



MANUFACTURER'S INSTALLATION INSTRUCTIONS

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CAREFULLY READ ALL INSTALLATION INSTRUCTIONS BEFORE PROCEEDING WITH YOUR CENTURION STONE VENEER PROJECT. Accepted installation procedures for all building products, including pre-cast stone, vary to some degree based upon the region, the type of structure, the architect, the local building officials, and the local codes. For that reason, Centurion's installation guidelines are suggested guidelines. Ultimately, the particular installation method for a particular project must be determined by the above factors, including most importantly, the local codes and the architect. Centurion makes every attempt to provide helpful guidelines for installation procedures. Although these guidelines have been formulated over many years, they may, or may not, comply with standards for a particular project based upon local building codes, local standards or mandated requirements for a particular project. For additional information refer to our ICC-ES Evaluation Report No. ESR-2239

1. CALCULATING REQUIRED FOOTAGE AND ORDERING

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 for 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.

STEP 4 Place your order as follows:

Order you 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. In addition, most patterns are designed to be installed with a $\frac{3}{4}$ " grout joint, and the square footage in each box is therefore calculated assuming a $\frac{3}{4}$ " grout joint. Extra stone may be required for laying patterns outside the recommended $\frac{3}{4}$ " mortar joint. Example: Tighter or zero mortar joints.

2. FLASHING

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. 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 should be in accordance with the local

building code. Flashing should be installed by trained flashing personnel.

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 water resistant barrier 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.0.2)

Depending upon the particular application, proper flashing also includes 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.

On 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.

3. WEATHER RESISTANT BARRIERS

After completion of the flashing, the next step is to install a weather resistant barrier on the wall surface. Building codes generally require 2 layers of moisture barrier complying with ICC-ES AC38, and

Centurion recommends 2 layers even where not required by codes. There are several weather resistant barriers available in the market today, but the most highly recommended is Class D building paper which meets IBC Section 2510.6 & IRC Section R703.6.3. This paper is water resistant, yet retains a high degree of vapor permeability. Other available weather resistant barriers are house wrap and #15 Type I felt paper complying with ASTM D226.

A combination of barriers is acceptable -- for example, a layer of Class D paper over a layer of house wrap. Generally, the paper is attached in ship lapped style, lapping the horizontal joints 2" and 6" on the end joints. All openings must be flashed with waterproof paper or specifically designed metal flashings. One alternative to metal flashing is the rubberized asphalt self-adhered flashing, which is self-sealing when penetrated with fasteners.

4. LATH INSTALLATION

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.

Before installation of the lath, cover the wall surface with two layers of a weather resistant barrier. Install 2.5 or 3.4 lbs diamond expanded galvanized metal lath complying with ASTM C-847 or No. 18 gage galvanized woven wire mesh conforming to ASTM C1032. Alternate lath acceptable with a product evaluation acceptable report showing compliance to ICC ES AC 275. Black metal non-galvanized lath may be used on the interior applications. Lap lath sides not less than 1" on vertical and horizontal sides. 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.

The lath should be attached by using the following fasteners' depending upon the wall surface:

Wood – use galvanized nails on 6" centers vertically and 16" centers horizontally penetrating studs a minimum of 1" nails to comply with ASTM C1063 sec. 7.10.2. Wide crown staples may be used for lath attachment. On open wood studs, studs must be spaced no more than 16 inches (406 mm) on center.

Steel studs – use fasteners with a minimum No. 8 gage, galvanized self-tapping screws with minimum 7/16 inch diameter heads, complying with ASTM C 1002 and sufficient length to penetrate the studs a minimum of 3/8 inch (9.5mm). On open steel studs, studs must be spaced no more than 16 inches (406 mm) on center.

Rigid insulation boards – use nails 4" on centers vertically and 16" centers horizontally, penetrating studs a minimum of 1".

Masonry – use corrosion-resistant concrete nails, concrete screws or powder actuated fasteners, which are shot into the wall surface or other approved fasteners.

5. 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 1 for Mix Design)

Premixed mortars must meet requirements of ASTM C-270 for Type N or S. Check with manufacturer to determine if it is acceptable for adhered concrete masonry veneer and meets code requirements of 50 PSI shear bond when tested under ASTM C482.

6. SCRATCH COAT APPLICATION

The cement mixture is troweled over the lath using the hawk & trowel method to a recommended 1/2" thickness ensuring the lath is completely covered with mortar. The mortar should fully embed the lath, and

should be allowed to cure until the mortar is thumb-print hard. Once cured, scratch the surface horizontally to create the mortar scratch coat. Apply to wall in areas not to exceed 10 square feet or in areas that will not setup before stone is applied.

7. SETTING COAT APPLICATION

After the scratch has been completed, you are ready to apply the stone to the wall. When applying the stone to the wall, 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 the back of the stone has dust, dirt or loose particles, brush off prior to applying mortar to stones back then proceed with application.

In hot weather conditions in excess of 90 degrees, 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 cold temperatures below 40 degrees 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.

8. RECOMMENDED PROCEDURES FOR APPLYING STONE TO WALL

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.

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 had dried to a crumbly state. 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.O.1 & M.O.2)

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.

When trimming or cutting stones to fit, you may use a mason's hammer, wide mouth rippers, 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. 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.

9. MORTAR JOINT AS COMPARED TO DRYSTACK APPLICATION

All Centurion stone patterns can be installed with a mortar joint. However, most patterns are designed to be installed with a $\frac{3}{4}$ " mortar joint, while certain patterns are designed to be installed without a mortar joint ("drystack").

Mortar Joint. When applying a pattern designed to have a mortar joint, leave a $\frac{3}{4}$ " joint between the stones. However, joints will vary in width depending on the pattern being installed or customer preference. Install stone with uniform size grout joints, and 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, grout the joint 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.

When the mortar joints become firm (normally 30-60 min), or thumb print hard, they should be pointed up by applying a finishing joint 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.

Drystack. On joint less or drystack application, a concrete bonding agent should be used to ensure bonding and adhesion. Check with your local dealer for a recommended brand in your area. When installing a 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 retempering. The additional water needed in the tempering will reduce the strength of the bonding coat.

Although a mortar joint is not used on drystack applications, Centurion recommends touch up grouting on void areas between stone pieces, and around windows, doors, and openings to conceal cut or broken edges.

10. CAPPING OFF EXTERIOR WALLS, AND CHIMNEY CAPS

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).

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. (DETAIL A.0.1 & B.0.1).

Capstones and chimney caps should be sealed.

11. INSTALLATION ON MASONRY WALLS

The above installation instructions apply to all wall surfaces, including masonry walls. However, if the stone is being applied to a clean, untreated masonry wall that is not affected by potential water intrusion, then the stone can be applied pursuant to the above installation instructions, but without the water resistant barrier and lath.

Examples include retaining walls, entrance walls and landscaping features. Installation without a water resistant barrier and lath should not be used on houses, commercial buildings or any other structure which could be damaged by water intrusion into, or through, the masonry walls.

The masonry wall must be free of dirt, waterproofing, form oil, or any substance that could inhibit the mortar bond. These surfaces must have a rough texture to ensure a mortar bond. If a bondable surface cannot be achieved, attach lath before applying the scratch coat.

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.

12. 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. The mortar joint area should be

filled to the top of each hearth piece.

Do not cantilever a hearth piece out more than the stone below, usually 1 1/2". 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.

Place mortar approximately 3/4" 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.

13. 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.

14. MAINTENANCE AND CARE

SEALING. Sealing of Centurion Stone or hearth pieces is not necessary but sealing will assist in the cleaning of smoke and soot stains should they occur around the 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, and should be of the penetrating breathable type.

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 MAY DAMAGE THE STONE, MAY CAUSE WATER INTRUSION, MAY RESULT IN THE STONE DETACHING FROM THE WALL, AND MAY RESULT IN OTHER UNDESIRABLE RESULTS! IN ADDITION, THESE METHODS VOID CENTURION'S WARRANTY.

SALTS AND DE-ICING AGENTS

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.

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 recommended in these guidelines and most marks will disappear.

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.

TABLE I

MORTAR MIX DESIGNS				
GROUTED JOINT INSTALLATION				TABLE II
PARTS BY VOLUME	PORTLAND CEMENT OR BLENDED	MASONRY CEMENT TYPE (N)	HYDRATE LIME ASTM	SAND ASTM
MORTAR TYPE	ASTM C 150	ASTM C 91	C 207	C 144
-----	1	----	1	2 to 3
S	1	----	----	2 to 3
N	-----	1	1 ½ to 1 ¾	2 ¼ to 3
N	-----	1	----	2 ¼ to 3

MIX FOR DRY-STACK SERIES			
PARTS BY VOLUME	PORTLAND CEMENT OR BLENDED	BONDING AGENT	SAND
MORTAR TYPE			
-----	1	BONDING AGENT 1 TO 1	2 to 2 ½
S	1	BONDING AGENT 1 TO 1	2 to 2 ½

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