

## Adding Brick Veneer to Existing Construction

**Abstract:** This *Technical Note* presents information on adding anchored brick veneer and thin brick adhered veneer to existing construction. Considerations and recommendations for design, detailing, material selection and construction specific to retrofitting existing walls with brick veneer are presented. Other *Technical Notes* are referenced for general brick veneer construction information not specific to the retrofit of existing construction.

**Key Words:** adhered veneer, anchored veneer, anchors, brick veneer, design, existing construction, flashing, retrofit, reveneering, thin brick, walls, weeps.

### SUMMARY OF RECOMMENDATIONS:

#### Preparation:

- Inspect and repair existing siding as necessary to act as a water resistive barrier
- Where existing siding cannot be readily repaired, wrap existing siding with a new water resistive barrier
- Where neither option above is desired, remove existing siding and inspect and repair existing water resistive barrier and sheathing as necessary, installing a new water resistive barrier where none currently exists

#### Anchored Brick Veneer:

- Provide drainage wall details in accordance with *Technical Note 7*, materials in accordance with *Technical Note 7A* and workmanship in accordance with *Technical Note 7B*
- Provide a minimum nominal 1 in. (25.4 mm) air space behind brick veneer

#### Support:

- Bear veneer on existing or extended footing or angle fastened to existing foundation wall
- For angle support, provide corrosion resistant angle; fasten angle to existing foundation wall with anchors sized and placed in accordance with Table 2
- Where no footing or foundation wall exists, consult a design professional

#### Anchorage:

- Select type and length of anchor based on existing wall type
- Place anchors to penetrate existing sheathing and securely fasten into existing structural members

#### Veneer Construction:

- Lap flashing at top of openings and base of veneer with existing exterior finish
- Lap flashing at bottom of openings with existing sill
- Provide open head joint weeps immediately above flashing at 24 in. (610 mm) o.c.

#### Edge Details:

- At perimeter of veneer openings, install molding and sealant to close air space
- At top of veneer, provide at least ¾ in. (19.1 mm) clearance to bottom of existing soffit, sealed at exterior edge
- Use proper construction techniques

#### Thin Brick Adhered Veneer:

- Provide barrier wall details in accordance with *Technical Note 28C*
- Attach to existing wall with mortar or adhesive, or proprietary clip anchoring system provided by thin brick system manufacturer

### INTRODUCTION

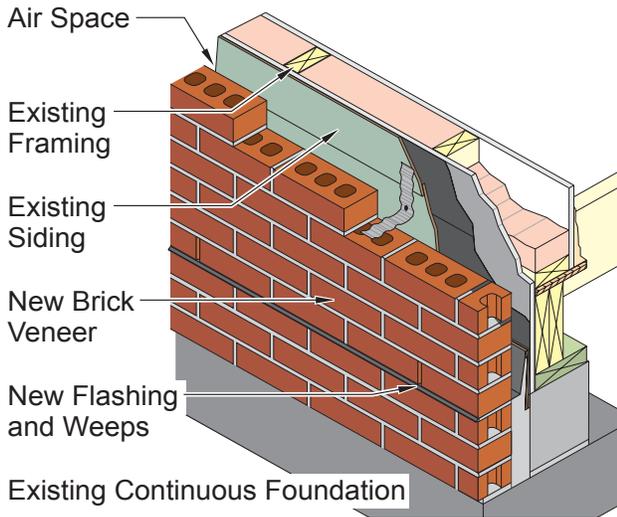
Brick veneer provides superior performance with many properties desired by designers, contractors and property owners, such as attractive appearance, high fire resistance, high resistance to water penetration, low thermal transmission rate, low maintenance and increased resale value. For an existing home or building clad in other materials, adding a brick veneer exterior can result in a significant improvement, such as that shown in [Photo 1](#) and [Photo 2](#).



**Photo 1**  
Before



**Photo 2**  
After

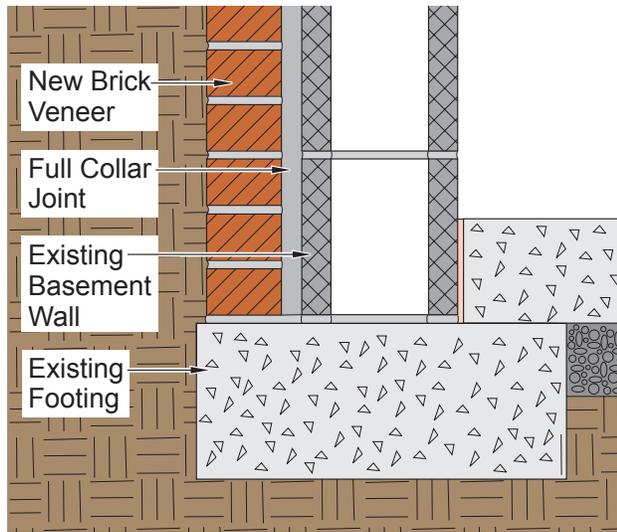


**Figure 1**

**New Brick Veneer on Existing Construction**

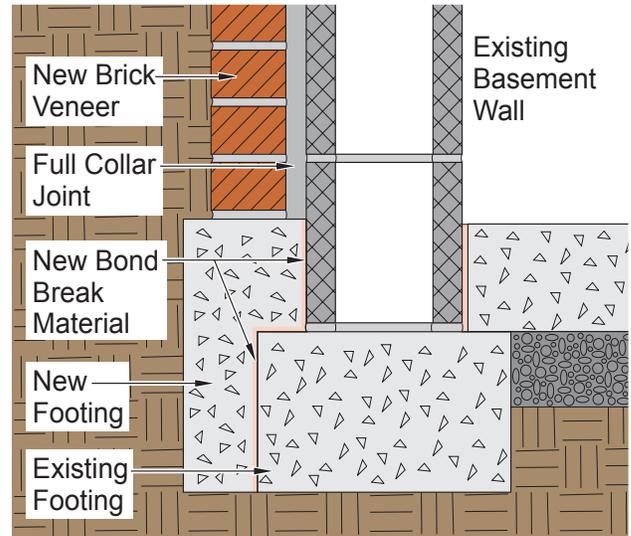
Anchored brick veneer is a non-loadbearing component, supported by a foundation and attached to the structure by anchors fastened to studs or embedded within masonry. Behind the veneer, an air space and water-resistive barrier direct water downward to flashing and weeps, providing an effective drainage wall system. The brick veneer bears on an existing or extended continuous footing, as shown in **Figure 1**, **Figure 2** and **Figure 3**, or angles attached to an existing foundation wall, as shown in **Figure 4**.

Thin brick adhered veneer is attached to and supported by the backing wall or framing with lath and plaster, as shown in **Figure 5**, adhesive or a proprietary clip system. For substrate walls with framing, a water resistive barrier separates the veneer from the wall framing. Mortar behind and surrounding the brick units create a barrier wall system to manage water.



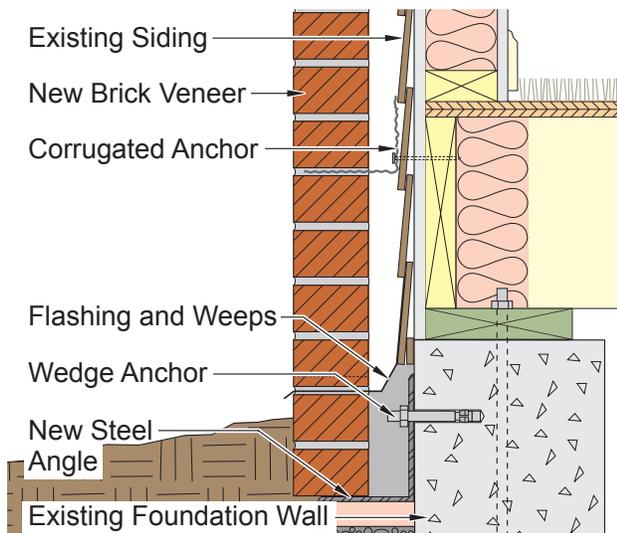
**Figure 2**

**Brick Veneer on Existing Foundation**



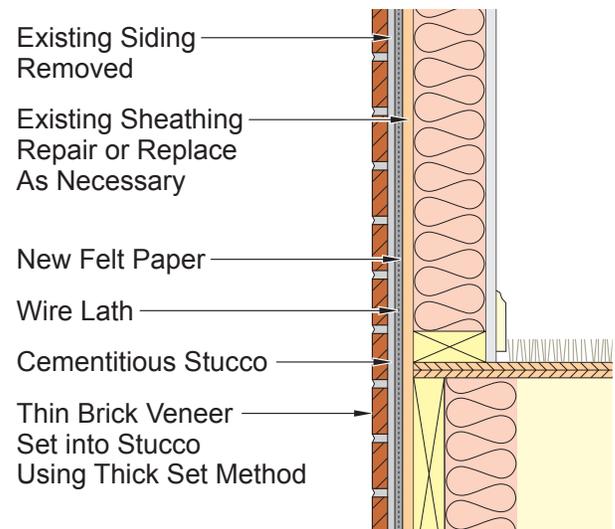
**Figure 3**

**Brick Veneer on Footing Extension**



**Figure 4**

**Brick Veneer on Steel Support**



**Figure 5**

**Thin Brick Adhered Veneer on Existing Wood Studs**

# Building Plans Without Brick Veneer

Brick veneer may be added to drawings and plans where it currently is not included. For anchored brick veneer, the existing design can be modified. For an existing design with a continuous footing, the details and explanation presented herein are directly applicable. Where an existing design includes pier foundations without continuous footings, such as with most modular homes or in coastal construction, brick veneer may likely require the addition of a new footing and foundation wall. Guidance for various types of foundation wall construction can be found in *Technical Note 26*, *Technical Note 17L* and in the *Technical Note 21 Series*. Footing design should be coordinated with a contractor and/or design professional.

For thin brick adhered veneer, the thin brick simply may be substituted for other siding materials. Due to the lighter weight of thin brick, further modification to the existing design is not necessary.

## Existing Construction

Generally, the existing exterior walls of a building, whether wood stud, steel stud or masonry, are sufficient as backing for anchored brick veneer or thin brick adhered veneer. Where exterior framing may allow excessive deflections, such as steel stud backing or premanufactured home walls, stiffen the backing as necessary to meet current code requirements for deflection limits.

In addition to structural preparations, the existing walls may need modification to provide a water resistive barrier. Where existing siding materials cannot provide this barrier, either install a new barrier outside the existing siding or remove the siding. If the siding is removed, either repair the barrier behind the siding as necessary or install a new water resistive barrier. Existing sheathing should not be used alone as the water resistive barrier.

This *Technical Note* is one in a series focusing on brick veneer. It addresses adding brick veneer to an existing building and focuses on anchored brick veneer. For more detailed information on thin brick adhered veneer, refer to *Technical Note 28C*. Other *Technical Notes* in the series are devoted to various brick veneer systems in new construction and provide additional useful information.

## PROPERTIES OF BRICK VENEER CONSTRUCTION

The following properties are true of virtually all types of brick veneer. With thin brick adhered veneer, some properties, such as fire resistance, may be somewhat less than those of full thickness units.

### Aesthetics

Brick is a traditional sign of quality construction that will increase the value of an existing home or commercial structure. Brick is available in a large variety of sizes, colors, textures and coatings. Multiple bond patterns, colored mortars and details are available to create unique looks. For further information on sizes and patterns, refer to *Technical Note 10* and *Technical Note 30*.

### Thermal Performance

Adding brick veneer to an existing wall can increase thermal performance. Brickwork has a high thermal mass, storing and releasing heat slowly. As a result, walls with brick veneer require less insulation than walls without brick. Closed-cell rigid board insulation can be added over the existing wall behind the veneer. For further information regarding the thermal resistance of brick assemblies, refer to the *Technical Note 4 Series*.

### Fire Resistance

Brickwork is non-combustible and excellent fire resistance. A nominal 3 or 4 in. (76 or 102 mm) brick wythe has a 1-hour fire resistance rating, significantly reducing the chance of fire spread [Ref. 4]. For additional information, refer to the *Technical Note 16 Series*.

### Acoustics

Brick veneer walls reflect a large portion of sound waves. The mass of the brickwork absorbs another portion of sound energy. For anchored brick veneer, the air space separates the brickwork from the existing wall, further reducing sound transmission. For additional information on sound transmission, refer to *Technical Note 5A*.

# Moisture Resistance

Anchored brick veneer construction is separated from the existing wall by an air space, creating a drainage wall. If wind-driven rain penetrates the brickwork, the air space drains water down the back face of the brickwork to flashing and weeps. A water resistive barrier acts as a second line of defense against water penetration. Thin brick adhered veneer uses the thickness of the brick and mortar backing as a barrier wall to resist water penetration. For additional information regarding water penetration resistance, refer to the *Technical Note 7 Series*.

## DESIGN AND DETAILING

Proper design and detailing of brick veneer added to a completed design or existing construction are essential to ensure proper performance. Design and detailing considerations include supporting the weight of the veneer, attachment of the veneer to the existing structure, drainage and movement provisions, and details around openings.

## Supporting Brick Veneer

The height limitations for anchored brick veneer above foundations are based on the history of successful performance and depend on both the support offered by the backing and the anticipated seismic or other lateral loads. **Table 1** is based on the 2006 International Residential Code (IRC), Tables 703.7(1) and 703.7(2) [Ref. 2]. Existing siding or sheathing may need to be upgraded to meet the minimum sheathing thickness and coverage requirements of the code tables. The same height limits apply to nonresidential construction, except that in Seismic Design Categories E and F, the veneer is required to be supported at each story. Refer to the IRC, the International Building Code, and the MSJC Code for additional requirements for residential (IRC) and nonresidential (IBC and MSJC) construction in Seismic Design Categories C through F [Refs. 1, 2, 5].

**TABLE 1**  
**Height Limitations for Anchored Brick Veneer**

Seismic Design Category	Type of Backing	Empirical Height Limitations		
		Max, Stories	Height at Plate, ft (m)	Height at Gable, ft (m)
A, B or C <sup>1</sup>	Wood stud	3	30 (9.14)	38 (11.58)
	Steel stud	2	30 (9.14)	38 (11.58)
	Concrete or masonry	No specific limit		
D <sub>0</sub> <sup>2</sup>	Wood stud	3 <sup>4</sup>	30 (9.14) <sup>4</sup>	38 (11.58)
	Steel stud	Not permitted		
	Concrete or masonry	No specific limit		
D <sub>1</sub> <sup>2</sup>	Wood stud	3	20 (6.10) <sup>5</sup>	28 (8.53) <sup>5</sup>
	Steel stud	Not permitted		
	Concrete or masonry	No specific limit		
D <sub>2</sub> <sup>3</sup>	Wood stud	2	20 (6.10) <sup>5</sup>	28 (8.53) <sup>5</sup>
	Steel stud	Not permitted		
	Concrete or masonry	No specific limit		

1. Veneer to be maximum 5 in. (127 mm) nominal thickness and maximum 50 psf (245 kg/m<sup>2</sup>) installed weight.
2. Veneer to be maximum 4 in. (102 mm) nominal thickness and maximum 40 psf (196 kg/m<sup>2</sup>) installed weight.
3. Veneer to be maximum 3 in. (76 mm) nominal thickness and maximum 30 psf (147 kg/m<sup>2</sup>) installed weight.
4. Maximum height of one- and two- story veneer limited to 20 ft (6.10 m) unless bottom 10 ft (3.05 m) is backed by concrete or masonry.
5. Maximum height may be increased to 30 ft (6.10 m) and 38 ft (11.58 m) in the gable if the bottom 10 ft (3.05 m) is backed by concrete or masonry.

When adding anchored brick veneer, its weight may be supported directly on either existing or new concrete foundations. Alternatively, where existing concrete or masonry foundation walls provide sufficient strength, the veneer may be supported by steel angles anchored to the existing foundation walls.

## Concrete Footings

Where possible, support new brickwork with an existing concrete footing, as shown in Figure 2. If an existing footing is not wide enough to support the brick wythe (minimum bearing of two thirds of the thickness of the wythe), the existing footing can be extended by placing new concrete at the same depth as the existing footing, as depicted in Figure 3. A bond break is recommended between the existing and new footing to allow for expected slight differential movements. Provide reinforcement in any new concrete footing as required by the building code. Coordinate any modification to the existing footing with the local building official.

## Steel Angles

An alternate method of supporting the brick veneer is by attaching a continuous corrosion-resistant steel angle to the existing foundation or basement wall. The preferred location of the horizontal leg of the angle is at or slightly above grade. If the angle is to be placed below grade and above the frost line, the space beneath the angle can be backfilled with freely draining granular material and a compressible pad to limit frost heave and to protect the angle from displacement. It is recommended that the angle be attached to existing basement or foundation walls constructed of concrete or masonry. Anchorage to concrete or masonry walls can be achieved either by anchors, as depicted in Figure 4, or by using through-bolts. When through-bolting, seal the annular space around the shaft of the bolt to prevent water penetration. When using mechanical anchors secured in poured concrete or filled concrete masonry units, use maximum anchor spacing as defined in Table 2. Note that the angle size used will depend on the proposed distance from face of brick back to face of foundation wall. The horizontal leg of the angle must be long enough to allow a minimum of two thirds of the brick thickness to bear on the angle. Attach angles through holes centered at two-thirds the height of the angle using non-corrosive shims as necessary.

**TABLE 2**  
Support Angle Anchor Bolt Spacing, in. (mm)<sup>1</sup>

Brick Height, ft. (m)	Drop-In Anchors		Wedge Anchors or Through-Bolts <sup>2</sup>	
	½ in. (12.7 mm) diameter	⅝ in. (15.9 mm) diameter	½ in. (12.7 mm) diameter	⅝ in. (15.9 mm) diameter
4 (1.2)	42 (1067)	48 (1219)	48 (1219)	48 (1219)
6 (1.8)	28 (711)	48 (1219)	42 (1067)	48 (1219)
8 (2.4)	20 (508)	36 (914)	32 (813)	45 (1143)
10 (3.0)	18 (457)	28 (711)	24 (610)	36 (914)
12 (3.7)	14 (356)	24 (610)	21 (533)	30 (762)
Min. embedment, in. (mm)	2 (51)	2¾ (60)	2¼ (57)	2¾ (70)
Min. edge distance, in. (mm)	2½ (64)	3⅜ (79)	2½ (64)	3⅜ (79)

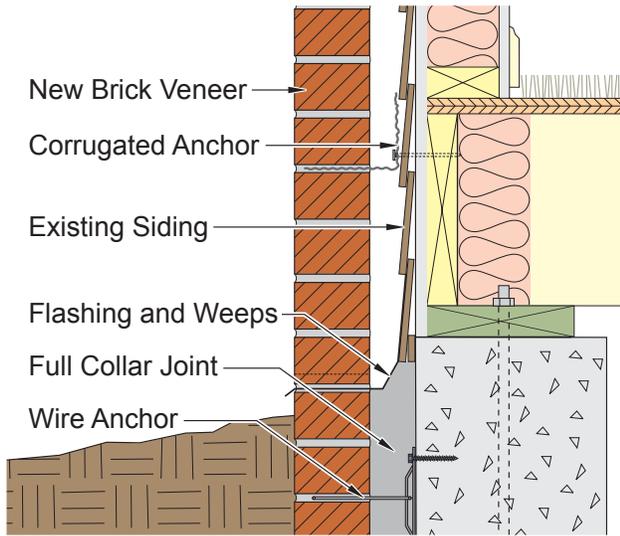
1. Assumes steel equal leg angles, ⅝ in. (9.5 mm) thick, maximum leg dimension of 5 in. (127 mm), used in 10 ft. (3.0 m) sections with ½ in. (12.7 mm) gap between sections.

2. Minimum embedment not applicable to through-bolting.

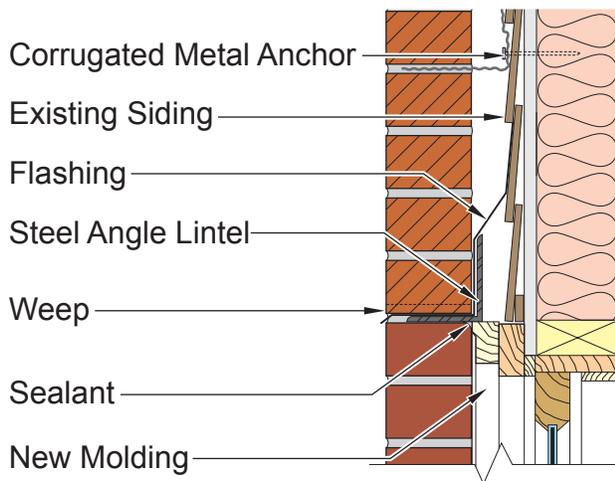
This method of supporting veneer with retrofit steel angles may not be suitable for some applications and may require review by a qualified design professional. Loads applied to the angle and foundation wall should be carefully considered, as well as the strength of the foundation wall itself. Special consideration should be given to the eccentricities of the applied loads, especially when acting in conjunction with existing soil backfill loads. In general, this method of support should be confined to one-story structures where the total height to the plate does not exceed approximately 12 ft (4.3 m).

## Attachment

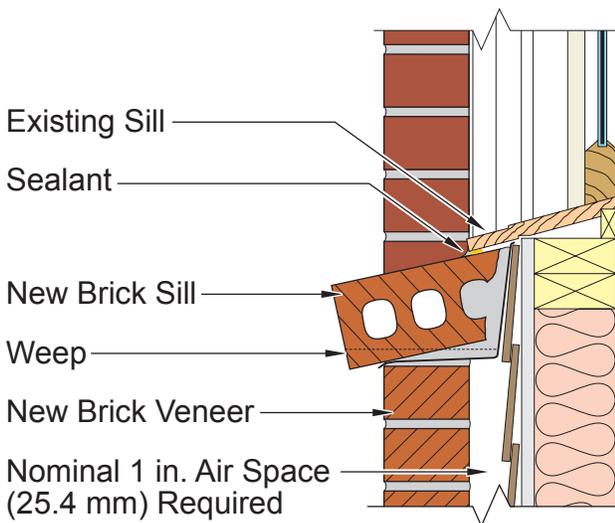
The brick veneer must be securely attached to the existing construction throughout its height. When using adjustable two-piece W 1.7 (MW11) wire or 22-gage corrugated anchors, provide one anchor for each 2.67 sq ft (0.25 m<sup>2</sup>) of wall area. For other anchor types, provide one anchor for each 3.5 sq ft (0.33 m<sup>2</sup>) of wall area. Depending on the applicable code (IRC or IBC), the maximum spacing of anchors cannot exceed 24 in. (610 mm) horizontally or vertically for residential construction and cannot exceed 32 in. (813 mm) horizontally or 18 in. (457 mm) vertically for nonresidential construction. This spacing applies above and below grade.



**Figure 6**  
**Base Detail**



(a) Window Head/Lintel



(b) Window Sill

**Figure 7**  
**Window Head and Sill Details**

## Supporting Lateral Loads

Lateral loads push or pull a wall surface due to forces from wind and earthquakes. The addition of brick veneer, when properly attached, does not affect the ability of the existing construction to resist wind pressures. The wind loads on the brickwork are considered to be transferred through the anchors into the existing walls, just as if the veneer had not been added. Seismic loads, which are based on wall stiffness and weight, among other factors, can be significantly affected by the addition of the veneer. For all buildings in areas defined by the building code as Seismic Design Categories A and B, as well as detached one- and two-family homes in Seismic Design Category C, there are no requirements associated with the addition of the veneer. The height limitations in Table 1 were established based on the seismic resistance of wood stud framing. In all other cases, a local building official and/or design professional should be consulted to determine if modification of the existing exterior walls is needed to accommodate the seismic loads induced by the new veneer.

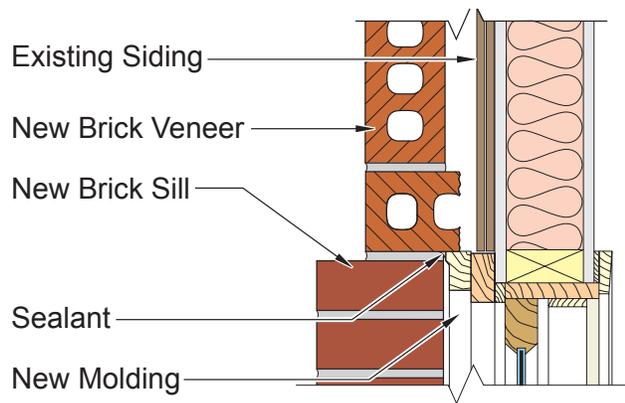
## Flashing and Weeps

Flashing details, similar to those depicted in Figure 4, Figure 6 and Figure 7, are essential to brick veneer construction. In order to divert the moisture out of the air space through the weeps, install continuous flashing at the bottom of the air space and above grade. Where the veneer continues below grade, completely fill the space between the veneer and the existing construction below the flashing with mortar or grout. Install flashing at the heads and sills of all openings and wherever the air space is interrupted. Turn the back of the flashing up a minimum of 8 in. (203 mm) such that the top edge of the flashing is covered by or sealed to the existing siding. The front of the flashing should extend to the face of the brick veneer. Where the flashing is not continuous, such as at heads and sills, the ends should be turned up approximately 1 in. (25.4 mm) to form an end dam.

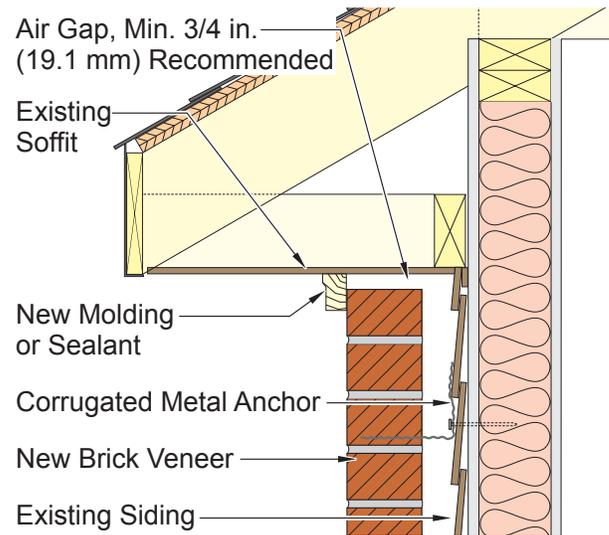
Locate weeps in the head joints immediately above all flashing. The maximum recommended spacing of open head joint weeps is 24 in. (610 mm) on center. When wick materials are used in the weeps, the maximum recommended spacing of weeps is 16 in. (406 mm) on center. Additional discussion of flashing and weeps may be found in the *Technical Note 7 Series*.

## Framing Around Openings

Typically, openings in an added veneer are constructed similarly to those in new construction, with existing window trim and details left in place behind



**Figure 8**  
**Window Jamb Detail**



**Figure 9**  
**Eave Detail**

the new veneer. At the window ledge, the new brick sill is made sufficiently deep to span the new air space and tuck under the existing sill, as shown in Figure 6. Maintain a minimum  $\frac{1}{4}$  in. (6.4 mm) gap below the existing sill to allow for potential brick expansion. At the top and sides of the opening, install a new molding deep enough to cover the air space, as depicted in Figure 7 and Figure 8.

Steel angles commonly used as lintels support veneer over door and window openings. Reinforced brick masonry or precast concrete are also alternatives. Steel angle lintels must bear a minimum of 4 in. (102 mm) onto adjacent masonry. For further information on the design, detailing and material selection of various types of lintels, refer to *Technical Notes 17H and 31B*.

## Top of the Veneer

A typical detail for the top of the brick veneer at an existing eave is shown in Figure 9. Maintain a minimum  $\frac{3}{4}$  in. (19.1 mm) clear space between the top of the last course of brick and the bottom of the soffit. Cover this space with a new molding strip and sealant or otherwise protected from moisture. If the eave is insufficient to fully cover the top of the veneer, extend it to protect the top of the brick.

## Movement Provisions

Differential movements due to temperature, moisture, shrinkage, and creep are ordinarily insufficient in small brick veneer buildings to require that movement joints or other provisions be installed. For large structures, such as commercial buildings and large single-family houses, the design should include considerations of potential differential movements and proper details to accommodate them. This is especially true for new veneer around existing second story windows. Design and details for differential movement may include expansion joints, flexible anchorage, joint reinforcement, bond breaks, and sealants. These items and their applications are discussed in the *Technical Note 18 Series*, *Technical Note 28* and the *Technical Note 21 Series*.

## MATERIALS

The proper selection of quality materials is essential to the satisfactory performance of a brick veneer wall assembly. No amount of design, detailing or construction can compensate for the improper selection of materials.

## Brick

Use nominal 3 or 4 in. (76 or 102 mm) thick brick, conforming to the requirements of ASTM C216, *Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)*, or ASTM C652, *Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)* [Ref. 3]. Grade SW brick is recommended for all veneer applications because the brick wythe is isolated from the remainder of the wall by the air space, thus exposing it to the maximum temperature extremes.

Generally, salvaged brick are not recommended since their original properties cannot be determined and they may not provide the strength and durability required for satisfactory performance. For further information on salvaged brick, refer to *Technical Note 15*.

## Mortar

Selection of an appropriate mortar helps to ensure durable brickwork that meets performance expectations. Mortar Type and mortar material selection should consider multiple aspects of a project, including design, brick or masonry materials, exposure and required level of workmanship. Improper mortar selection may lead to lower performance of the finished project. Mortars are classified by ASTM C270, *Standard Specification for Mortar for Unit Masonry*, into four Types: M, S, N and O. These four Types of mortar may be made with portland cement, masonry cement, mortar cement or blended cements, some of which are combined with hydrated lime. Type N mortar is recommended for most brick veneer. Type M portland cement-lime mortar is recommended for brick veneer below grade, where the brickwork is in contact with earth. Mortars for brick masonry are discussed in *Technical Note 8 Series*.

## Veneer Anchors

The type of anchor system used with brick veneer depends on the construction of the existing wall. Corrugated metal anchors are permitted to be used with wood frame backing. Metal wire anchors are required for other backing systems. Several types of anchors that may be used in brick veneer applied to existing construction are shown in [Figure 10](#).

**Corrugated Metal Anchors.** Install corrugated anchors that are at least 22 gage, 7/8 in. (22.2 mm) wide, 6 in. (152 mm) long and corrosion-resistant. Corrugated metal anchors should comply with ASTM A36, *Specification for Carbon Structural Steel*, or ASTM A 1008/A 1008M, *Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability*.

**Metal Wire Anchors.** Use wire anchors that are at least 9 gage and corrosion-resistant. Metal wire ties should comply with ASTM A82, *Specification for Steel Wire, Plain, for Concrete Reinforcement*.

**Corrosion Resistance.** Corrosion resistance is usually provided by a zinc coating, or by using stainless steel. To ensure adequate resistance to corrosion, coatings or materials should conform to the following standards:

**Zinc Coatings -**

ASTM A123 or A153 Class B (for sheet metal anchors) or 1.50 oz/ft<sup>2</sup> (458 g/m<sup>2</sup>) (for wire anchors)

**Stainless Steel -**

ASTM A240 (for sheet metal anchors)

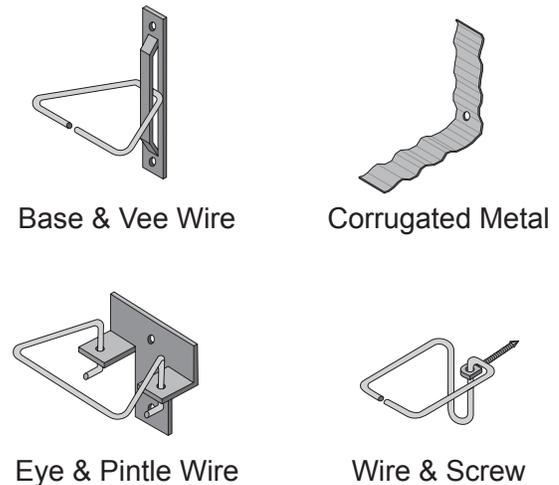
ASTM A480 (for stainless steel sheet metal)

ASTM A580 (for wire anchors)

## Anchor Fasteners

The existing wall construction will influence the type of fastener used to attach anchors. Some systems have manufacturer-specific attachment hardware for each type of backing. Where no manufacturer requirements are given, the following guidelines apply.

**Wood Frame.** Use corrosion-resistant screws or nails to attach corrugated metal anchors to wood frame construction. Use minimum No. 10 screws and 8d nails long enough to penetrate at least 1¼ in. (32 mm) into the wood studs after passing through existing siding and sheathing.



**Figure 10**  
**Veneer Anchors**

**Metal.** Use corrosion-resistant, self-tapping metal screws, No. 10 minimum, to attach the wire receiver or strap to metal construction. The screws should penetrate at least ½ in. (12.7 mm) into the metal.

**Concrete or Masonry.** There are several methods of attaching the metal wire anchors to existing concrete or masonry walls. Attach anchors with minimum ¼ in. (6.4 mm) lag bolts and expansion shields, minimum 8d masonry nails, or minimum ⅜ in. (4.8 mm) masonry screws. Use corrosion-resistant fasteners and anchors sufficiently embedded to provide the necessary capacity to resist lateral loading.

**Other Wall Types.** For pole buildings, pre-manufactured metal buildings, or other forms of construction where structural members are widely spaced and lateral load resistance is provided mainly by the exterior skin, coordinate the anchorage type and layout with a design professional.

## Steel Angles

Steel for angles supporting new brick veneer at the foundation wall should conform to ASTM A36 and be treated or coated for corrosion resistance. Bolts or other fasteners should also be corrosion-resistant. Steel angles for lintels should be a minimum ¼ in. (6.4 mm) thick with at least 3 in. (76 mm) legs made of steel conforming to ASTM A36. For information on steel lintels for brick masonry, refer to *Technical Note 31B*.

## Flashing and Weeps

Flashing materials for use with brick veneer may be plastic or rubber membranes, sheet metals or a combination of these materials. Selection of superior flashing materials is recommended since replacement in the event of failure will be costly and difficult, if not impossible. Asphalt-impregnated felt paper is not recommended as a flashing material. Open head joint weeps are recommended. For a more information on flashing and weeps, refer to the *Technical Note 7 Series*.

## CONSTRUCTION

### Supports

**Footings.** Supporting brick veneer on an augmented or existing footing requires excavation. The excavation must be sufficiently wide for the mason to work and sufficiently stepped, braced or shored to avoid collapse. Remove loose soil and debris from the existing footing with a brush prior to placement of masonry.

**Angles.** When constructing brick veneer on continuous corrosion-resistant steel angles, lay the first course of brick in a mortar setting bed. This provides a means to compensate for any variations and misalignment of the steel angles.

### Installing Additional Insulation

Applying brick veneer over existing construction offers an opportunity to better insulate the existing exterior walls. The insulation materials used should comply with the criteria discussed in *Technical Note 21A*.

Rigid insulation may be installed directly over the existing finish prior to constructing the new brick veneer. Maintain a minimum 1 in. (25.4 mm) air space between the brick veneer and the rigid insulation. If the existing wood or metal framing contain little or no insulation, the existing siding of the wall may be removed to install insulation within the wall. Replace materials removed from the existing wall with appropriate new materials to provide a water-resistant barrier. When insulation is added, wire tie veneer anchors are required instead of corrugated anchors due to the width of the cavity.

### Workmanship

Good workmanship is necessary to achieve satisfactory performance of brick veneer. For information on workmanship, refer to *Technical Note 7B*.

**Mortar Joints.** Completely fill all bed and head joints with mortar. Keep clean and free of mortar and mortar droppings any locations not intended to receive mortar, such as air spaces, weeps and expansion joints. Tool mortar joints to enhance the water resistance of the wall by consolidating the mortar. Joints should be properly tooled when the mortar is “thumbprint” hard with a jointer tool slightly larger than the joint. Concave, “V” or grapevine joints are recommended for the most water-resistant brickwork.

**Flashing and Weeps.** Securely attach flashing to the existing wall with its top edge overlapped by the existing siding. Extend the flashing to the face of the brick veneer and install weeps immediately above all flashing.

**Anchor Placement.** Embed anchors a minimum of 1½ in. (38 mm) into the bed joints and completely surround with mortar.

**Sealants.** Provide sealant joints at the perimeter of exterior door and window frames not less than ¼ in. (6.4 mm) nor more than ½ in. (12.7 mm) wide. Remove old sealant, dirt, debris, loose paint or coatings to a minimum depth of ¾ in. (19.1 mm). Prime joints before placing sealant. Apply the sealant with a pressure gun.

## Protection

As with any brick masonry construction, protect materials from weather before and during construction. Store brick and mortar materials above the ground and under cover. Store flashing, anchors and other components indoors or in a shed or trailer, or otherwise protected from weather. During construction, protect partially completed walls by securely attaching a strong, weather-resistant membrane to the existing structure and allowing it to overhang the brickwork by at least 2 ft (0.61 m). This will help keep excessive moisture out of the wall and materials, decreasing the possibility of efflorescence and other deleterious effects.

## MAINTENANCE

Most brickwork is virtually maintenance-free. If properly designed, detailed and constructed, minimal brickwork maintenance is required. However, brick veneer added to existing wall systems should be inspected periodically to ascertain performance and identify any potential problems. Inspections are recommended on a seasonal basis or on an annual basis at a minimum. Such inspections should address sealant joints, plumbness of the wall, cracking, etc., to identify repairs and corrections before severe issues develop. For additional information regarding maintenance, refer to *Technical Note 46*.

## SUMMARY

This *Technical Note* provides the basic information required to properly select materials, design, detail, and construct brick veneer over existing construction. Added veneer relies on proper support at its base and anchors to the existing framework of the building. Intact existing siding materials can remain in place, with water penetration resistance provided by a new air space, water resistive barrier and flashing details. By following these recommendations, existing buildings can attain the aesthetic, thermal, acoustic and fire resistive benefits of brick veneer.

*The information and suggestions contained in this Technical Note are based on the available data and the experience of engineering staff and members of the Brick Industry Association. This information contained herein must be used in conjunction with good technical judgment and a basic understanding of the properties of brick masonry. Final decisions on the use of the information discussed in this Technical Note are not within the purview of the Brick Industry Association, and must rest with the project architect, engineer and owner.*

## REFERENCES

1. *2006 International Building Code*, International Code Council, Inc., Country Club Hills, IL, 2006.
2. *2006 International Residential Code*, International Code Council, Inc., Country Club Hills, IL, 2006.
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C652-07 Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)
4. Borchelt, J.G., and Swink, J., "Fire Resistance Tests of Brick Veneer/Wood Frame Walls," 14th International Brick/Block Masonry Conference, Sydney, Australia, 2008.
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