If trimming is required, use same method as called for in the flats.

8.3 **SEALING HEARTH PIECES AND FLATS**

Sealing of Centurion Stone or hearth pieces is not necessary but sealing will assist in cleaning of smoke and soot stains should they occur around fireplace opening. Sealing stone at grade lines to prevent mud

stains is an option some masons prefer. Some sealers may deepen the stones color. It is recommended the sealer be tested on several loose pieces of stone to make sure the end result is acceptable. Only a good quality masonry sealer should be used of the penetrating breathable type.

GOOD BUILDING PRACTICES

9.0 **CODES**

Good building practices are essential in stone work. Building codes vary from area to area and it's recommended you know and follow your local codes. Know your local codes prior to starting your installation. For additional information, refer to Centurions' ICC-ES Evaluation Report No. ESR-2239

9.1 **EXTERIOR APPLICATIONS**

In exterior applications the incorrect installation or absence of flashing, gutters, or downspouts may result in diversion of water runoff onto finished surfaces. Masonry and other building products may stain under these conditions and combined with severe freeze-thaw conditions may eventually cause surface damage. The application of Centurion Stone under these conditions is not recommended.

9.2 **COLD WEATHER AND FOUL WEATHER CONDITIONS**

In hot weather conditions it may become necessary to moisten the wall before applying the setting coat. Weather conditions may also require moistening the back of each stone. This is best done using a fine spray of water, or a wet brush. This step is important to prevent excessive absorption of moisture from the mortar. Application must be protected from freezing temperatures by sheltering the wall as mortar will not set up properly under such conditions. Do not use anti-freeze compounds to lower the freezing point of mortar.

GENERAL HELPFUL INFORMATION

10.0 **CLEANING**

Cleaning may never be necessary. But if needed use a solution of granulated soap or detergent and water with a bristle brush. Rinse immediately with fresh water.

DO NOT ATTEMPT THE FOLLOWING!

- Cleaning with a wire brush
 - High pressure power washing
 - Using acid or acid containing products
- These methods will give you undesirable results!**

10.1 SALTS AND DE-ICING AGENTS
Since all masonry and concrete products are vulnerable to damage incurred by salts or other chemicals used to remove snow and ice. Centurion Stone is NOT warranted against damage from these products. DO NOT use these products on areas immediately adjacent to a Centurion Stone application.

10.2 POOLS AND FOUNTAINS
Centurion Stone is not recommended to be installed below the water line in swimming pools or water fountains where chlorine or other water chemicals are used. Discoloring may occur from these chemicals.

10.3 SCUFFING
Scuffing occurs when pieces of product rub against one another. Scuffing occurs in all natural stone and occasionally in Centurion Stone. Usually this enhances the appearance of the stone wall. If scuff marks need to be removed clean stone as mentioned in Section 10.0 of this brochure and most marks will disappear.

10.4 EFFLORESCENCE
Efflorescence is a water-soluble salt that leaches out of masonry walls or products. As the water evaporates a deposit is left on the masonry surface (usually white in color). It can occur on any masonry type surface (brick, stucco, concrete, natural stone, etc.). It may even occur on Centurion Stone on rare occasions. To remove efflorescence you must allow the stone to dry thoroughly, then scrub vigorously with a stiff brush with clean water, and rinse thoroughly. For a more difficult problem, scrub with a solution of 1 part household vinegar to 5 parts water then rinse thoroughly.

10.5 CAPPING OFF EXTERIOR WALLS
When stone is applied to exterior walls, or retaining walls or other surfaces where a cap is needed it is recommended that Centurion Capstones be used, or a poured-in-place concrete cap to provide adequate runoff protection. Centurion caps should extend over each side of wall area. Centurion Stone corners are not recommended for capping walls. All retaining walls should be damp proofed at the fill side with weep holes and proper drainage prior to the stone being applied. (DETAIL K.0.1 & K.0.2)

10.6 CHIMNEY CAPS (DETAIL A.0.1 & B.0.1)
All chimney chases must be capped with a one piece cap that extends 1" beyond the finished stones surface to eliminate water from entering the chase.

11.0 CALCULATING REQUIRED FOOTAGE
Determine the stone required by measuring the area to be covered.

STEP 1 Measure and multiply the length of the wall by the height of each wall to be covered. This will give you the gross area square footage of flats.

STEP 2 Measure and calculate the total square footage of all openings (windows, doors, etc.). Deduct this footage from the gross footage amount. This is your net square feet requirement for flats.

STEP 3 If outside corners are required, measure the total linear feet of corners needed. When figuring corners to flats, a good rule to remember is a linear foot of corners averages approximately $\frac{3}{4}$ of a foot of flat coverage. Subtract this footage from your flat footage, and this gives you the net feet of flats.

PLACING YOUR STONE ORDER

Order your net square feet of flats
Order your net linear feet of corners
Order any accessories needed by the piece. (Hearthstone, Keystones, Window Trim, etc.)

You may wish to order extra stone and component pieces to allow for trimming and cutting. Extra stone may be required for special laying patterns outside the recommended $\frac{3}{4}$ " mortar joint that most patterns are designed with. Example: Tighter or zero mortar joints.

View or download Centurions' ICC-ES Evaluation Report ESR-2239 at www.centurionstone.com