FMA/AAMA/WDMA 400-13

Standard Practice for the Installation of Exterior Doors in Surface Barrier Masonry Construction for Extreme Wind/Water Exposure







MANUFACTURERS ASSOCIATION



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FOREWORD

This standard practice includes procedures for the installation of exterior doors into residential and light commercial buildings of not more than three stories above grade in height, with surface barrier wall construction (masonry/concrete). Wood frame construction is not included in this document. Detailed instructions for installation of exterior doors in wood frame construction are covered in FMA/AAMA/WDMA 300.

The techniques demonstrated in this standard practice have been developed specifically to restrict liquid water from entering through the masonry opening and/or around the perimeter of the exterior door frame. The major emphasis is focused on sealing the surrounding area of the exterior door's masonry opening in such a manner as to restrict liquid water from penetrating the wall at the exterior door opening. Integration methods for door mounting attachment types with mounting flanges (Section 6.6), exterior casing / brickmolding (Section 6.7), and box frame / non-flanged (Section 6.8) are addressed. This standard practice presumes a drainage plane is not present behind the façade (surface barrier system).

This standard practice provides details for both a "barrier installation", such that there is a full perimeter seal at the exterior interface between the exterior door and the wall cavity (under the flange) and a "drainage installation", such that there is a discontinuous seal at the exterior sill interface to allow drainage from a 'sill pan' flashing system. In general, drainage installations should be utilized for systems that are susceptible to high moisture exposure, moisture sensitive materials, and potential leakage around the interface. It is essential that a robust air/water seal around the interior perimeter of the exterior door/wall cavity interface is achieved in drainage installations. However, there are cases where barrier installations can be utilized successfully and also can be more practical, particularly in such cases where the robust interior air/water seal is difficult to achieve.

This standard is specifically designed for installations subject to extreme wind/water climate exposure, particularly in the coastal southeast United States, and addresses buildings that will be at high risk for water intrusion. Thus, preventative measures shall be taken that are above normal installation practices (such as those referenced in ASTM E2112).

CAUTIONARY STATEMENT: Surface barrier construction presents some unique challenges for climates that experience frequent and/or heavy rainfall. It is extremely difficult to obtain and maintain a continuous water barrier over the entire building envelope. In addition, once water breaches the barrier and is absorbed by the construction material, the barrier inhibits the ability for the wall to dry out rapidly. Therefore, a water-managed/drainage plane construction is better suited for areas that experience heavy and/or frequent rain.

1.0 SCOPE

1.1 This standard practice covers the installation of exterior doors in new construction residential and light commercial buildings of not more than three stories above grade in height, with surface barrier wall construction (masonry/concrete). It is expected that all referenced components shall meet code requirements in force at the time of the installation.

1.2 To simulate extreme exposure conditions and demonstrate the effectiveness of the standard practice, installation methods that are consistent with this document have been water tested up to a test pressure of 575 Pascal (12 psf) using the ASTM E547 water test (ASTM E331 is an acceptable alternative). This does not advocate field or lab testing to those levels as a requirement for this standard practice.

1.3 This practice applies to exterior doors which employ a mounting flange, exterior casing/brickmold, or box frame/non-flanged. When nailing fins are used, they may be attached to the exterior door perimeter frame, with or without a flange on the sill, and are designed as an installation appendage.

1.4 This standard practice covers exterior side hinged and horizontal sliding glass doors.

1.5 This standard practice covers slab on grade sill conditions. For slab on grade sill conditions, which terminate below the membrane drainage wall system, full barrier sill conditions may be appropriate.

1.6 This standard practice covers the installation of exterior doors from pre- to post-installation. It does not include factory or field fabrication techniques that would be required to join individual doors and/or transoms to each other, either horizontally or vertically.

1.7 This standard practice provides recommended requirements for exterior door installation based on current best practices. If the exterior door manufacturer provides installation instructions, the manufacturer's instructions shall take precedence.

1.8 This standard practice provides installation instructions to enhance water management performance of the interface of the door system with the opening.

1.9 This standard practice does not address safety concerns, either from the installation process or those that may be present at the building site. It shall be the responsibility of the user of this standard practice to ensure that all appropriate health and safety practices have been implemented.

1.10 Accessibility requirements, such as American Disabilities Act, (ADA) are beyond the scope of this standard practice.

1.11 Exterior door products which have frames that are pocket-type, mulled together, joined, or set side-by-side require additional flashing and sealing steps that are not included as an installation practice in this standard. Consult the manufacturer for installation instructions when these types of products are utilized.

1.12 This document was developed in an open and consensus process and is maintained by representative members of FMA, AAMA and WDMA as advisory information.

2.0 REFERENCED STANDARDS

2.1 References to the standards listed below shall be to the edition indicated. Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as to referring to the latest edition of that code or standard.

2.2 American Architectural Manufacturers Association (AAMA)

AAMA 711-13, Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products

AAMA 713-08, Voluntary Test Method to Determine Chemical Compatibility of Sealants and Self-Adhered Flexible Flashings

AAMA 714-12, Voluntary Specification for Liquid Applied Flashing Use to Create a Water-Resistive Seal around Exterior Wall Openings in Buildings.

AAMA 800-10, Voluntary Specifications and Test Methods for Sealants

AAMA 812-04(2010), Voluntary Practice for Assessment of Single Component Aerosol Expanding Polyurethane Foams for Sealing Rough Openings of Fenestration Installations

AAMA AG-12, AAMA Glossary

2.3 ASTM International (ASTM)

ASTM C794-10, Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants

ASTM C920-11, Standard Specification for Elastomeric Joint Sealants

ASTM C1281-03(2009), Standard Specification for Preformed Tape Sealants for Glazing Applications

ASTM E331-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

ASTM E547-00(2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference

ASTM E2112-07, Standard Practice for Installation of Exterior Windows, Doors and Skylights

2.4 Fenestration Manufacturers Association (FMA), American Architectural Manufacturers Association (AAMA) and Window & Door Manufacturers Association (WDMA)

FMA/AAMA/WDMA 300-12, Standard Practice for the Installation of Exterior Doors in Wood Frame Construction for Extreme Wind/Water Conditions

3.0 DEFINITIONS

3.1 Please refer to AAMA Glossary (AG-12) for all definitions except for those appearing below (which apply only to this standard practice).

AIR SEAL, n. – A continuous seal put into the air gap area around the interior side, exterior side, or both sides of the fenestration perimeter to restrict infiltration or ex-filtration of air past the fenestration product.

AEROSOL FOAM SEALANT, *n*. – In building construction, a sealant that expands in volume as it is dispensed from a container, using propellant under pressure, to form a rigid or semi-rigid cellular mass.

APPLIED FLANGE (a.k.a. **FIELD-APPLIED/MECHANICALLY ATTACHED**, **NON-INTEGRAL FLANGE**), n. – A separate flange that may be added to or removed from the window or door frame.

BACK DAM, n. – The rear upturned leg of a masonry sill, sill pan or subsill designed for the purpose of diverting liquid water. A sealant joint can also be used to form a back dam provided it is part of a continuous air seal.

BOX FRAME/NON-FLANGED DOOR, *n*. –A type of non-flanged fenestration product that has no factory applied mouldings and that is installed into the rough opening either by driving fasteners through shimmed side jambs or by use of installation clips or brackets.

BUCK, n. – A framework anchored into an opening in a concrete or masonry wall, creating a rough opening into which the exterior door frame is secured.

COMPATIBILITY, n. – When materials maintain physical and functional properties when in direct contact or close proximity to each other

CONCRETE MASONRY UNIT (CMU) (a.k.a. CONCRETE BLOCK, CEMENT BLOCK and FOUNDATION BLOCK), n. – A pre-cast masonry block used to construct walls

DRIP CAP/DRIP MOULDING, *n*. – A moulding or flashing installed over windows and doors to direct water away from the building.

END DAM, n. – Any means provided to stop the flow of water out of the ends of a sill, panning system or subsill and into the wall cavity, such as sealant, upstands, plates or gasketing. End dams shall be of a height equal to the height of the back dam or higher.

EXTERIOR CASING/BRICKMOLD (BMC), *n*. – Trim applied around a window or door through which fasteners may be driven to install the unit. BMC covers the gap between the frame & masonry opening. Siding or brick is installed up to and adjacent to the edge of the BMC.

FLASHING, *n*. – Water resistive material that bridges the joint between the window/door frame and the adjacent construction to prevent water penetration. See *Pan Flashing*, *Liquid Applied Flashing*.

LIQUID APPLIED FLASHING, n. – A material that is fluid at the time of application that provides a water-resistive seal around building openings at or near the interface between the through-wall penetration and the building envelope and meets the performance requirements of this specification.

MASONRY OPENING, n. – That portion of a masonry wall which is left open, providing for the installation of a fenestration product.

PAN FLASHING (*a.k.a.* **SILL PAN**), n. – A type of flashing used at the base of a rough opening to divert water to the exterior or to the exterior surface of a concealed WRB. Pan flashings have upturned legs at the rear interior edge (back dam) and right and left sides (end dams), to form a three-sided pan that has the front open for drainage.

SEALANT (**CONSTRUCTION**), n. – Any of a variety of compounds used to fill and seal joints or openings in wood, metal, masonry, and other materials. For the purposes of this standard practice, sealant shall have the capability of allowing for joint movement and appropriate adhesion as required for construction applications.

SHIM, n. – A material used to raise, level, or plumb a fenestration frame. Lateral shims are placed in the rough opening adjacent to the frame jambs. Setting shims are placed in the rough opening beneath the sill.

SURFACE BARRIER WALL SYSTEMS, n. – Systems in which the outermost surface of the wall or roof is the sole barrier to intrusion of liquid water.

NOTE 1: Barrier systems are designed to be sealed at the exterior surface to keep water out. Barrier systems rely on sealants around building penetrations to prevent moisture intrusion. Most systems make no provision for drainage of incidental moisture that does enter the system. In addition, they generally include an exterior coating that is relatively impermeable to moisture.

4.0 SIGNIFICANCE AND USE

4.1 This standard practice recognizes that the effective performance of installed fenestration products is highly dependent upon following proper installation procedures, using appropriate materials, and quality workmanship.

4.2 This standard practice recognizes that the coordination of trades and proper sequencing are essential for effective fenestration installation. The general contractor shall be responsible for the necessary coordination of trades and proper construction sequencing of the installed fenestration product.

4.3 This standard practice recognizes that improper installation of door systems may contribute to excessive air infiltration, water penetration, sound leakage, insufficient structural integrity and condensation.

4.4 This standard practice presumes the installer/contractor has a working knowledge of applicable federal, state and local codes and regulations; specifically, but not limited to required means of egress, requirements for safety glazing materials and structural requirements based on the applicable codes.

4.5 This standard practice presumes the installer has a working knowledge of the tools, equipment and methods necessary for the installation of specified fenestration products. It further requires the installer to have familiarity with flashing and sealing techniques, application of caulking & sealants, finishes (where applicable), and an understanding of the fundamentals of construction that affect the installation of these units, including their compatibility with other materials.

4.6 This standard practice presumes that the products supplied have been furnished for the applicable installation and that their locations within the structure have been pre-determined to comply with all the applicable building codes and regulations.

5.0 RELATED ISSUES AND PROCEDURES

5.1 CONTINUITY

Continuity shall be maintained between all elements of the surrounding wall and the exterior door

5.2 JOINTS AND ANCHORAGES

Joints and anchorages shall be designed to accommodate differential thermal expansion and contraction, as well as the structural requirements within the exterior door /wall assembly.

5.3 CONSTRUCTION DAMAGE

Masonry openings which have any cracked, missing/misaligned or damaged masonry, rough opening sill, mortar joints or missing blocks shall be repaired or replaced prior to application of any waterproofing materials and the installation of the exterior door.

5.4 SEALANT AND FLASHING SELECTION

Prior to using sealant, the general contractor, design professional or builder shall seek input from sealant manufacturer regarding sealant selection. This includes proper joint design, material (chemical) compatibility, and sealant adhesion to the substrates.

5.4.1 Chemical Compatibility

All materials, such as, but not limited to coatings, flashings and sealants that come into contact with each other shall exhibit chemical compatibility, per AAMA 713.

5.4.2 Adhesion of Sealants

Adhesion of sealants to the substrates they will contact shall be verified by the sealant manufacturer peel adhesion per ASTM C794.

5.4.3 Sealant Joint Design

The design professional, general contractor or builder shall consult with the sealant manufacturer to ensure the sealant joint is designed to accommodate the joint gap and expected joint movement between the door and the wall opening for the intended purpose.

5.4.4 Sealant Performance Specifications

Gunnable sealants shall comply with AAMA 808.3 per AAMA 800 Section 1.4 or ASTM C920 Class 25 Grade NS or greater for proper joint expansion and contraction. If preformed tapes are used, they shall meet ASTM C1281.

5.4.5 Self adhering flashing shall meet the performance requirements of AAMA 711.

5.4.6 Liquid applied flashing shall meet the performance requirements of AAMA 714.

5.4.7 Low expansion aerosol or spray foams may be used as the interior perimeter seal material. Foam shall be low expansion, predominantly closed cell, non-rigid, and approved by the door manufacturer for use as a seal and shall be tested in accordance with AAMA 812.

5.5 STUCCO AND OTHER CLADDING

Stucco and other cladding shall not be installed prior to exterior door installation.

5.6 SHIMS

Shims shall be installed between the exterior door frame and the rough opening in such a manner to support the product in a plumb, level, square and true position.

NOTE 2: Where shims are used under the sill of the exterior door to compensate for uneven floor surfaces, shims should be made of durable materials with sufficient compression strength to support the loads that will be experienced during the life of the door.

5.7 PAN FLASHING

Pan flashings are intended to collect and drain water toward the exterior, including water that may enter through the exterior door unit or around the exterior door (between the rough opening and the fenestration). The pan flashing must be integrated with other flashings and the exterior door assembly to capture water that may otherwise penetrate to the sill framing and allow it to freely drain to the exterior. For this reason, pan flashings shall not be sloped to the interior. The front edge can be configured to provide a downturned leg which can then be lapped over the water resistive barrier of the wall system. The exterior door flashings and pan flashing must be sealed in a manner that reliably inhibits air and moisture flow to the interior. Pan flashing can be made from self-adhered flashing, liquid applied flashing, or from rigid or semi-rigid material, such as metal or a semi-rigid polymer.

6.0 EXTERIOR DOOR INSTALLATION PROCEDURES

6.1 PRE-INSTALLATION INSPECTION (Responsible trades are detailed in Appendix B)

6.1.1 Verify that the masonry rough opening meets this standard with regard to being the correct size, square, plumb and true (see Figure 1). Remedy any discrepancies.



FIGURE 1

6.1.2 Before installation, inspect the masonry opening for missing mortar, cracks in the sill, and any other defect which has produced a void or allows passage of liquid water through the masonry opening. Remedy any discrepancies.

6.1.3 Size and tolerances of masonry rough openings shall be determined from the door manufacturer's instruction and this standard practice.

6.1.3.1 The masonry opening shall be plumb, level, square and true prior to the installation of the exterior door. No more than 6 mm (1/4 in) deviation from square, height and width, 3 mm (1/8 in) deviation from level and plumb, and 5 mm (3/16 in) deviation from rack and twist shall be allowed, unless otherwise specified by the manufacturer's instruction.

6.2 MASONRY OPENING SILL PREPARATION

6.2.1 Ensure that the concrete sill area is clean and free of debris, crevices and cracks.

6.2.2 Concrete slab sills can be recessed or level with the floor. Recessed sill dimensions depend on the specific door frame depth and profile. Consult with the door manufacturer for proper recess dimensions. The rough framing material shall not protrude into the recessed sill area.

NOTE 3: Recessed sills may not be practical for use with in-swing doors. Consult door manufacturer's instructions for guidance.

6.2.3 Sills shall be level to ensure a continuous flat surface to support the door. If necessary, leveling can be done with grinding and/or a non-shrinking, water-resistive cementitious mud, grout, or other continuous shimming material. If rough opening sills are sloped to exterior to promote drainage, then wedge shims shall be used to provide flat bearing as needed.

6.3 MASONRY AND ROUGH OPENING PREPARATION

6.3.1 For the purpose of sealing the masonry door cavity from absorbing liquid water, treat the masonry opening with a liquid applied flashing. The seal performance shall meet local wind exposure requirements and shall not interfere with adhesion of the exterior façade. The liquid applied flashing shall be applied in accordance with the manufacturer's recommendations. This application shall include the entire opening return, to form one continuous sealed area (see Figures 2 and 3). The seal shall be applied before the installation of the buck/receptor materials.

NOTE 4: In the event that adhesion of the surface applied stucco to the liquid applied flashing is a concern, it is acceptable to coat only the portion of the masonry opening that will not be in direct contact with the surface applied stucco exterior façade.



6.3.2 Using a compatible sealant or liquid applied flashing, ensure the corner joints are properly sealed (see Figure 4).

NOTE 5: This application may be done before the application of liquid applied flashing as described in Section 6.3.1. Follow sealant and liquid applied flashing manufacturer's guidelines.





6.3.3 Application to the interior face around the perimeter of the masonry opening provides additional protection.

6.4 PRE DOOR INSTALLATION INSPECTION

6.4.1 Before door installation, the installer shall inspect the masonry opening to ensure that it has been coated with liquid applied flashing in accordance with this standard practice and the flashing manufacturer's instructions. Any penetrations, or defects within 305 mm (12 in) of the masonry opening area shall be repaired per the flashing manufacturer's instructions.

6.4.2 The installer shall verify that the masonry opening is plumb, level, square, and true. The installer shall notify the contractor to remedy any discrepancies per this standard practice.

6.4.3 Installer shall inspect the exterior door for damage and repair or replace if necessary.

6.5 INSTALLATION OF BUCK

6.5.1 Install a buck which will act as a mounting surface on both sides and the top for the seating of the exterior door into the masonry opening. Use of multiple layer bucks shall not be allowed.

6.5.1.1 The buck shall be installed in such a fashion that there are no edge gaps exceeding 3 mm (1/8 in) between the buck and the masonry sill member.

6.5.1.2 If a sill pan/subsill is used, the buck shall be cut and coped as required to fit snugly on top of the subsill without causing interference with the end dams.

6.5.2 Prior to installation of the buck, apply a 10 mm (3/8 in) nominal diameter bead of sealant or appropriate gasket between the buck/receptor/device material and the masonry (see Figure 5) to prevent the passage of liquid water behind the buck/receptor/device. Additionally, completely seal the sill end of the wood buck with sealant to restrict the passage of liquid water through the cut ends.



FIGURE 5

6.5.3 The exterior face of the bucks shall align with the sill material to create a continuous, planar mounting surface for the exterior door flanges (see Figure 6). Anchorage of the buck into the CMU shall be done in accordance with the local wind loading requirements or applicable code.



FIGURE 6

6.5.3.1 Carefully remove any loose construction debris from the buck and sill areas and make sure it is clean and ready for installation of the exterior door.

6.5.3.2 Once the bucks have been attached to the CMU, apply a fillet bead of sealant into the perimeter joint, and into the joinery between the end of the buck and the masonry/sill, effectively creating an end dam. Tool the sealant, ensuring continuity between the buck and the sill member, with no air or water gaps (see Figures 7 & 8).







FIGURE 8

6.5.3.3 When wood bucks are used, the exposed exterior face and the return surface of the jambs shall be coated with a liquid applied flashing or a self-adhering flashing membrane to restrict liquid water from penetrating (see Figures 9 and 10). The liquid applied or self-adhering flashing shall be compatible and allow adhesion with the sealant applied to the back side of the flange later. The interior surface of the wood buck shall be left unsealed to allow drying to the interior.



FIGURE 9



NOTE 6: in the event that adhesion of the surface applied stucco to the water resistant coating is a concern, it is acceptable to coat only the portion of the masonry opening that will not be in direct contact with the surface applied stucco exterior façade.

6.6 MOUNTING FLANGE DOOR INSTALLATION

Mounting flange doors can consist of either integral flange or applied (non-integral) flange attachment.

6.6.1 Application of Sealant on Interior of Mounting Flange - Inspect and clean the back side (interior surface) of the exterior door mounting flange. Look for any sealant gaps or misaligned welding (particularly for vinyl products) at the corner joinery. If corner seals of the flange are missing in whole or part, contact the exterior door manufacturer for the recommended remedy.

6.6.1.1 Integral Flanges

After cleaning the mounting flange, carefully run a continuous 10 mm (3/8 in) nominal diameter bead of sealant on the back surface (interior face) of the mounting fin of the exterior door at the head and both jambs (see Figure 11). Apply sealant in line with any pre-punched holes or slots in the mounting flange. Connect the bead of sealant across any joinery on the exterior door frame at all four corners. As an option, sealant can be applied to the exterior edge of the buck (see Figure 12).





FIGURE 11



6.6.1.2 Applied Flanges (Field-Applied/Mechanically Attached/Non-Integral Flange Systems)

Additional flashing and sealing detail is required in order to provide a waterproof seal at the interface between the flange and the door frame. When using applied flanges, refer to the manufacturer's instruction for sealing the applied flange to the frame.

6.6.1.3 For drainage installation methods, the bead of sealant shall be discontinuous, leaving two 50 mm (2 in) voids within 100 mm (4 in) of each jamb (see Figure 13). Any alternative to the discontinuity in the bead of sealant at the exterior sill area shall be approved by the exterior door manufacturer (see Figure 14).



FIGURE 13

FIGURE 14

6.6.1.4 Full perimeter barrier installation methods shall apply a continuous bead of sealant on all four sides of the interior surface of the flange or exterior edge of the buck.

6.6.2 Apply a single continuous bead of sealant onto the previously installed sill pan at a location closest to the innermost plane of the sill pan and up along each jamb, to serve as part of the interior air and water seal. The water performance integrity of the installation is dependent upon this critical seal.

6.6.3 For slab on grade sill conditions where a barrier type installation is used, apply continuous sealant beads across the full floor length of the framed opening (or along the bottom of the door frame) in a location where the sealant makes contact with the door sill and concrete slab. Two 10 mm (3/8 in) diameter beads shall be used. Apply a sufficient amount of the sealant at the framed opening corners so the bottom door frame corners are embedded in sealant when the door is installed.

NOTE 7: Barrier type installations are not designed to manage incidental water intrusion through the door unit or at the interface with the wall.

6.6.4 For drainage installations that are designed to manage incidental water, a sill pan is used to promote drainage to the exterior. The sill pan shall not be sloped toward the interior. The water resistant recessed sill area described Sections 6.3.1 serve as a sill pan.

6.6.5 Immediately after sealant application at the sill, set the exterior door into the opening. Hold the exterior door temporarily into position and apply shims as required to ensure the exterior door is set plumb, level, square and true.

6.6.5.1 Install shims in such a manner that they will not interfere with the application of an air seal which will be applied on the interior side in the steps that follow.

6.6.5.2 Fasten the exterior door perimeter securely into position in accordance with the manufacturer's instructions (see Figure 15).



FIGURE 15

6.6.5.3 When penetration of the CMU or masonry material is required for structural integrity the installer shall use the manufacturer's specified fasteners.

6.7 EXTERIOR CASING (BRICKMOLDING) DOOR INSTALLATION

6.7.1 The interface between the exterior casing/brickmold and the door frame may not be a reliable water tight seal. Extra precautions shall be taken to seal this interface. This shall be done with a continuous 10 mm (3/8 in) nominal diameter bead of sealant at the seam between the exterior casing/brickmold and the frame (see Figure 16). Tool sealant to ensure a proper seal between parts.





6.7.2 Apply a continuous 10 mm (3/8 in) nominal diameter bead of sealant around the entire perimeter of the exterior casing / brickmolding interface with the CMU wall.

6.7.3 Apply a single continuous bead of sealant onto the previously treated concrete sill area or sill pan at a location closest to the innermost plane of the sill and up along each jamb, to serve as part of the interior air and water seal (see Figure 17). The water performance integrity of the installation is dependent upon this critical seal.





NOTE 8: The jamb to wall interior seal may require backer rod as it is difficult to pre-apply a sealant bead before installation as recommended here.

NOTE 9: The location of the sealant may vary when the installation is a barrier wall system.

6.7.4 For slab on grade sill conditions where a barrier type installation is used, apply continuous sealant beads across the full floor length of the framed opening (or along the bottom of the door frame) in a location where the sealant makes contact with the door sill and concrete slab. Two 10 mm (3/8 in) diameter beads shall be used. Apply a sufficient amount of the sealant at the framed opening corners so the bottom door frame corners are embedded in sealant when the door is installed.

NOTE 10: Barrier type installations are not designed to manage incidental water intrusion through the door unit or at the interface with the wall.

6.7.5 For drainage installations that are designed to manage incidental water, a sill pan is used to promote drainage to the exterior. The sill pan shall not be sloped toward the interior. The water resistant recessed sill area described Sections 6.3.1 serve as a sill pan.

6.7.5.1 For drainable installations, an exterior bead of sealant shall be discontinuous, leaving two 50 mm (2 in) voids within 100 mm (4 in) of each jamb (see Figure 13). Any alternative to the discontinuity in the bead of sealant at the exterior sill area shall be approved by the fenestration product manufacturer

6.7.6 Door Frame Installation into the Rough Opening

Immediately after sealant application at the sill, set the exterior door into the opening. Hold the exterior door temporarily into position and apply shims as required to ensure the exterior door is set plumb, level, square and true.

6.7.6.1 Install shims in such a manner that they will not interfere with the application of an air seal which will be applied on the interior side in the steps that follow.

6.7.6.2 Install the exterior door perimeter securely into position in accordance with the manufacturer's instructions (see Figure 18).



FIGURE 18

6.7.6.3 When penetration of the CMU or masonry material is required for structural integrity the installer shall use the manufacturer's specified fasteners.

6.7.7 Fasten the exterior casing/brickmold to the wall frame, making sure that this does not impact the trueness of the door.

NOTE 11: Additional fasteners may be required at locations such as locking mechanism or hinges, per manufacturer's instructions

6.7.8 For applications where the exterior door sill will be screwed down, pre-drill the fastener holes in the sill and apply appropriate sealant into the drilled hole. Install the fasteners and seal over the fastener head ensuring a water-tight condition.

6.7.9 A drip cap shall be applied at the head of the exterior casing/brickmold door (see Figure 19). See manufacturer's instructions for installation details.



FIGURE 19

6.8 BOX FRAME (NON-FLANGED) DOOR INSTALLATION

6.8.1 Apply a single continuous bead of sealant onto the previously installed sill pan at a location closest to the innermost plane of the sill pan, and up along each jamb, to serve as part of the interior air and water seal. The water performance integrity of the installation is dependent upon this critical seal.

6.8.2 For slab on grade sill conditions where a barrier type installation is used, apply continuous sealant beads across the full floor length of the framed opening (or along the bottom of the door frame) in a location where the sealant makes contact with the door sill and concrete slab. Two 10 mm (3/8 in) diameter beads shall be used. Apply a sufficient amount of the sealant at the framed opening corners so the bottom door frame corners are embedded in sealant when the door is installed.

NOTE 12: Barrier type installations are not designed to manage incidental water intrusion through the door unit or at the interface with the wall.

6.8.3 For drainage installations that are designed to manage incidental water, a sill pan is used to promote drainage to the exterior. The sill pan shall not be sloped toward the interior. The water resistant recessed sill area described Sections 6.3.1 serve as a sill pan.

6.8.3.1 For drainable installations, an exterior bead of sealant shall be discontinuous, leaving two 50 mm (2 in) voids within 100 mm (4 in) of each jamb (see Figure 13). Any alternative to the discontinuity in the bead of sealant at the exterior sill area shall be approved by the fenestration product manufacturer.

6.8.4 Door Frame Installation into the Rough Opening - Immediately after sealant application to the sill pan, set the exterior door into the opening. Hold the exterior door temporarily into position and apply shims as required to ensure the exterior door is set plumb, level, square and true.

6.8.4.1 Fasten the exterior door perimeter securely into position in accordance with the manufacturer's instructions, making sure that this does not impact the trueness of the door.

6.8.4.2 Install shims in such a manner that they are not permitted to interfere with the application of the air seal; which will be applied on the interior side in the steps that follow.

6.8.4.3 When penetration of the CMU or masonry material is required for structural integrity the installer shall use the manufacturer's specified fasteners.

NOTE 13: Additional fasteners may be required at locations such as locking mechanism or hinges, per manufacturer's instructions

6.8.5 For applications where the exterior door sill will be screwed down, pre-drill the fastener holes in the sill and apply appropriate sealant into the drilled hole. Install the fasteners and seal over the fastener head ensuring a water-tight condition.

6.8.6. Apply a properly sized backer rod around the exterior perimeter gap between the door frame and the rough opening. Apply a continuous 10 mm (3/8 in) nominal diameter bead of sealant around the entire perimeter of the door frame to bridge the interface with the WRB, leaving at least two 50 mm (2 in) gaps at the sill to allow drainage from the sill pan (see Figure 20) for drainable installations.



FIGURE 20

THE REMAINING SECTIONS APPLY TO ALL DOOR ATTACHMENT TYPES

6.9 From the exterior, tool the squeezed-out portion of the sealant to make it flat over the wood buck, ensuring that there is no interference with the installation of the cladding or stucco after it has been anchored.

6.9.1 In cases where the buck is still exposed on the exterior side after the installation of the door, sealant shall be re-applied and then tooled over the wood to ensure full coverage.

6.10 At the interior, apply a sealant meeting guidance given in Section 5.4, using appropriate bond breakers or backer rod. Apply a bead of sealant, and/or low expansion aerosol foam sealant, or other manufacturer approved material between the exterior door and the rough opening on all sides to form a continuous air seal (see Figures 21-23).













6.10.1 For drainage sill pan methods, this interior seal effectively forms a back dam to prevent water intrusion into the interior, thus the integrity (adhesive bond strength) of this seal is critical. A raised upturned leg on the interior plane of the sill pan made from a rigid material can be also be used, if properly air sealed. If a rigid or semi-rigid sill pan was used, recheck the seal between the sill of the door and the upturned leg of the sill pan and reseal as needed.

6.11 In cases where shims, clips, or anchoring devices cause interference with the application of the interior air and water seal, trim, remove or take steps necessary to seal such obstructions to allow for a continuous air/water seal. In all cases make sure the entire perimeter joint has been sealed, creating an air/water tight condition (see Figure 24).



FIGURE 24

6.12 Sealant shall be tooled in such a way as to not interfere with the placement of any interior trim on the inside of the door opening.

6.13 To ensure adequate protection against extreme wind driven water, it is critical that the perimeter interior air and water seal between the door and the sill pan flashing is able to withstand this pressure load without air and water leakage. Special caution needs to be used when applying perimeter air and water seals to the interior corners.

6.14 After stucco (or other cladding) is installed on the exterior of the wall, install an exterior perimeter sealant joint between the door and the cladding using sealant per Section 5.4.

NOTE 14: Any exterior finish applied to the sill shall not interfere with the drainage of liquid water. The water must be allowed to drain to the exterior surface of the façade.

7.0 POST-INSTALLATION PROCEDURES

7.1 Verify that the fenestration product frame and panels are installed plumb, level, square and true, within the specified tolerances (see Section 6.0).

7.2 Check of Operable Elements – Verify that all panels move freely within their frames and that weather stripping or compressible seals make full contact with mating surfaces.

7.3 Verify that operable hardware such as locks, rollers, latches and hinges operate smoothly and that all locking mechanisms engage and operate properly.

7.4 Verify that all accessories and other components of the fenestration product assembly are present, such as screens and hardware as applicable.

7.5 Verify that Drainage holes are free from any blockages or obstructions.

8.0 KEYWORDS

8.1 Concrete Masonry Unit, CMU; Masonry Opening; Sealant; Sill pans; Exterior door; Exterior door installation



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