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Generic Wall Design: Flashing & Drainage System Details

History

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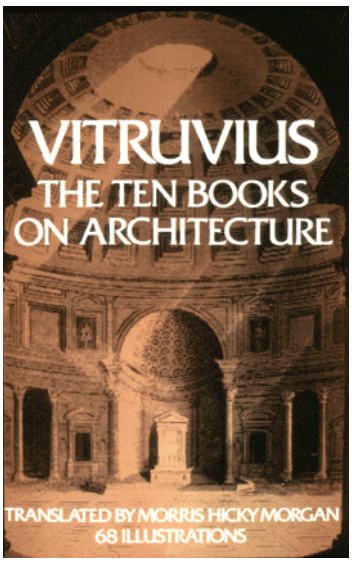
For Vitruvius (1st century AD), the wall cavity could occur in two locations, either behind the exterior facings to protect the inner structure of the wall or on the interior face of the wall to protect the frescoes. Water that flows down inside this cavity needs to be collected by a waterproof element and guided to the exterior.



Flashing for Masonry – A Long-Term View, Jonathan Kahn-Leavitt, The Construction Specifier, August 1996

Generic Wall Design (1995)

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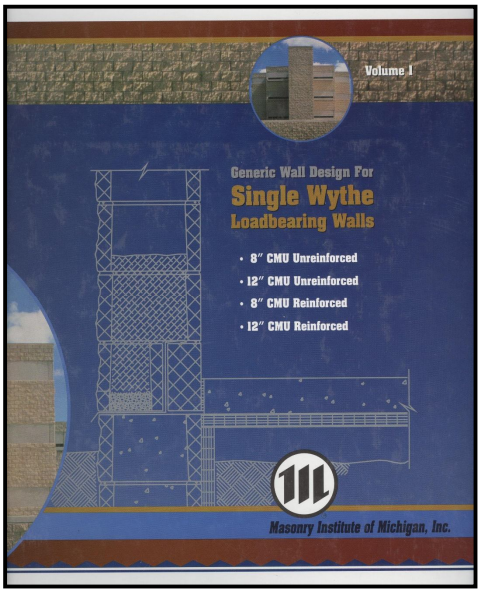

GWD Updated Mission

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GWD's mission is to offer the highest performing/ most economical "generic" masonry wall system details and specs available. Standardizing the assembly for the design community has many layers of compounded value including quick and easy design, off-the-shelf local supply of components, accelerated schedules and clear and repetitive installation procedures for field personnel and inspectors. Deciding which flashing material to specify and install is not easy. Many options are available and many circumstances must be weighed.

Flashing and Drainage System

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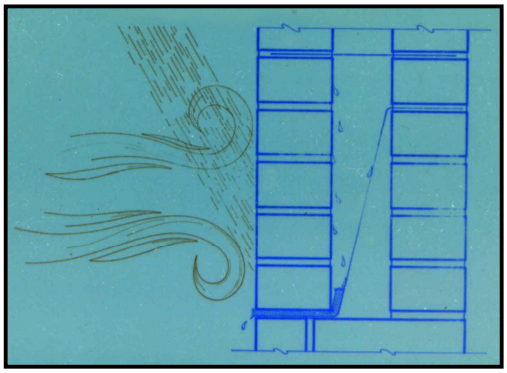

An assembly, installed in a wall system, which collects water that has penetrated the veneer and facilitates its drainage back to the exterior.

Building Code

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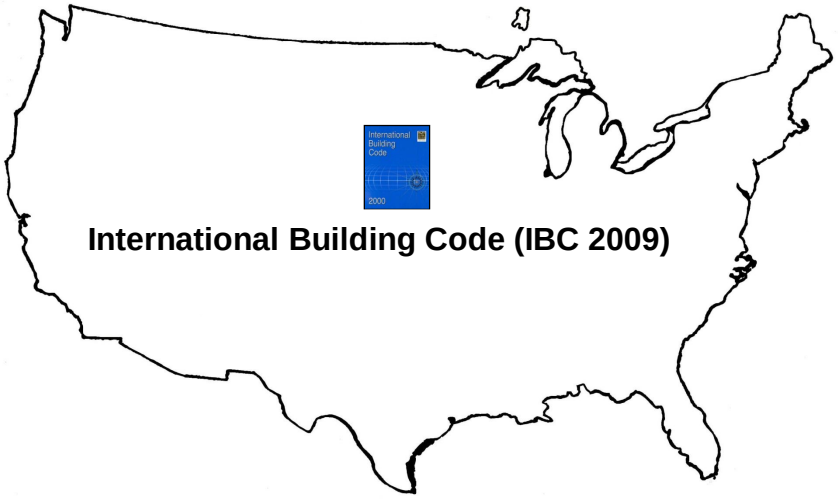

International Building Code (IBC 2009)

Building Code

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- **IBC 2009**
  - **Chapter 14 Exterior Walls**
    - **Section 1405.4 Flashing.** ***Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior…***
    - **Section 1405.4.2 Water-resistive barrier.** ***Flashing and weep holes in anchored veneer shall be located in the first course of masonry above finished ground level above the foundation wall or slab, and other points of support…***

Building Code

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- **IBC 2009**
  - **Chapter 21 Masonry**
    - **Section 2104.1 Masonry Construction.** ***Masonry construction shall comply with the requirements of Sections 2104.1.1 through 2104.4 and with TMS 602/ACI 530.1/ASCE 6. (MSJC)***

Building Code

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- **IBC 2009**
  - **MSJC 2008**
    - **CODE Chapter 6 - Veneer**
      - **Section 6.1.6.2 General Design Requirements.** ***Design and detail flashing and weepholes in exterior veneer wall systems to resist water penetration into the building interior. Weepholes shall be at least 3/16 in. in diameter and spaced less than 33 in. on center.***
    - **SPECIFICATION - Part 3 Execution**
      - **Section 3.3.D.5 Embedded items and accessories.** ***Install and secure connectors, flashing, weepholes, weep vents, nailing blocks, and other accessories.***

The Perfect Wall

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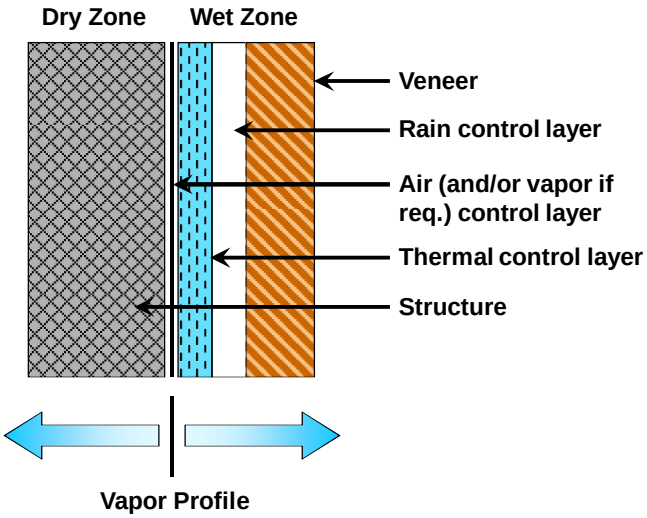

Flashing Selection

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- What is the building's projected life?

Types of Flashing

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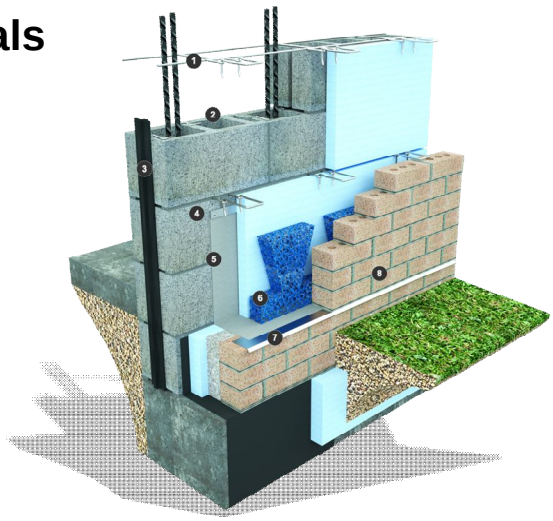
- Flexible Composites
- Laminated Metals
- Sheet Metals



Flashing

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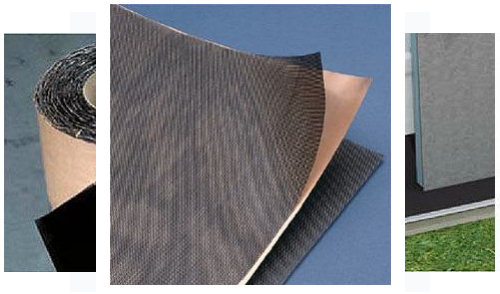
FLASHING TYPE	DESCRIPTION	FREEZE-THAW	UV RESISTANCE	EXPECTED LIFE	RELATIVE COST
Stainless Steel	.015 (28 Gauge)	Very High	High	Very Long	High
Laminated Copper	3, 5 or 7 oz	High	Moderate/High	Long	Moderate
Rubberized Bituthene	40 MIL	Moderate/High	Low	Moderate/Long	Low/Moderate
EPDM	40 MIL	High	Moderate	Moderate/Long	Low/Moderate
PVC	20 MIL	Low	Very Low	Very Short	Low

Figure A



Anchors to Weeps – A Practical Guide to Selecting Masonry Accessories, Don Hunson and Jeff Snyder, The Story Pole, Vol. 34 No 1., 2003

Weeps

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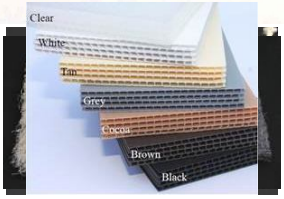
WEEP HOLES	DRAINABILITY	AIR MOVEMENT	RELATIVE COST
Open Head Joint	Very High	Very High	Very Low
Extruded Louver	High	High	Moderate
Cell Vent	High	High	Moderate
Cotton Sash	Very Low	Very Low	Low
Plastic Tubes	Moderate	Low	Very Low
Mesh	High	High	Moderate/High
Plastic Tube w/Cotton Sash & Stainless Screen	Moderate/Low	Low	Very High
Plastic Tube w/Cotton Sash	Moderate/Low	Low	Moderate

Figure B



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Cavity Drainage Materials

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GWD Specification

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2.5 EMBEDDED FLASHING SYSTEM MATERIALS

A. Metal Drip Edges: ASTM A 167, Type 304, stainless steel, 0.0156 inches thick.

1. **Metal Configuration: Extend at least 3 inches horizontally into wall and 1/2 inch out from exterior face of wall with outer edge bent down 30 degrees and hemmed.**
2. **Sealant: One-part non-skinning butyl sealant conforming to ASTM C 1311.**

GWD Specification

MASONRY Institute of Michigan

2.5 EMBEDDED FLASHING SYSTEM MATERIALS

B. Flexible Membrane Flashing: For membrane flashing not exposed to the exterior, provide one of the following:

1. **Copper-Laminated Flashing: 5 ounces per square foot copper bonded with asphalt between 2 layers of glass-fiber cloth.**
2. **Rubberized-Asphalt Flashing: Composite bonded flashing product of a rubberized-asphalt adhesive compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.**
3. **Elastomeric Thermoplastic Flashing: Composite of rubberized-asphalt adhesive, 0.025 inch thick, bonded to a polyester-reinforced ethylene interpolymer alloy.**
4. **EPDM Flashing: ASTM D 4637, ethylene-propylene-diene terpolymer, 0.040 inches thick.**
5. **Adhesives, Primers, Sealants, and Seam Tapes for Flexible Membrane Flashings: Provide manufacturer's recommended compatible products.**

GWD Specification

MASONRY Institute of Michigan

2.5 EMBEDDED FLASHING SYSTEM MATERIALS

C. Weep/Vent <Specify one of the following products/methods>:

1. **Fully Open Head Joint.**
2. **Partially Open Head Joint.**
3. **Rectangular Plastic Weep/Vent: Clear butyrate, 3/8 inch wide by 1-1/2 inches high by depth of outer wythe less 1/8 inch.**
4. **Mesh Weep/Vent: Free-draining polyethylene strand mesh, veneer height and depth by 3/8 inch wide. Color to match mortar.**
5. **Cellular Plastic Weep/Vent: One-piece, flexible extrusion made of UV-resistant polypropylene copolymer, veneer height and depth by 3/8 inches wide. Color to match mortar.**

GWD Specification

MASONRY Institute of Michigan

2.5 EMBEDDED FLASHING SYSTEM MATERIALS

D. Cavity Drainage Material: Provide one of the following:

1. **Pea Gravel: Clean, hard, durable free-flowing naturally rounded particle of rock, free of clay, silt, and fine particles, with 100 percent passing a 3/8 inch sieve and not over 5 percent passing a No. 8 sieve.**
2. **Free-Draining Mesh: Free-draining polyethylene strand mesh designed to catch mortar droppings and prevent weep holes from being clogged.**

GWD Specification

MASONRY Institute of Michigan

3.4 PLACEMENT – GENERAL

Q. Install flashings, on clean, solid and undamaged surface. Provide flashing at all locations indicated. Extend flashings to outside face of wall and terminate as indicated. Form end dams at horizontal terminations of flashings. All vertical legs at the backup shall be mechanically fastened. Lap joints a minimum of 6 inches and seal with compatible material:

1. **At lintels and shelf angles, install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.**
2. **Install weeps and cavity drainage material directly on top of flashing in a clean cavity.**

Flashing Locations

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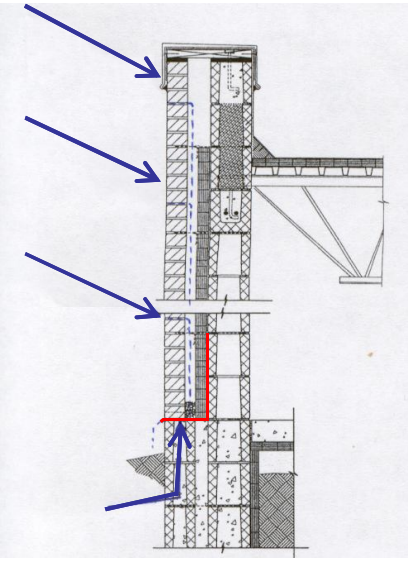
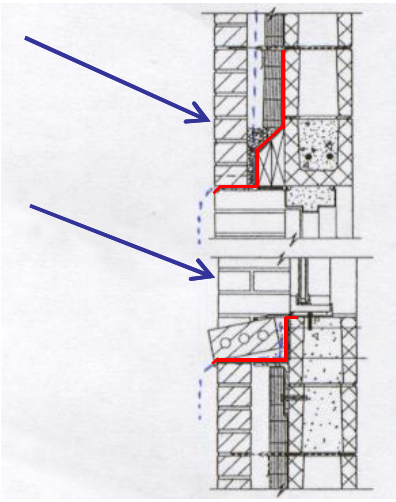


Wherever the drainage cavity is interrupted consider flashing and weepholes.

Flashing Locations

MASONRY Institute of Michigan

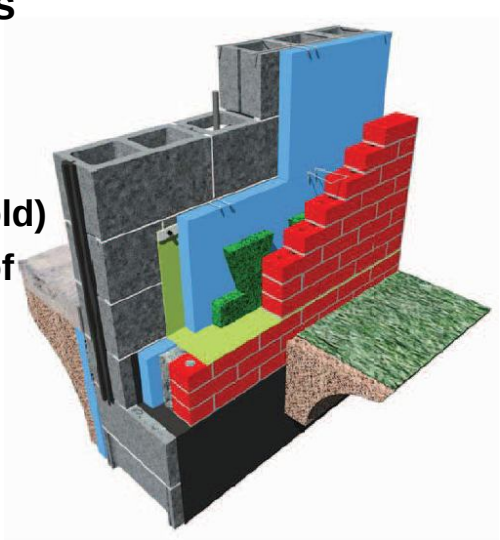


Wherever the drainage cavity is interrupted consider flashing and weepholes.

MIM Generic Wall Design

MASONRY Institute of Michigan

- **Multi-Wythe Details**
  - **Rigid Insulation**
  - **Mineral Wool (developing)**
  - **Spray Foam (on hold)**
  - **High Wall/Low Roof**



http://www.mim-online.org/architects/multi-wythe-exterior-details

MIM Generic Wall Design

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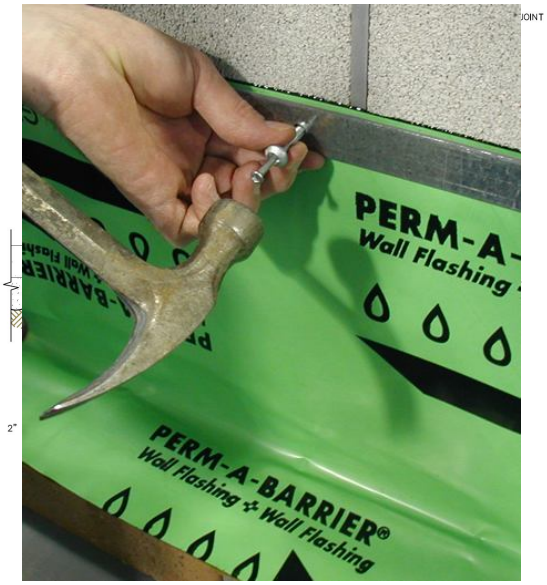

MIM Generic Wall Design

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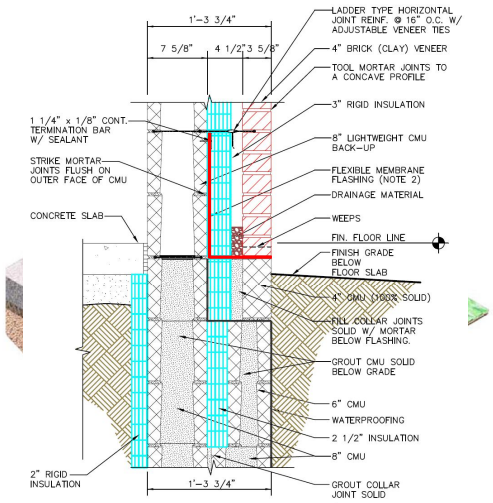

2B / A-2 BASE DETAIL W/ VENEER ABOVE GRADE

MIM Generic Wall Design

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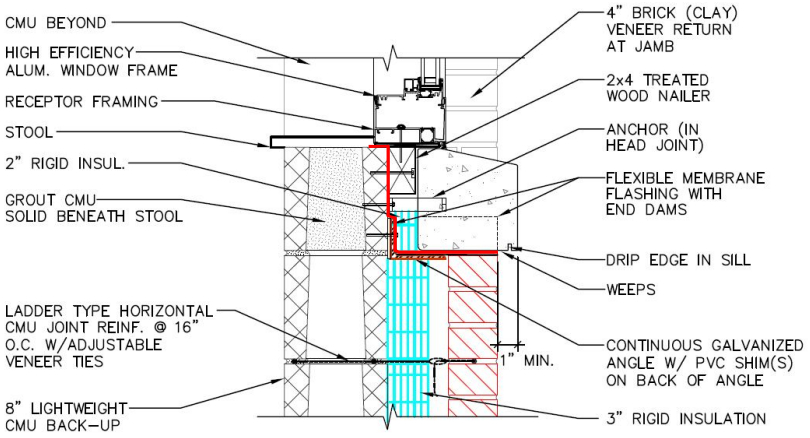

7B / A-1 NATURAL STONE OR PRECAST CONCRETE SILL DETAIL (USING RECEPTORS)

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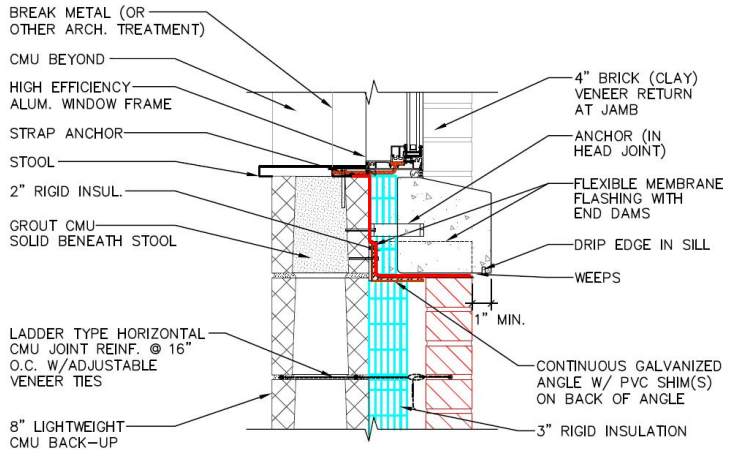

7A / A-1 NATURAL STONE OR PRECAST CONCRETE SILL DETAIL (USING STRAP ANCHORS)

MIM Generic Wall Design

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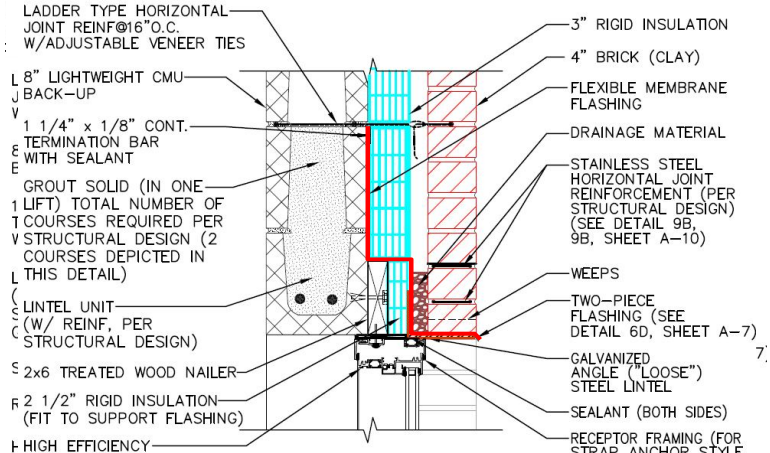

5A / A-1 MASONRY LINTEL @ WINDOW OPENING

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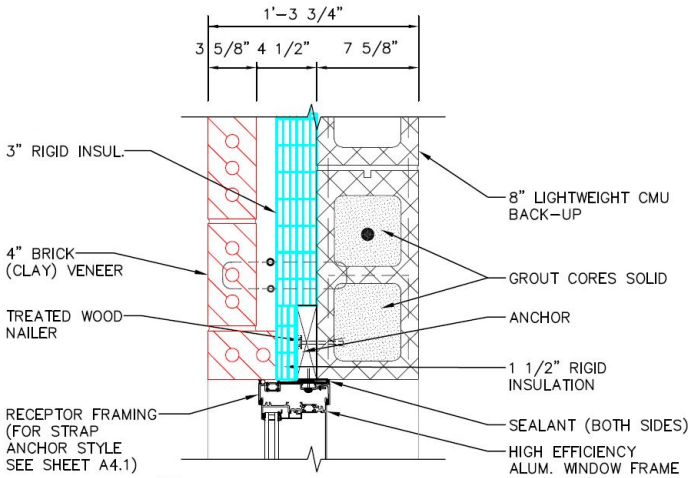

6B / A–1 WINDOW JAMB DETAIL (USING RECEPTOR)

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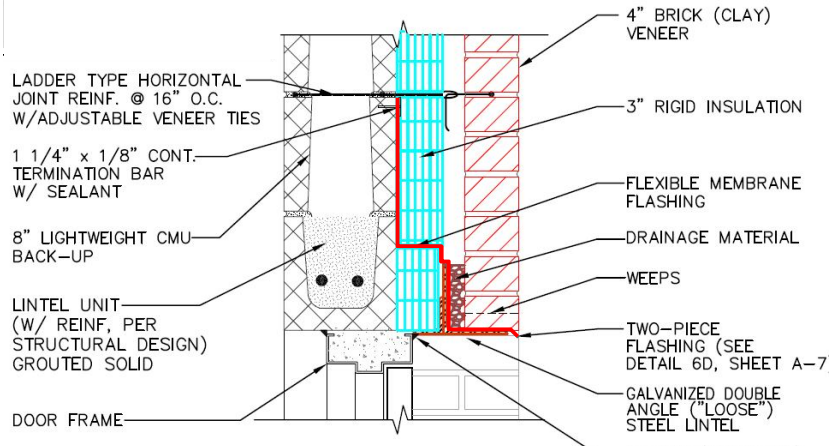

4A / A–1 MASONRY LINTEL (PREFERED)

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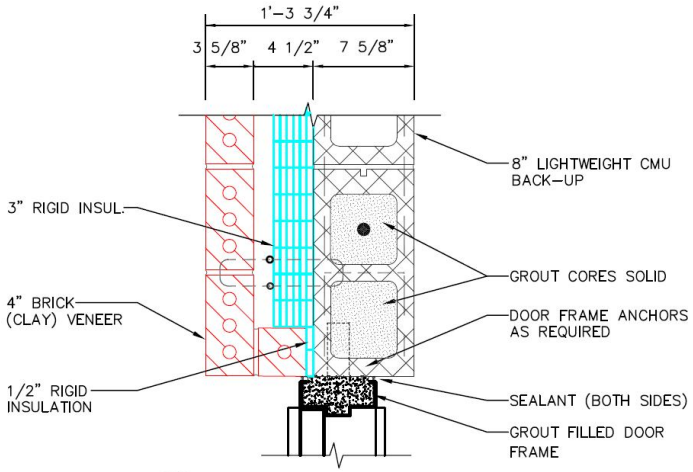

6A / A–1 MAN DOOR JAMB DETAIL

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10A / A–2 NATURAL STONE OR PRECAST CONCRETE COPING PARAPET DETAIL

MIM Generic Wall Design

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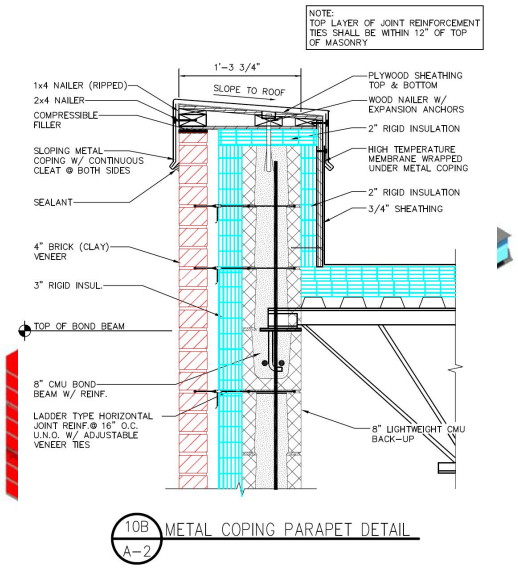

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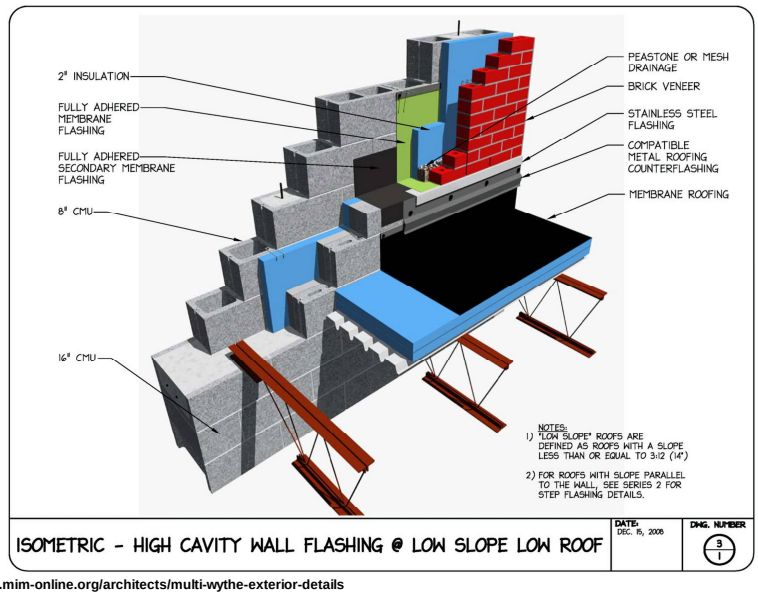

http://www.mim-online.org/architects/multi-wythe-exterior-details

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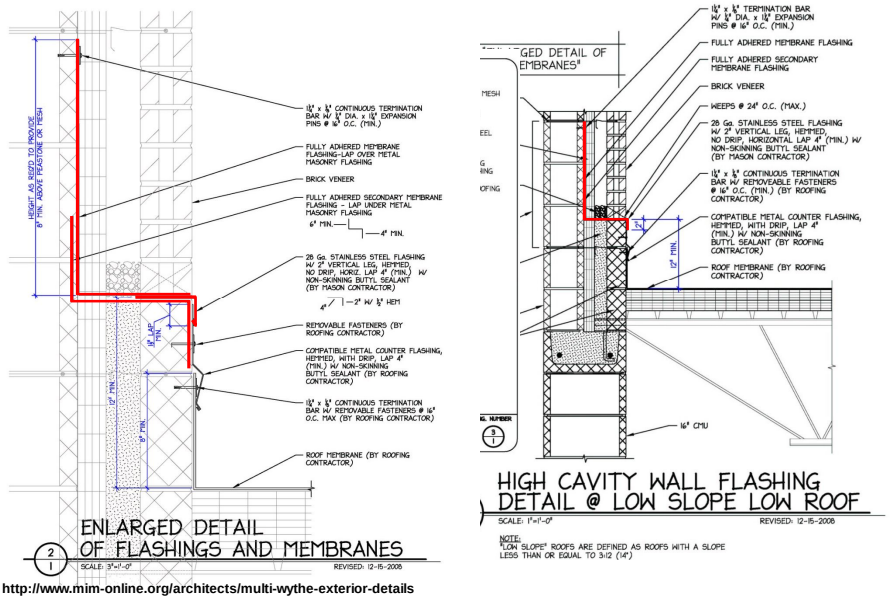

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Two-Piece Flashing System

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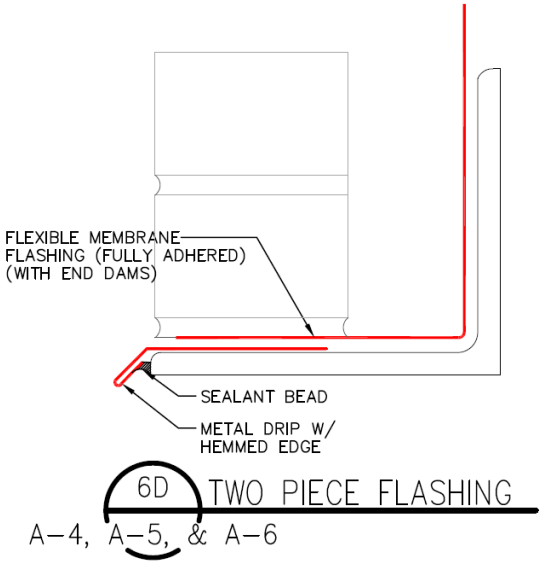

Exposed Metal Flashing

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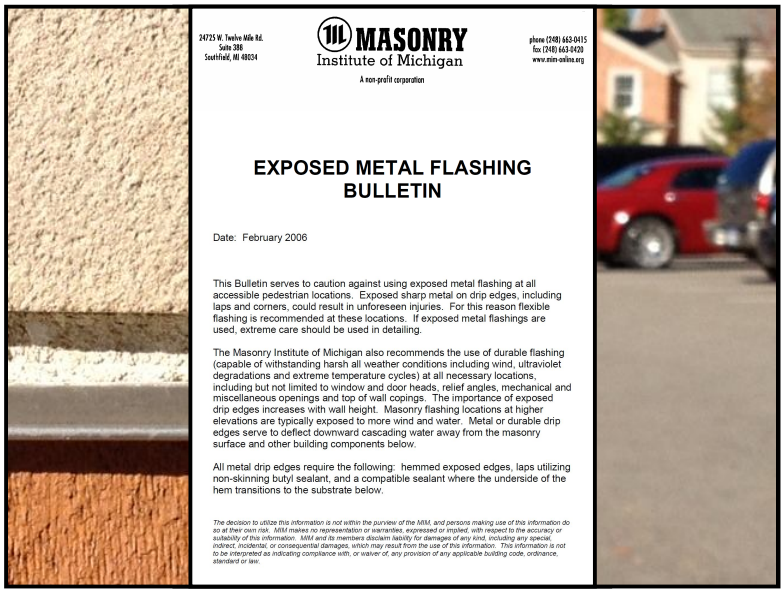

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EXPOSED METAL FLASHING BULLETIN

Date: February 2006

This Bulletin serves to caution against using exposed metal flashing at all accessible pedestrian locations. Exposed sharp metal on drip edges, including laps and corners, could result in unforeseen injuries. For this reason flexible flashing is recommended at these locations. If exposed metal flashings are used, extreme care should be used in detailing.

The Masonry Institute of Michigan also recommends the use of durable flashing (capable of withstanding harsh all weather conditions including wind, ultraviolet degradations and extreme temperature cycles) at all necessary locations, including but not limited to window and door heads, relief angles, mechanical and miscellaneous openings and top of wall copings. The importance of exposed drip edges increases with wall height. Masonry flashing locations at higher elevations are typically exposed to more wind and water. Metal or durable drip edges serve to deflect downward cascading water away from the masonry surface and other building components below.

All metal drip edges require the following: hemmed exposed edges, laps utilizing non-skinning butyl sealant, and a compatible sealant where the underside of the hem transitions to the substrate below.

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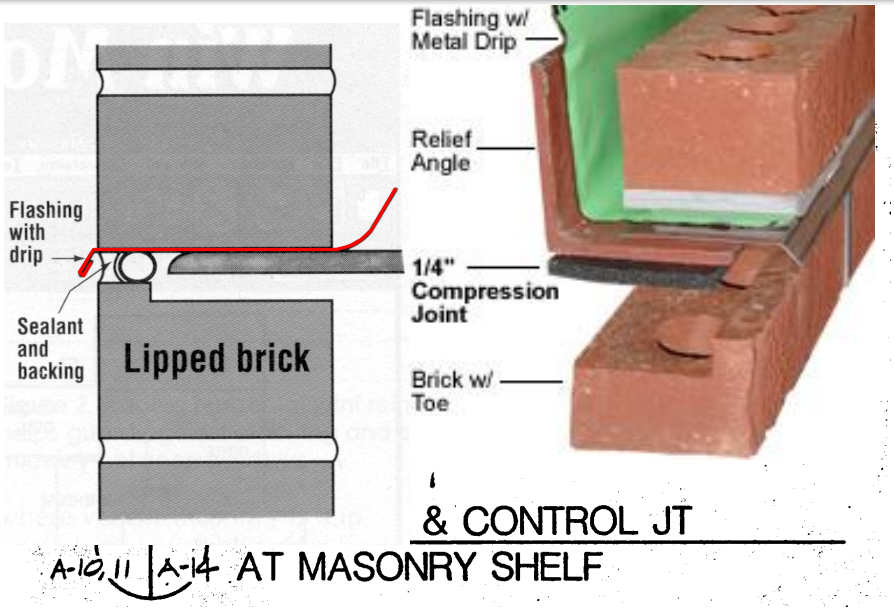

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No matter the weather. . .

MASONRY Institute of Michigan

rain

wind

snow

. . .flashing and weepholes control water movement in masonry walls!

National Magazine

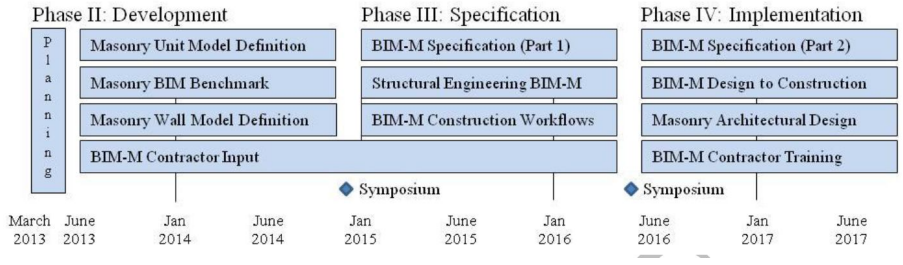
MASONRY Institute of Michigan

THE NEED…
BIM for MASONRY

- architects
- engineers
- construction managers
- owners

- All demand it!

THE NEED…
BIM for MASONRY



NEW NCMA App

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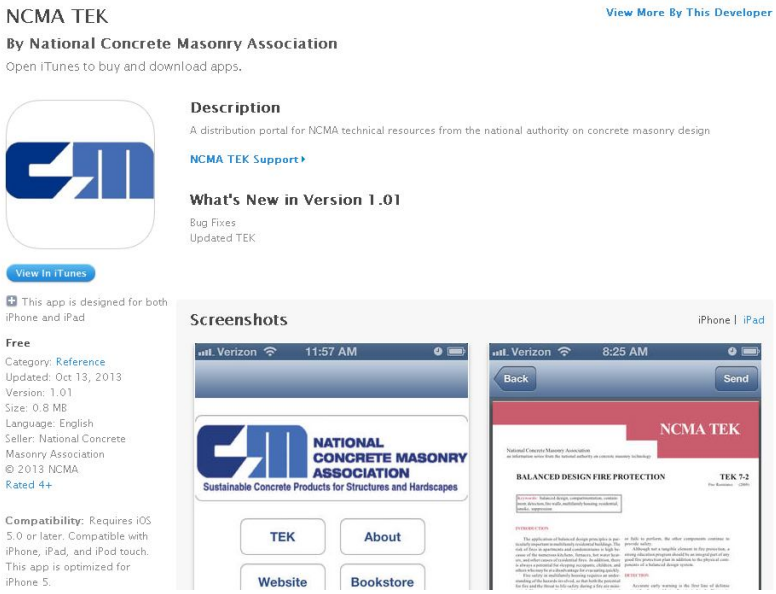

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