



architectural masonry units

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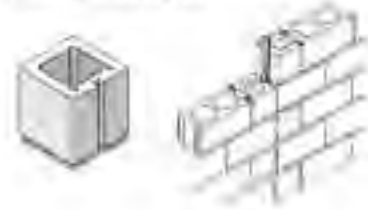
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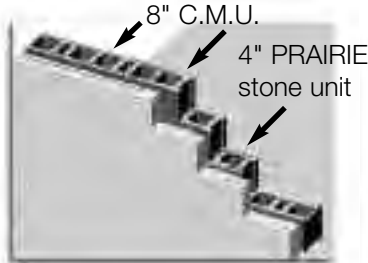
Control Joints

Sash: A sash masonry unit is used in conjunction with a "cross-shaped" rubber extrusion to produce an easily installed control joint.

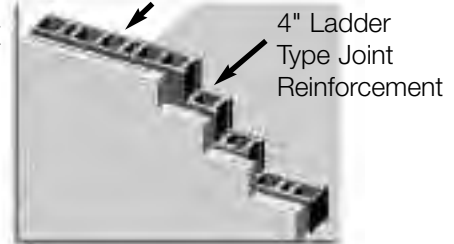


Control Joint Detail

Ladder Type Joint Reinforcement



Adjustable Eye and Pintle Anchor



As with any concrete masonry unit, Trenwyth units should be reinforced properly. Control joints are recommended approximately every 20 feet.

Continuous horizontal joint reinforcement is recommended in the exterior wythe every 16 inches or every course with 12 inch and 16 inch high units.

DESIGN CRITERIA

Control Joints should be no more than 20' apart.

Location of Control Joint:

- Approx. 4'-6' from corners.
- All inside corners, especially at wall piers/columns.
- At the corner/side of any large opening or window (If openings are over 6', locate at both sides).

4" horizontal joint reinforcing wire installed every 16" O.C.

When using 12" or 16" tall units, install every course.

This will greatly reduce or eliminate shrinkage or movement that create hairline cracks.

Use Trenwyth-approved integral water repellent additive in the mortar.

Use "Type N" mortar.

Type S mortar is too brittle and may create hairline shrinkage cracks.

Rake and caulk all window sill and coping unit head joints.

EMPIRICAL CRACK CONTROL CRITERIA

For walls without openings or other points of stress concentration, control joints are used to effectively divide a wall into a series of isolated panels. Table 1 (see Page GI 2) lists recommended maximum spacing of these control joints based on empirical criteria. This criteria has been developed based on successful, historical performance over many years in various geographical conditions. The empirical method is the most commonly used method and is applicable to most building types. An engineered method is presented in NCMA TEK Notes, 10-3 Control Joints for Concrete Masonry Walls - Alternative Engineered Method (ref. 1), available at www.trenwyth.com. It is generally used only when unusual conditions are encountered such as dark colored units in climates with large temperature variable.



architectural masonry units

Control Joints

General Information

Table 1 - Recommended Control Joint Spacing for Above Grade Exposed Concrete Masonry Walls*

Distance between joints should not exceed the lesser of:

<u>Length to height ratio</u>	<u>or ft (m)</u>
1 1/2	25 (7.62)

*Notes:

1. Table values are based on the use of horizontal reinforcement having an equivalent area of not less than 0.025 in.²/ft (52.9mm²/m) of height to keep unplanned cracks closed.
2. Criteria applies to all concrete masonry units.
3. This criteria is based on experience over a wide geographical area. Control joint spacing should be adjusted up or down where local experience justifies but no further than 25 ft (7.62m).

FOR MORE INFORMATION ON CONTROL JOINTS, SEE NCMA TEK NOTES:

10-2B Control Joints for Concrete Masonry Walls-Empirical Method

CONTROL JOINTS FOR CONCRETE MASONRY WALLS

Concrete masonry is a popular construction material because its inherent attributes satisfy the diverse needs of both exterior and interior walls. While these attributes are the primary basis for concrete masonry's popularity, performance should not be taken for granted. Like all construction systems, design decisions significantly influence field performance of the concrete masonry wall system. Proper application of crack control measures, including control joints when required, can help ensure satisfactory performance of the concrete masonry.

Control joints are one method used to relieve horizontal tensile stresses due to shrinkage of the concrete masonry units, mortar and, when used, grout. They are essentially vertical separations built into the wall at locations where stress concentrations may occur. These joints reduce restraint and permit longitudinal movement.

Potential cracking resulting from externally applied design loads due to wind, soil pressure, seismic forces or differential settlement of foundations is controlled by limiting the design stress in allowable stress design or by providing adequate strength when strength design is used. These design considerations are not covered here. Where external loads are an issue in combination with internal volume change, the design should consider the combined effects of these influences on cracking.

CONTROL JOINT PLACEMENT

When required, control joints should be located where volume changes in the masonry due to drying shrinkage, carbonation or temperature changes are likely to create tension in the masonry that will exceed its capacity. In practice, this can be difficult to determine, but several methods are presented in the following sections to provide guidance in locating control joints.

In addition, care should be taken to provide joints at locations of stress concentrations such as (see Figure 1 below):

1. at changes in wall height,
2. at changes in wall thickness, such as at pipe and duct chases and pilasters,
3. at movement joints in foundations and floors,
4. at movement joints in roofs and floors that bear on a wall,
5. near one or both sides of door and window openings. (Generally, a control joint is placed at one side of an opening less than 6 ft (1.83 m) wide and at both jambs of openings over 6 ft (1.83 m) wide. Control joints can be away from the opening if adequate tensile reinforcement is placed above, below and beside wall openings.)
6. adjacent to corners of walls or intersections within a distance equal to half the control joint spacing.

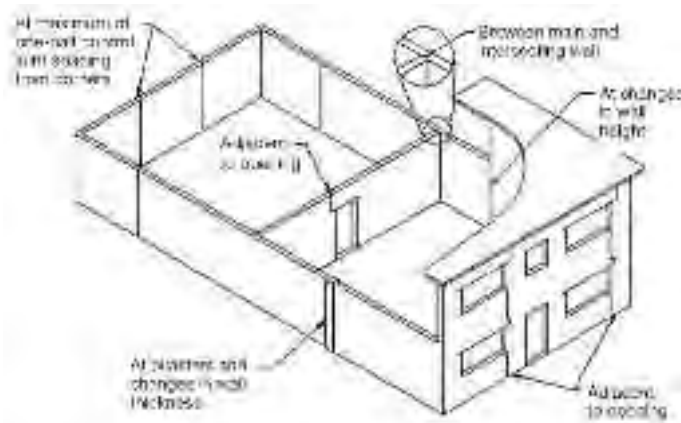


Figure 1— Typical Control Joint Locations



architectural masonry units

Design Recommendations General Information

Stacked Bond

1. The architectural appeal is a change in appearance from the traditional running bond.
2. The close dimensional tolerance provided with Trenwyth units allows the mason to lay precise stacked bond design.
3. Because of the close dimensional tolerance of Trenwyth units, many contractors will lay stacked bond.

Scored units

1. Choice of proper scale is often very important to an architect. Variation from the standard 8" x 16" face size is sometimes desired.
2. Scored units provide a wide selection of patterns, in addition to reduction in scale — many of which are a departure from the appearance of the rectangle.
3. As desired by the architect, emphasis can be placed horizontally or vertically through scoring patterns (such as the 4" x 16" scored or 2" x 16" scored units, laid soldier course).
4. Special pattern effects, departing completely from traditional masonry appearance, are available.
5. Superior results on scored jobs will be obtained if the natural joints are raked as the job progresses and all joints, natural and scored, are grouted or pointed together. **NO RAKE JOINTS.**

Vertical (Soldier) Coursing

1. The architectural appeal lies in the change in appearance from the usual horizontally coursed running bond wall. It is welcomed by many designers as a departure from the more traditional rectangle.
2. The closed end units, available with standard 4" and 6" blocks and 8" pilaster blocks, provide a solid and flat mortar bed which easily accommodates the laying of Trenwyth units in vertical coursing, either in stacked bond or running bond.
3. Keep in mind that the compressive strength of hollow concrete units vertically coursed is approximately 78% of the strength horizontally coursed. The loadbearing characteristics of the wall must be designed accordingly. (Solid units have the same compressive strength either way.)

Alignment

Proper alignment of masonry materials is most important to the appearance of a finished masonry wall.

Masonry materials invariably course differently due to their size and to the size of the mortar joints.

Therefore, it is of the utmost importance that a proper layout be prepared by the masonry foreman prior to the installation.

If the face of a masonry wall involves different masonry products, it is necessary for the foreman to know the exact sizes of each of the products in order to properly make bond when doing the layout.

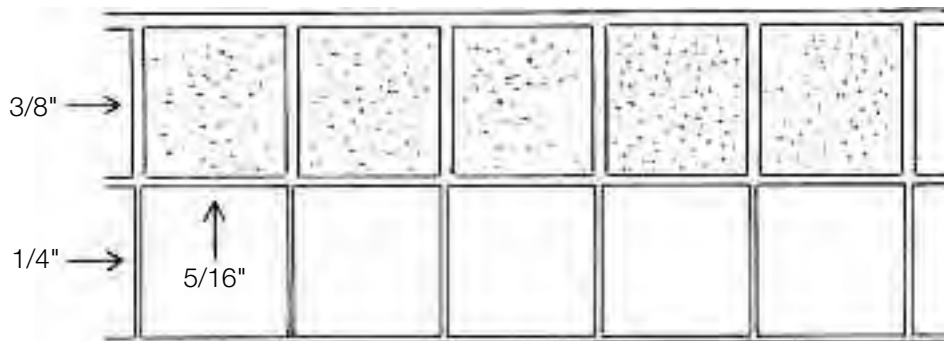
If the joint requirements for one of the products is 1/4" and for another is 3/8", this must be taken into consideration when laying out the first course. If it is not, the resulting finished wall will have unsightly misaligned vertical joints.

Example:

Astra-Glaze-SW+® units are specified in the wainscot of a corridor with Trendstone Plus® blocks above that point. Units have a single center score and the wall is in running bond.

The difficulty in holding a correct running bond is due to aligning the 3/8" joints of the Trendstone Plus units properly over the 1/4" joints of the Astra-Glaze-SW+ units.

Astra-Glaze-SW+ units must be laid using face joints of 1/4" both vertically and horizontally. The Trendstone Plus units being laid on top must be centered over the 1/4" joints of the Astra-Glaze-SW+ units which are in place. See detail below:





architectural masonry units

Mortar

General Information

The most common mortar used with our products is made with standard bagged masonry cement. This mortar may be one of four types—M, S, N or O. Each type of mortar has different characteristics primarily suited to bond or strengthen the mortar and is usually specified in the project architectural specifications. These mortars may also be colored.

Note: Two air-entertaining materials shall not be combined in mortar.

Table 1: Proportion Specification Requirements Proportions by Volume (Cementitious Materials)							
Mortar	Type	Portland Cement or Blended Cement	Masonry Cement			Hydrated Lime or Lime Putty	Aggregate Ratio (Measured in damp, loose conditions)
			M	S	N		
Cement-Lime	M	1	—	—	—	1/4	Not less than 2 1/4 and not more than 3 times the sum of the separate volumes of cementitious materials
	S	1	—	—	—	over 1/4 to 1/2	
	N	1	—	—	—	over 1/2 to 1 1/4	
	O	1	—	—	—	over 1 1/4 to 2 1/2	
Masonry Cement	M	1	—	—	1		
	M	—	1	—	—		
	S	1/2	—	—	1		
	S	—	—	1	—		
	N	—	—	—	1		
O	—	—	—	—	1		

Some mason contractors use job mixed mortar that consists of cement and lime. This is acceptable for use with all Trenwyth products.

Table 2: Property Specification Requirements ^a					
Mortar	Type	Average Compressive Strength at 28 days, min. psi (MPa)	Water Retention Minimum %	Air Content Maximum %	Aggregate Ratio (Measured in damp, loose conditions)
Cement-Lime	M	2500 (1.72)	75	12	Not less than 2 1/4 and not more than 3 times the sum of the separate volumes of cementitious materials
	S	1800 (12.4)	75	12	
	N	750 (5.2)	75	14 ^A	
	O	350 (2.4)	75	14 ^A	
Masonry Cement	M	2500 (1.72)	75	18	
	S	1800 (12.4)	75	18	
	N	750 (5.2)	75	20 ^C	
	O	350 (2.4)	75	20 ^C	

- (A) Laboratory prepared mortar only.
- (B) When structural reinforcement is incorporated in cement-lime mortar, the maximum air content shall be 12%.
- (C) When structural reinforcement is incorporated in masonry cement mortar, the maximum air content shall be 18%.

Consult NCMA TEK Notes relating to mortar for additional information.



architectural masonry units

Mortar

General Information

There are more sophisticated mortars that have additives such as latex, plasticizers or other products to harden and/or make the mortar more workable or change some other characteristics. These too may be used with Trenwyth products if specified but must be handled with greater care, following the manufacturers instructions.

Epoxy Mortar

Certain mortars are very difficult to work with because of their high bond strength and adhesive characteristics. One of these is epoxy mortar. Unless the work is kept very clean during the laying process, the finished wall may be extremely difficult to clean. For this reason we recommend careful installation of epoxy mortars as any cleaner strong enough to clean hardened epoxy may damage the glazed block facing. Follow manufacturer's instructions diligently.

Exterior Applications

All exterior mortar joints must contain a manufacturer-approved water repellent additive.

Importance of Cleaning Walls Daily

The single most important factor when laying glazed masonry units to assure a clean finished wall is to keep the walls clean during construction by bagging (wiping the wall with burlap to remove excess mortar) or brushing. The final cleandown will then be a relatively simple procedure.

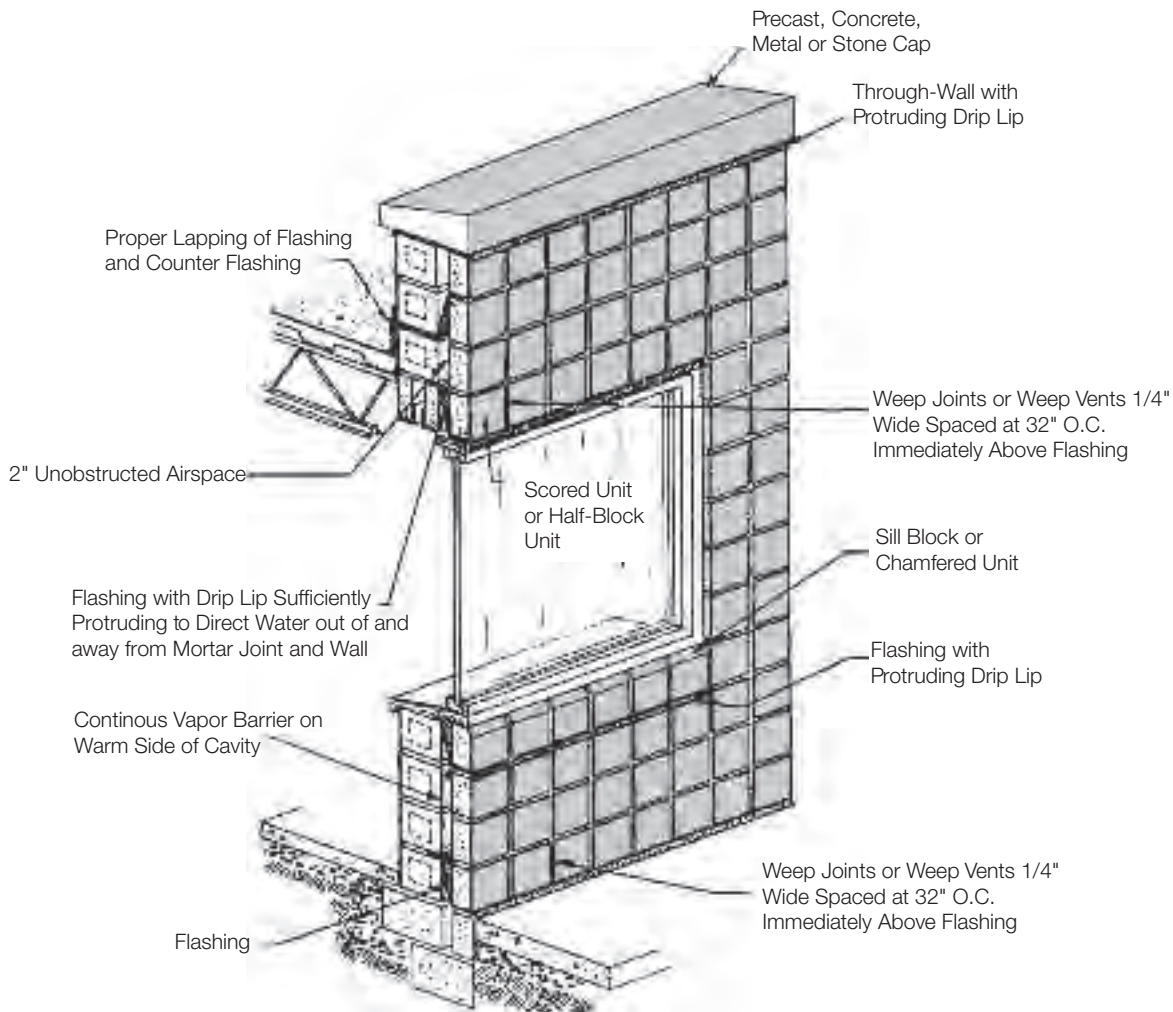
Mortar Gun

The easiest and most effective way to tuckpoint mortar joints is to use a mortar gun. The alternative, a baker's bag, is harder to work with and makes an even application of mortar difficult. The ceramic tile method of smearing grout all over the face should not be used because of damage caused to the glazed face.

See NCMA TEK Notes on Mortar for Concrete Masonry.

Mortar Bedding and Jointing:

1. Lay units with full mortar coverage on head and bed joints taking care not to block cores to be grouted or filled with masonry insulation.
2. Tool all mortar joints when thumbprint hard into a concave configuration.
3. Care should be taken to remove mortar containing manufacturer-approved water repellent admixture from the face of masonry units before it sets.
4. Tuckpoint the joints of scored units for proper appearance. All exterior scored units must be tuckpointed to prevent water penetration. **NO RAKE JOINTS**

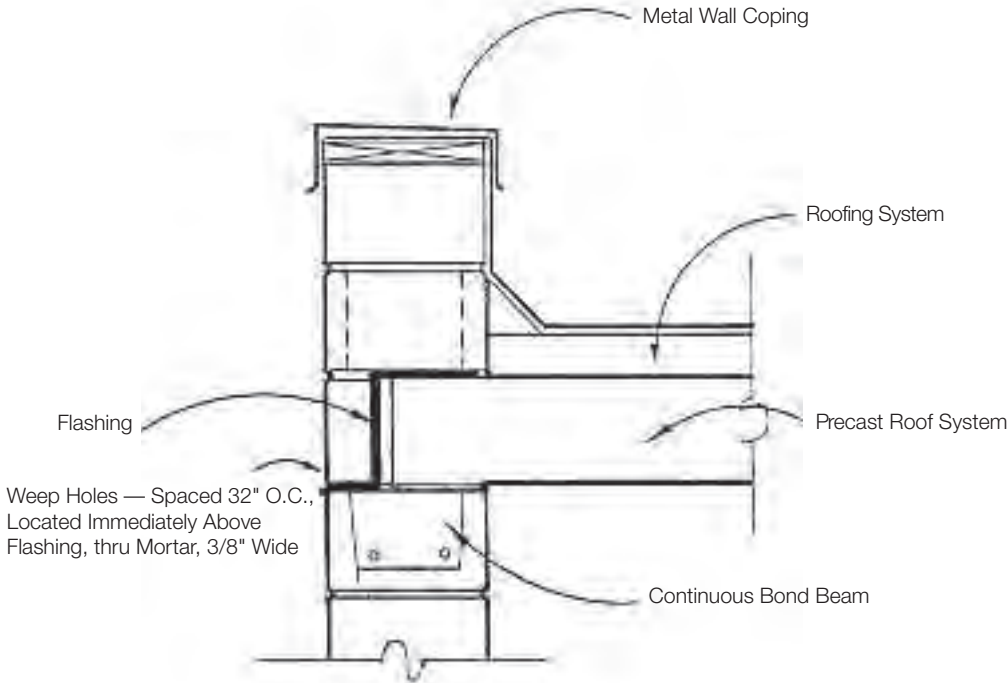
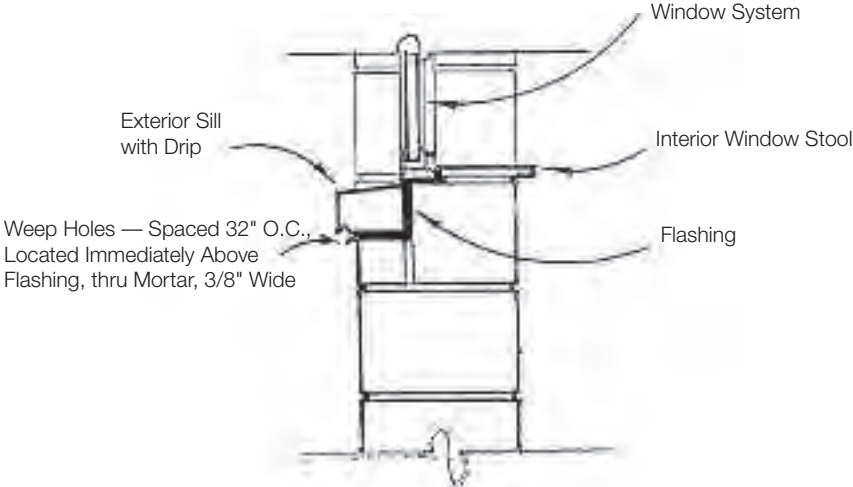




architectural masonry units

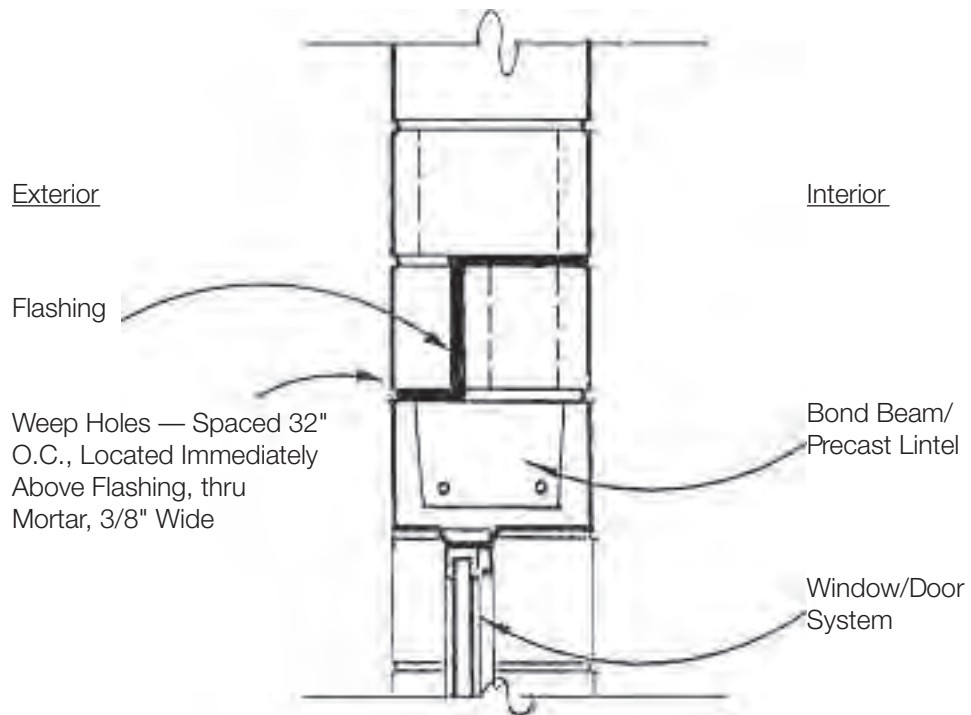
Detailing to Keep Moisture Out

General Information



Detailing to Keep Moisture Out

General Information

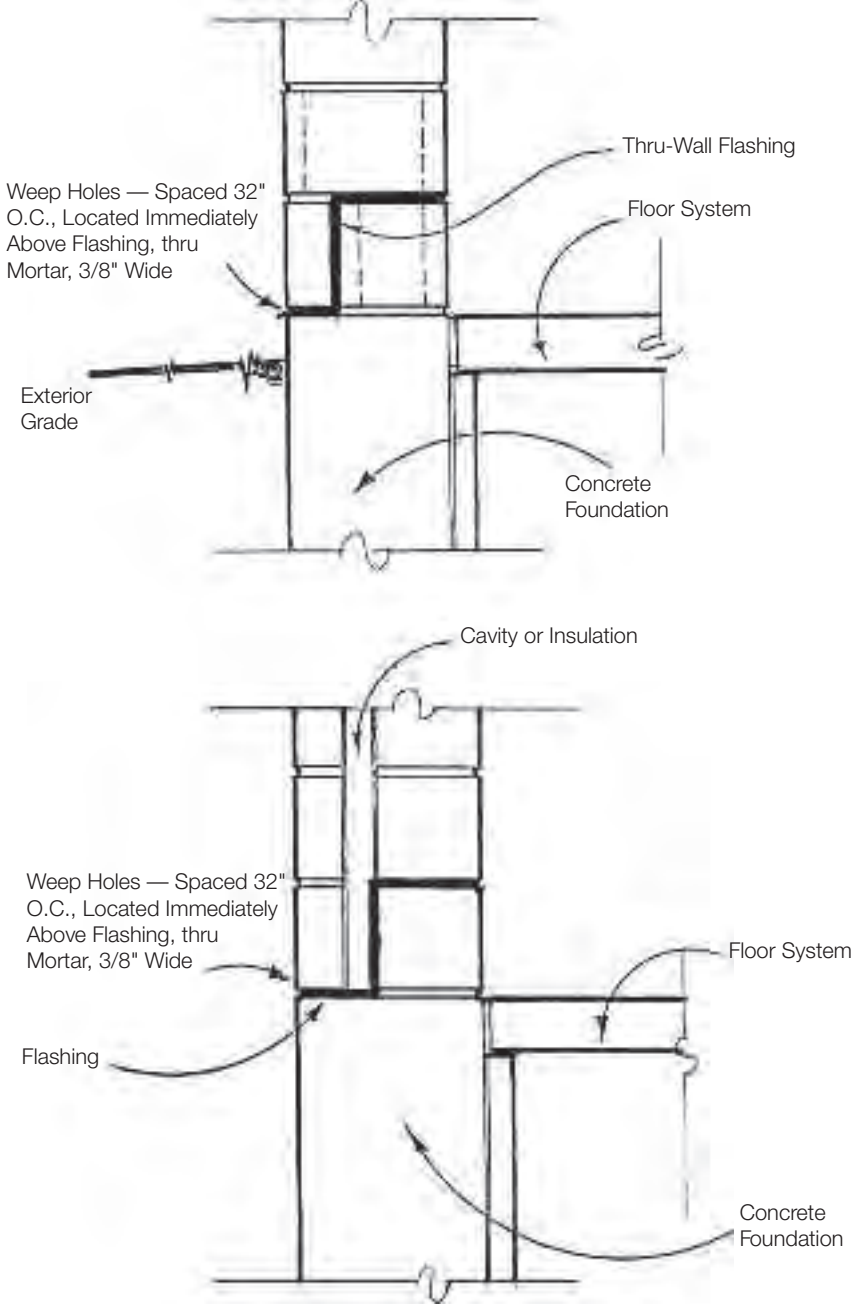




architectural masonry units

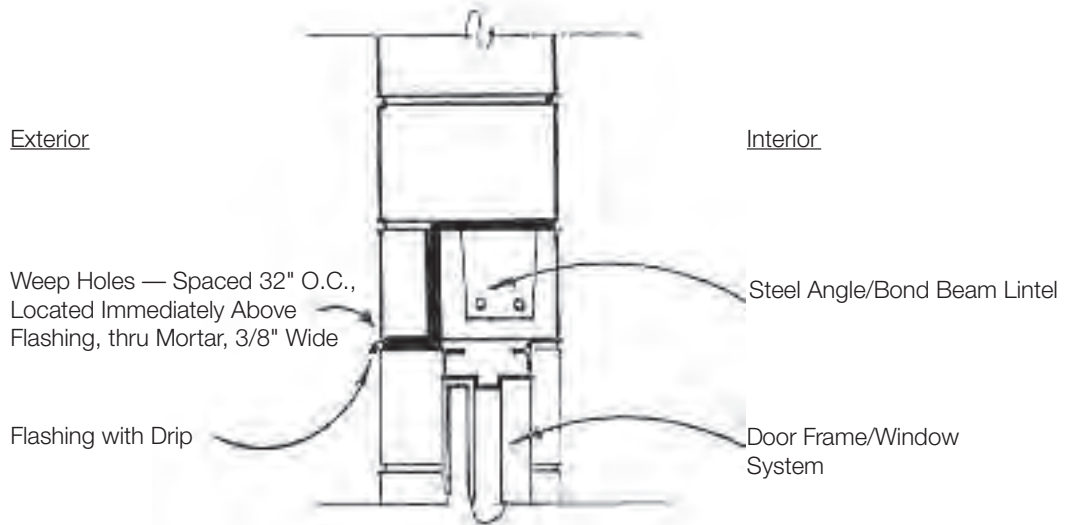
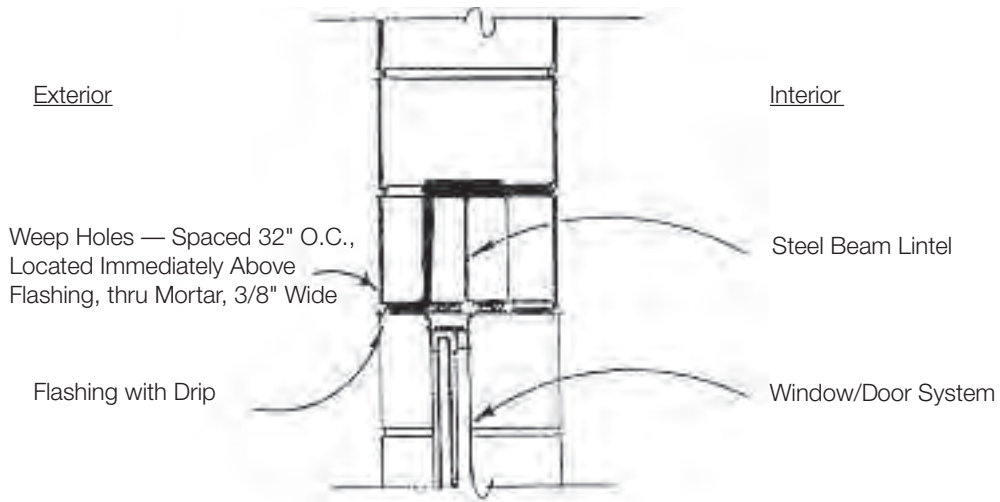
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General Information



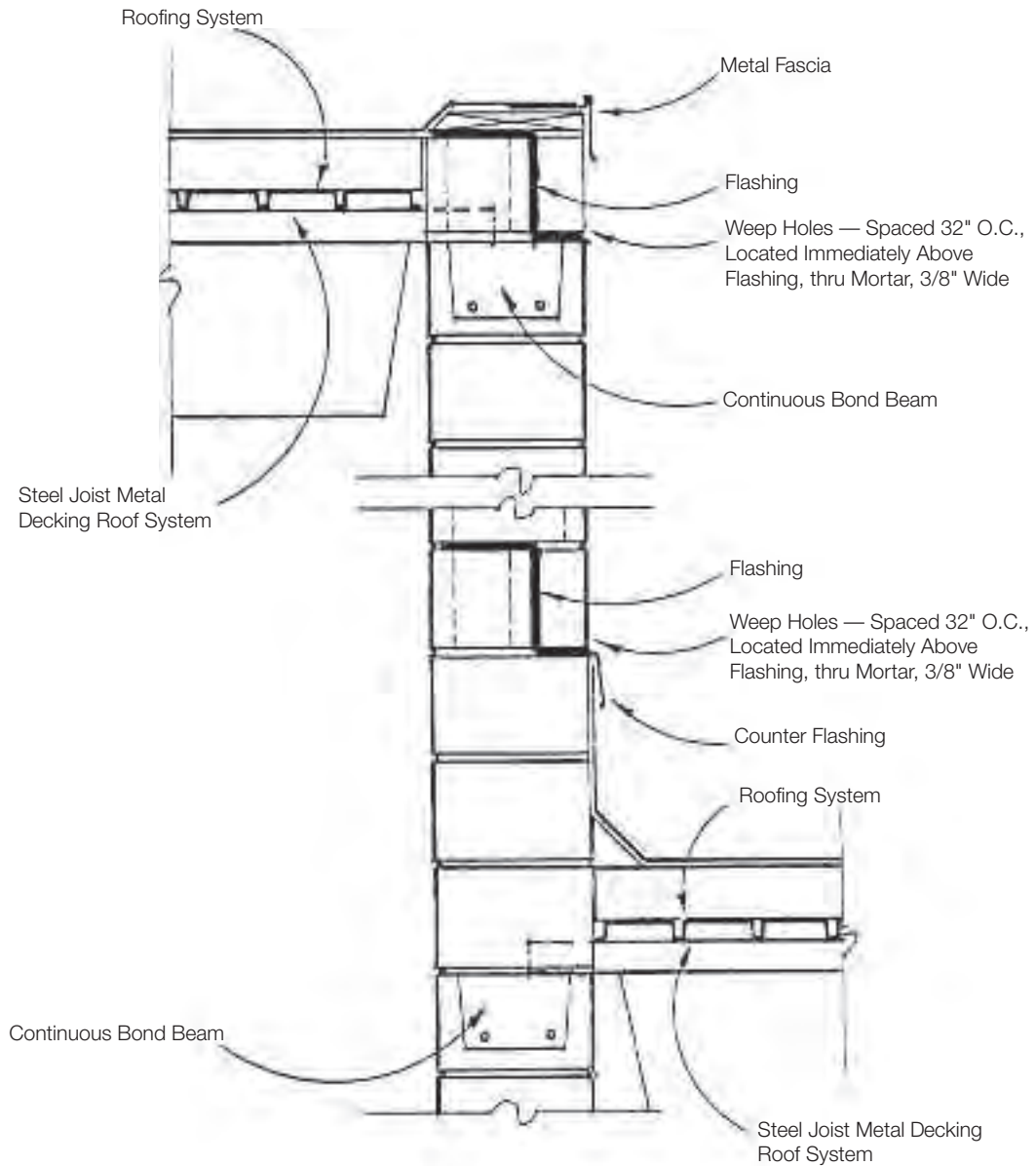
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General Information



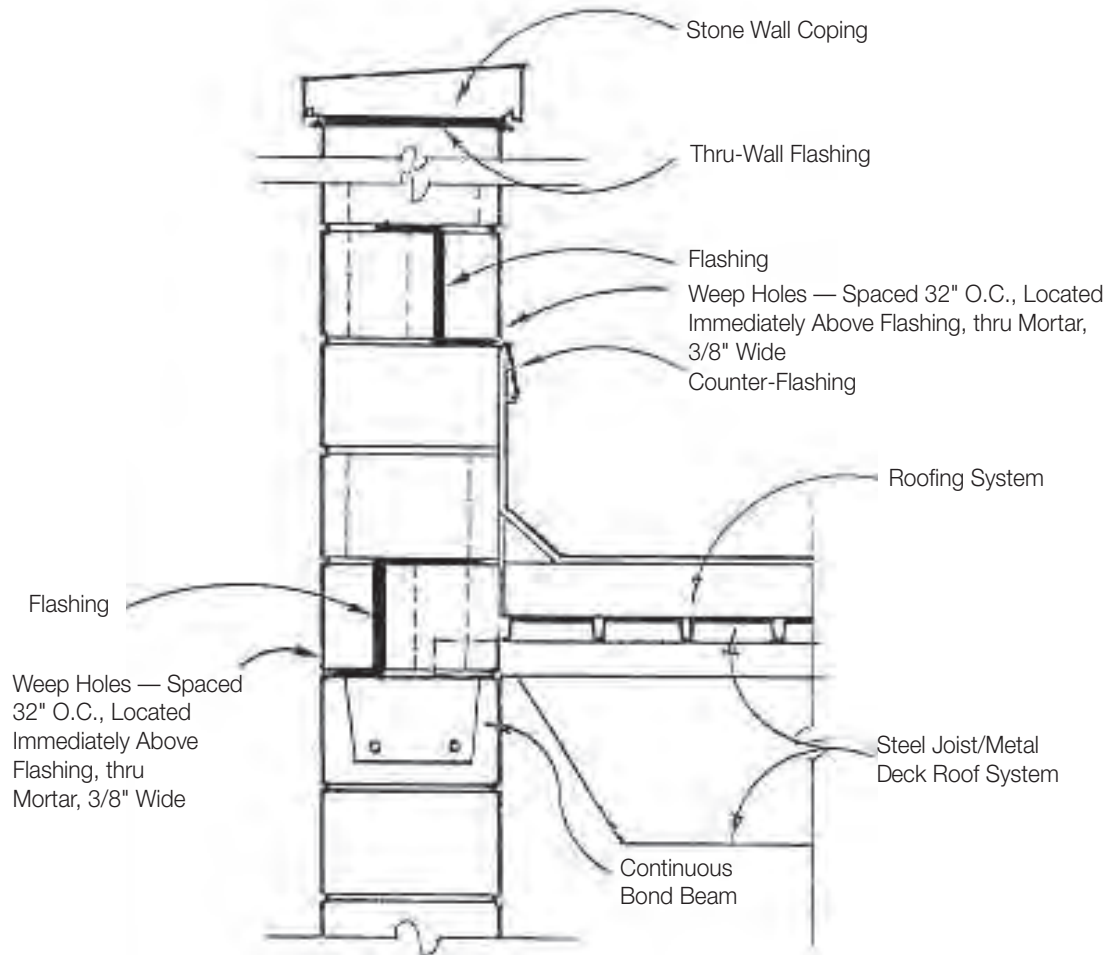
Detailing to Keep Moisture Out

General Information



Detailing to Keep Moisture Out

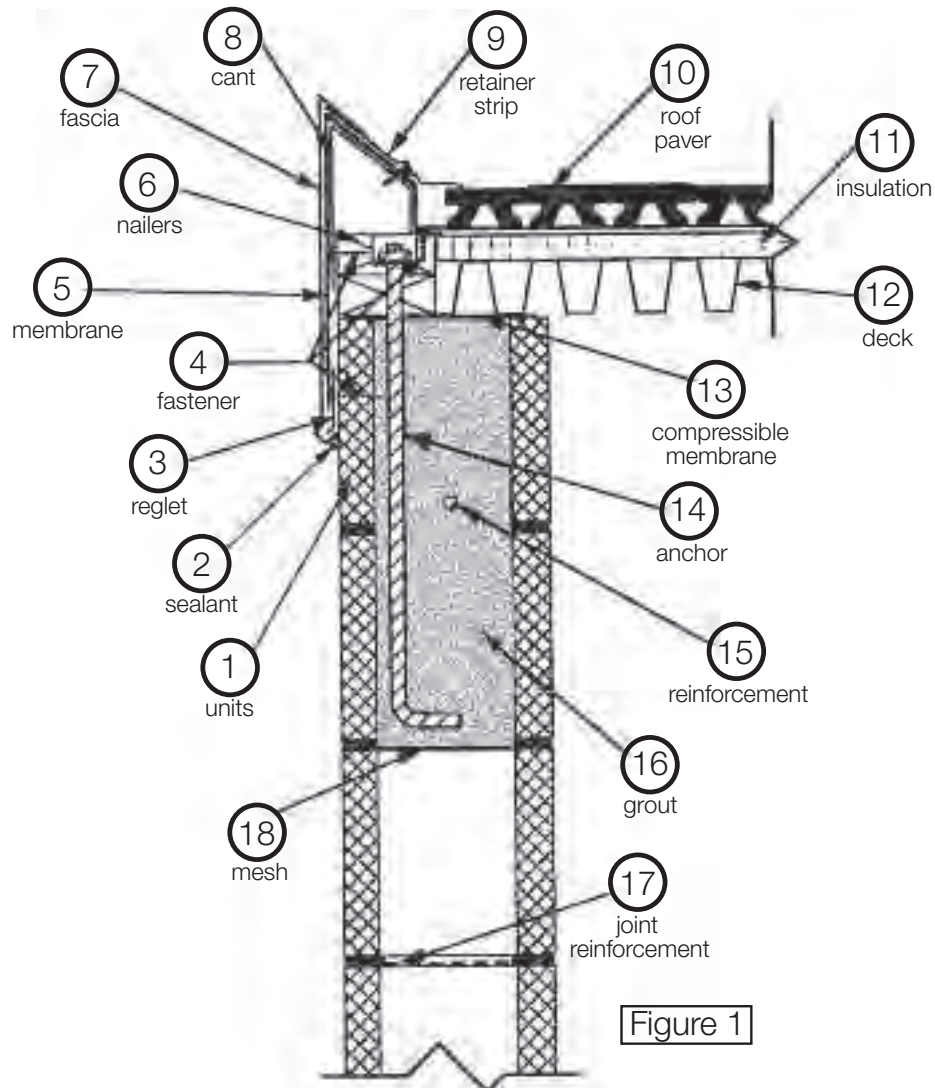
General Information



Proper design, detailing and installation of cap flashing is necessary to help assure weather-tight concrete masonry construction. This article presents four common wall/roof conditions and provides guidance and explanation for various techniques of proper cap flashing design.

1. **Concrete Masonry Units:** Smooth or molded textures and split textures. For split face or split ribbed concrete masonry construction (Fig. 3) use of a compressible membrane (Note 13).

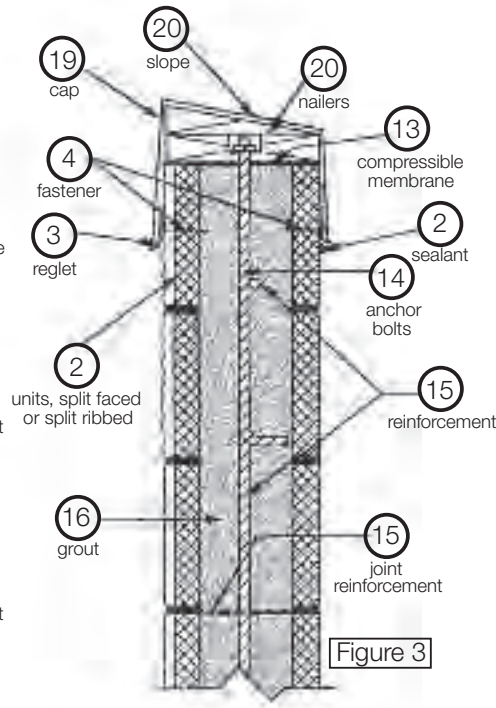
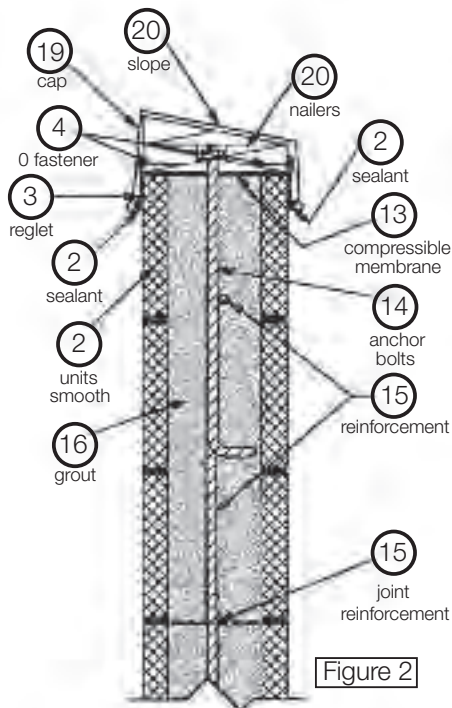
2. **Sealant joint:** Use durable sealants such as polysulphide, polyurethane or epoxy based sealants. Sealant may be omitted if the fascia or clip-on caps (Notes 7 or 19) extend at least four inches below the top of the top concrete masonry unit (Figs. 1 & 3). Applying sealants at the face of split faced or split ribbed units is difficult and can be avoided by properly installing fascia, caps and compressible membranes (notes 7 or 19 and note 13) or by using a band of smooth textured concrete masonry units at the top of the wall.



Detailing to Keep Moisture Out

General Information

3. **Reglet:** Position the bottom of the reglet at least four inches below the top of the concrete masonry or provide a sealant joint (Note 2). It is preferable that in areas subjected to wind driven rains that the cap material extend at least four inches below the top of the top masonry unit—not four inches from the top of the cap. One may anticipate in wind driven rains an upward movement of water one inch at each ten mile an hour increment of wind velocity.
 4. **Fastener:** Mechanically fasten reglet to the wall. Place fasteners for reglets as close to the bottom of the reglet as possible. Mechanically fastening the reglet to the wall and clipping the cap or fascia material to the reglet reduces buckling problems that may occur if the fascia or cap material is mechanically fastened directly to the masonry. Install neoprene washers to seal fasteners.
 5. **Single ply roofing membrane:** Lap over the top of the cant and extend the membrane to no more than two inches from the bottom of the reglet.
 6. **Nailers or Blocking:** Nailers or Blocking to be treated wood.
- (Notes 7 through 12 refer to Figure 1 only)
7. **Fascia:** The fascia should have a mechanical or friction fit to the cant and a friction clip-on fit to the reglet. Joints in the length of fascia should be capped at least six inches and sealed.
 8. **Cant:** Metal or plastic cants to be configured as required.
 9. **Retainer strip:** A non-ferrous strip is provided to restrain roof pavers against wind uplift forces.
 10. **Roof pavers:** Roof pavers are a ballast alternative to loose gravel. Interlocking roof pavers provide wind up-lift resistance, drainage, wearing surface and protection for the roofing membrane against ultra-violet degradation.
 11. **Rigid board insulation:** Provide as required.



Detailing to Keep Moisture Out

General Information

12. **Deck:** The deck is usually metal or concrete, configured and designed to resist bearing as required.
 13. **Compressible water resistance membrane:** Extend three quarters of an inch onto the face shells of the concrete masonry and adhere to the masonry. The membrane may be omitted if sealant joints (Note 2) are properly installed and maintained. The membrane is required, however, when capping split faced or split ribbed masonry and when the fascia does not extend at least four inches over the face of the smooth textured units
 14. **Anchor bolts:** Space and embed, as required.
 15. **Reinforcement:** Provide horizontal and/or vertical steel reinforcement as required.
 16. **Grout:** Provide as required.
 17. **Horizontal joint reinforcement:** Provide as required. Avoid placing joint reinforcement and flashing or other membranes in the same bed joints.
 18. **Building fabric or mesh:** Provide as required to confine grout to the grout space.
 19. **Clip-on cap:** Joints in the length of the cap to be lapped at least six inches and sealed.
 20. **Cap slope:** Slope to the roof side of the wall to minimize staining on the face of the wall. Most staining is caused by debris and dirt deposited on the cap and washed off onto the wall during light rains.
- (Notes 21 through 24 refer to Figure 4 only):
21. **Drip:** Drips should be provided at least one half inch from the face of the concrete masonry.
 22. **Epoxy joint:** Caps may be fastened by epoxying the caps to anchor bolts, by epoxy with mechanical fastener or by a dovetail connection.
 23. **Caps:** Seal head joints between units. Proper sealing may require raking out mortar joints and applying an effective sealant (see Note 2). Caps may be concrete masonry, stone or precast concrete.
 24. **Flashing:** Lap joints of metal or plastic flashing installed under the cap at least six inches and seal all joints. The flashing requires a drip. A sealant (Note 2) is required if a compressible membrane (Note 13) is omitted. Seal around anchor bolt penetrations through the flashing.

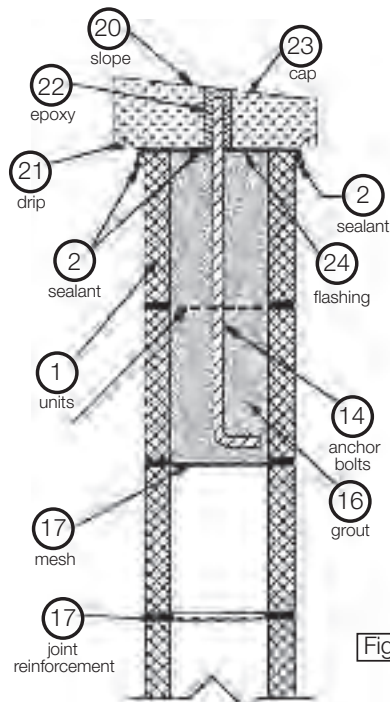
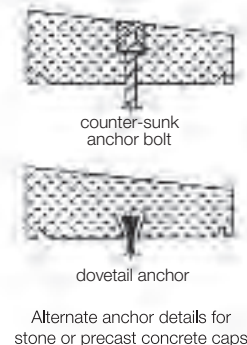


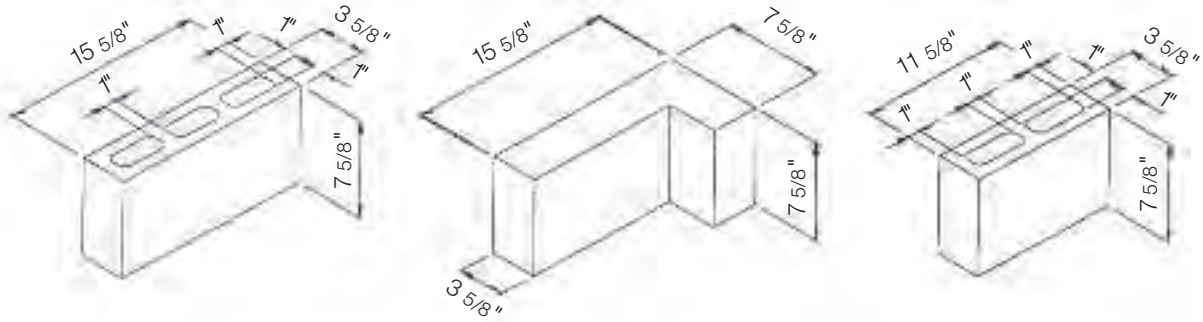
Figure 4



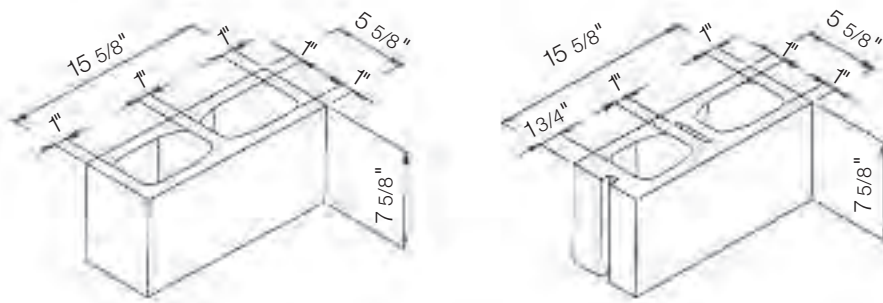
Basic Block Dimensions

General Information

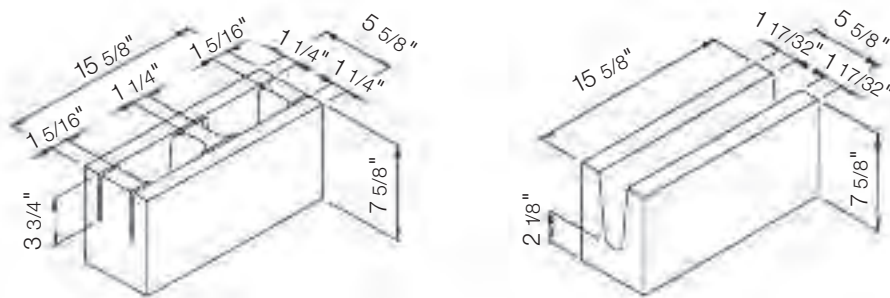
3 5/8" Square Core



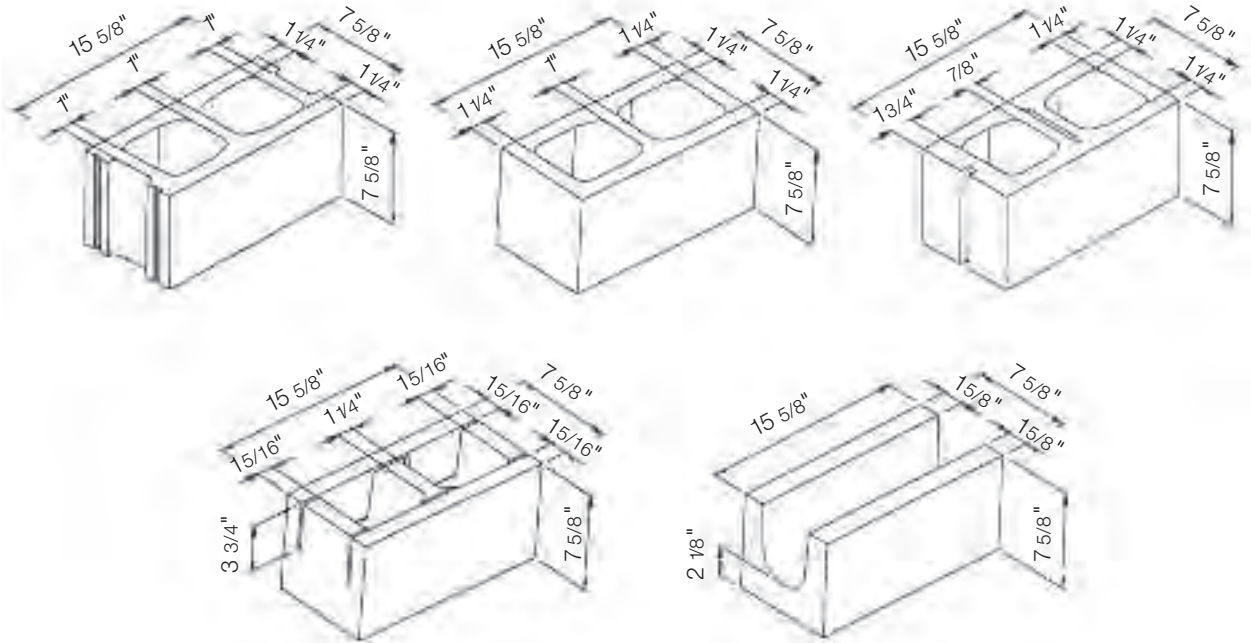
5 5/8" Reinforced Web



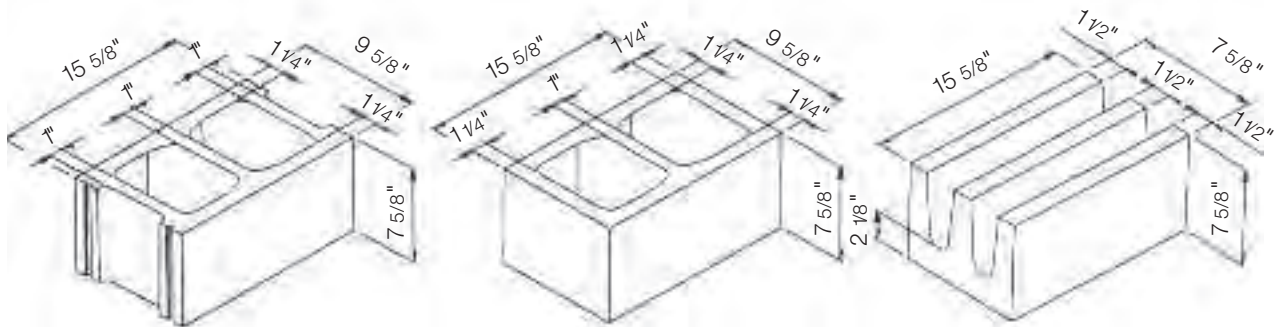
5 5/8" Reinforced Web



7 5/8" Reinforced Web



9 5/8" Reinforced Web

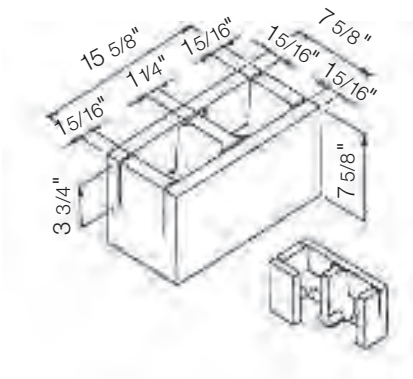


Bond Beam units are offered in 3 different standard shapes. Not all shapes are available for all applications. Please specify the shape you will require when you place your order. If no preference is specified we will manufacture the standard shapes for that unit.

KNOCK OUT BOND BEAM

(KOB), open bottom

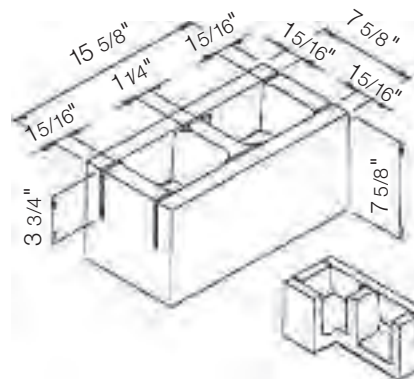
available in 6" and 8" units



FHA (KOB with a solid bottom)

available in 8" units only

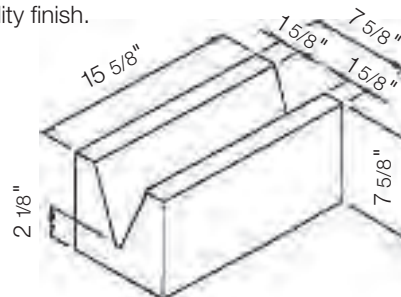
Note: This is the standard configuration for all 8" bond beam units if no preference is specified.



V-SHAPE-Cut

available in any size

Note: The unit is used for any units which are finished on the bottom (**excluding glazed units**) in order to achieve the best quality finish.



SPECIALS

Trenwyth products are available in specialty units which no one else can provide. If you have a special need, contact your Trenwyth representative.



architectural masonry units

Basic Block Dimensions

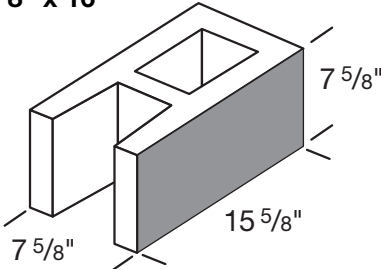
General Information

Open Ended Bond Beams

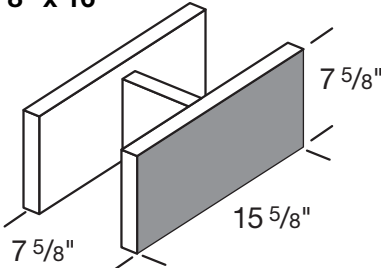
Also available in 4", 6", 10" & 12" thickness.

Available from the Phoenix, AZ facility only.

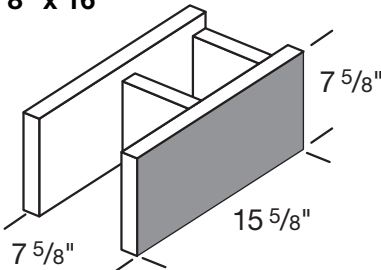
OE1E
8" x 8" x 16"



DCBB OE1E
8" x 8" x 16"

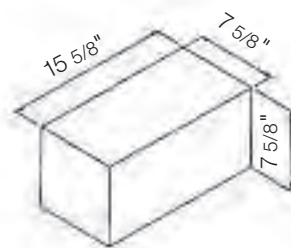
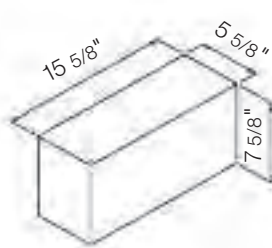
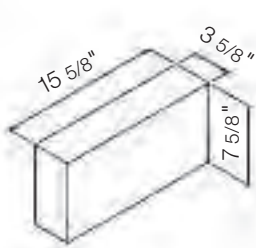
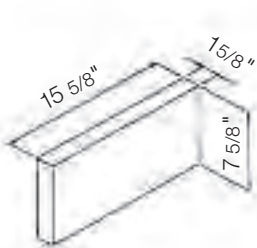
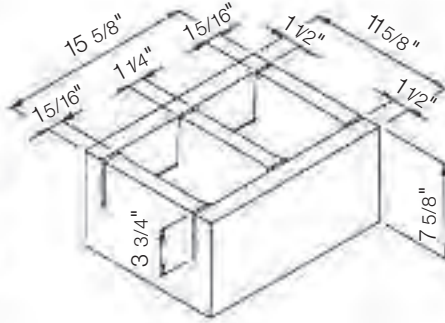
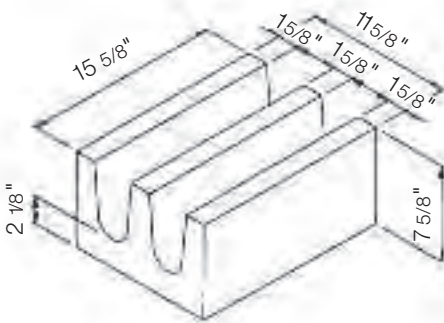
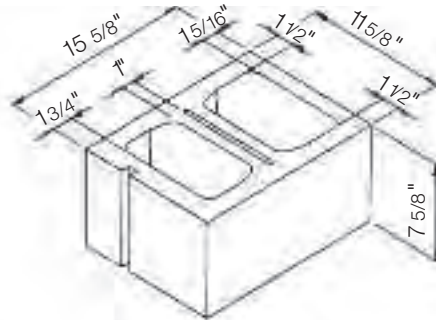
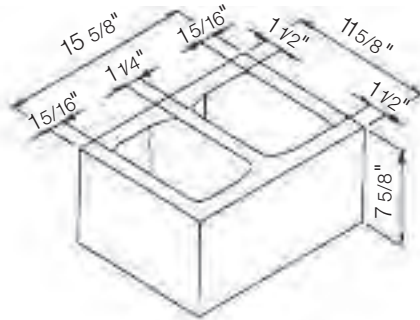


DCBB OE1E
8" x 8" x 16"



Basic Block Dimensions

General Information



Lintel

Scored Face

