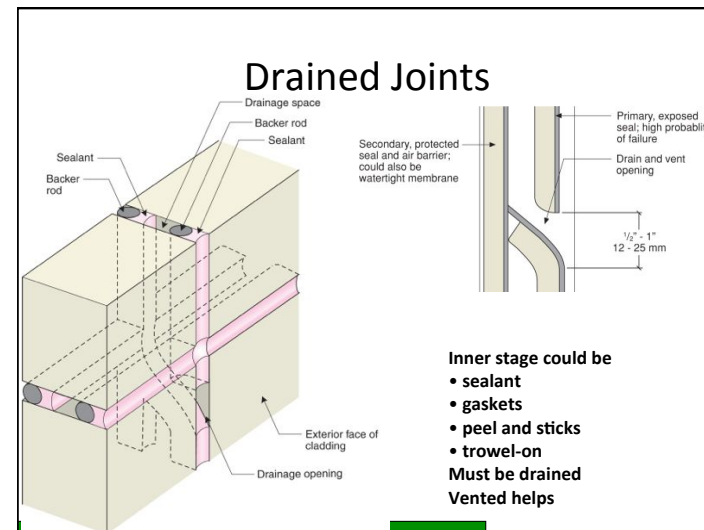
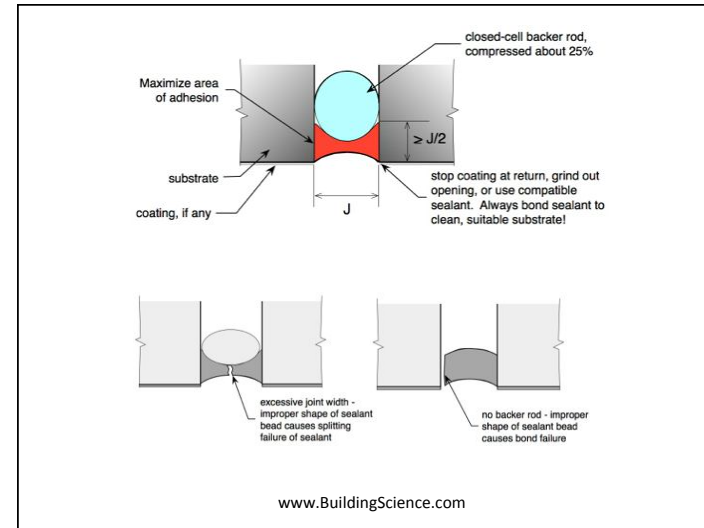
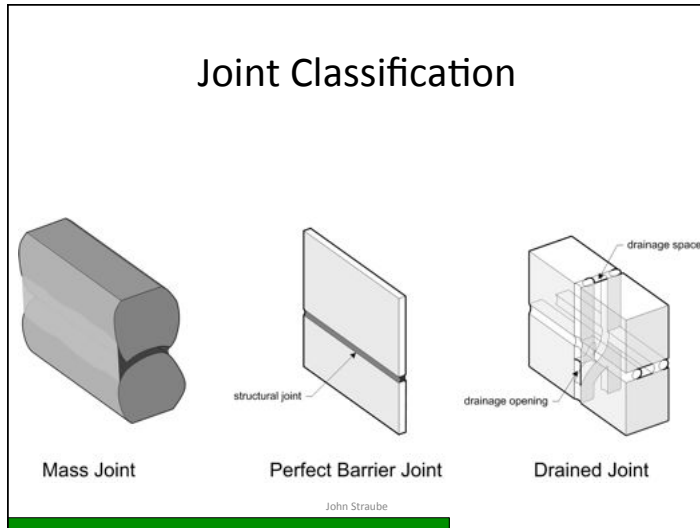


- Details required at
1. Changes in plane
  2. Changes in material
  3. Changes in system / trade

Thus penetration, windows, rails, signs etc.

### Categorization

- Elements and joints **can be different**
- Joints leak more than cladding
- Joints attract surface water
- Joints can be storage drained, perfect
- More reason to use drained systems
- Venting is important

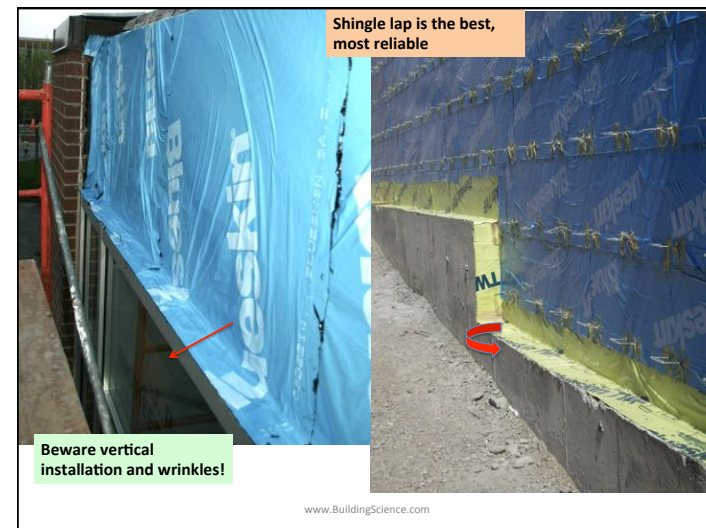
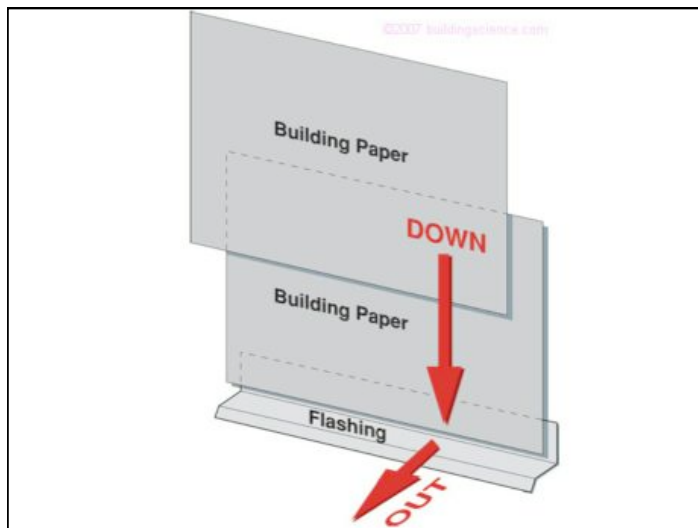


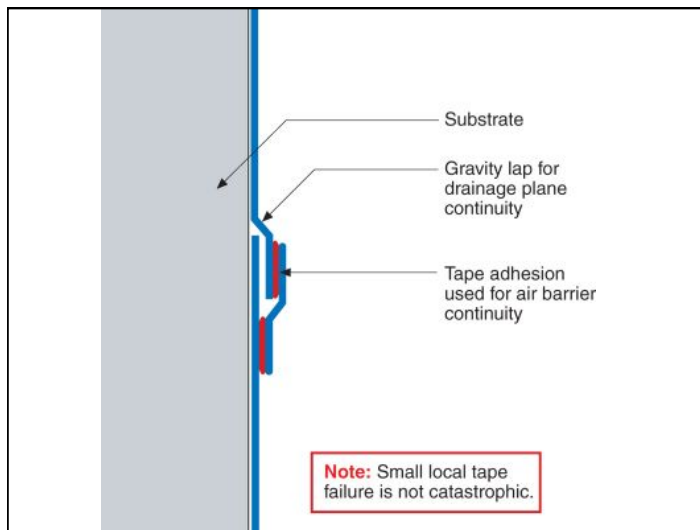
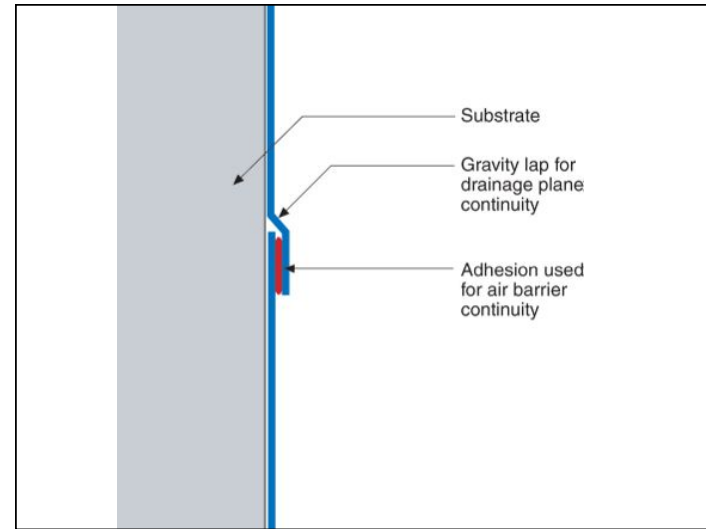
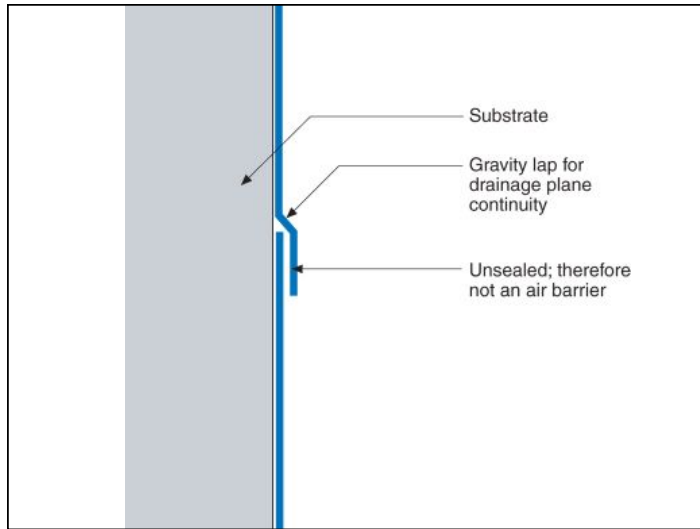


## Drainage Planes

And continuity

[www.BuildingScience.com](http://www.BuildingScience.com)





## Fully-adhered vs point-attached

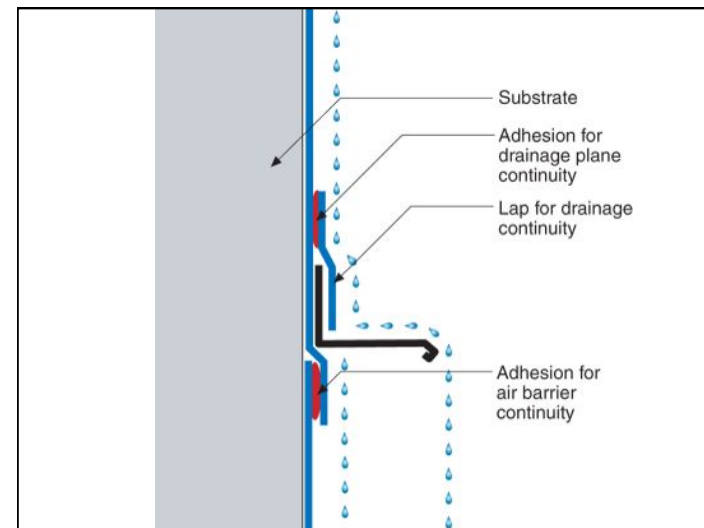
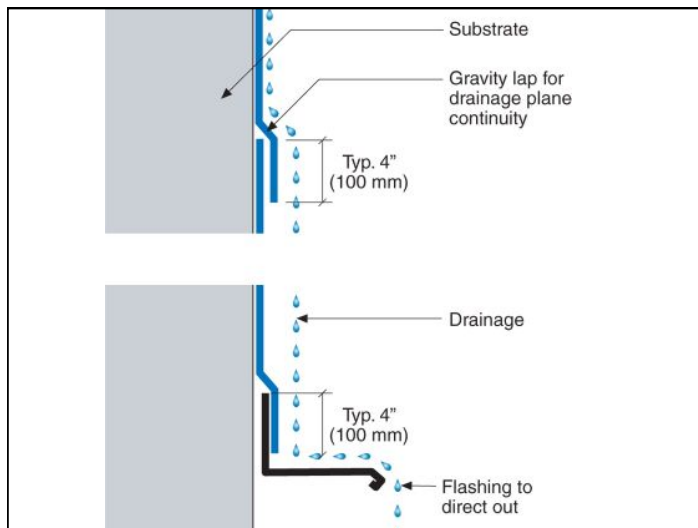
- Flutter
- leaks

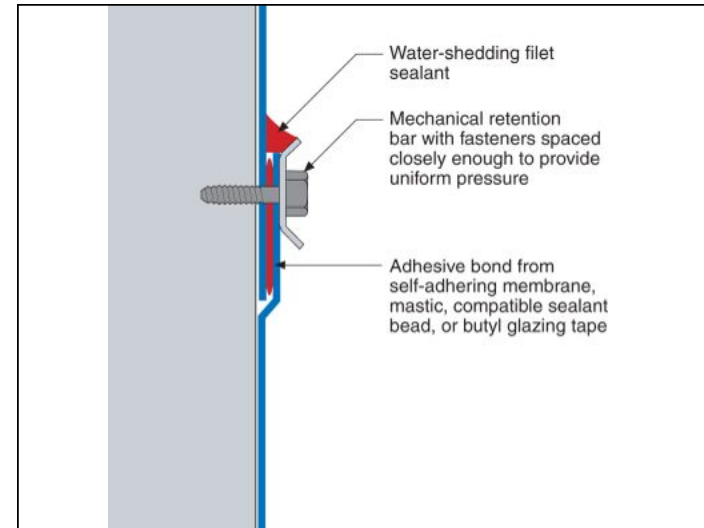
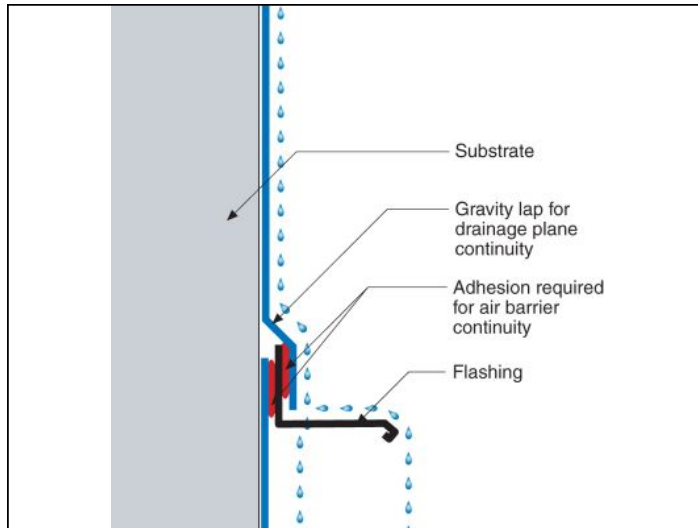
www.BuildingScience.com

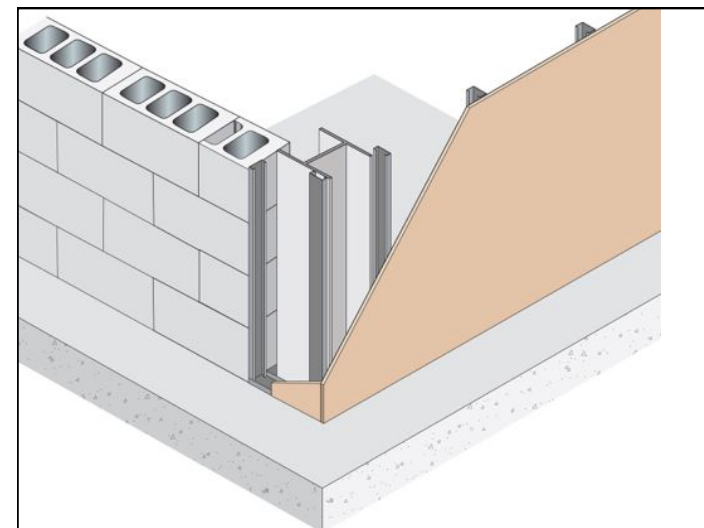
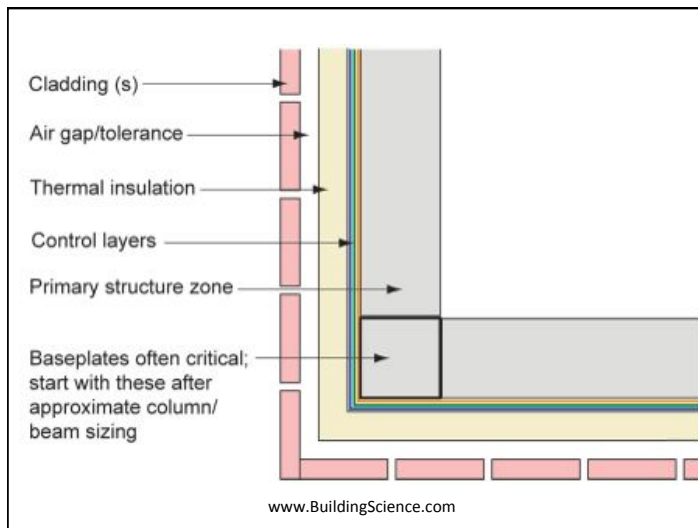
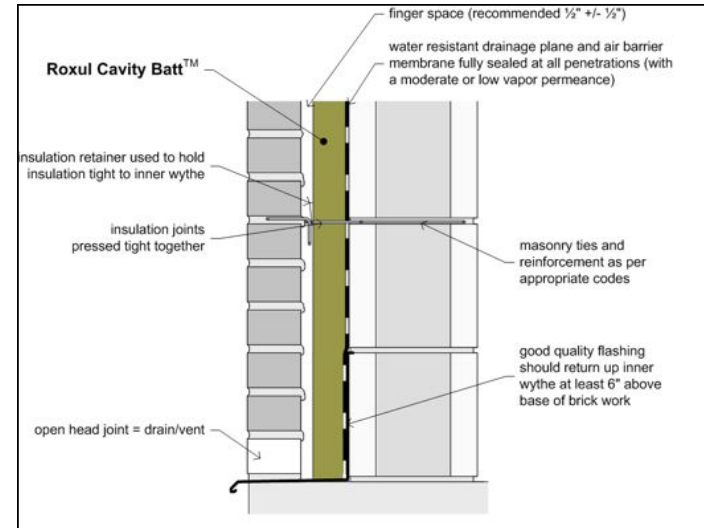
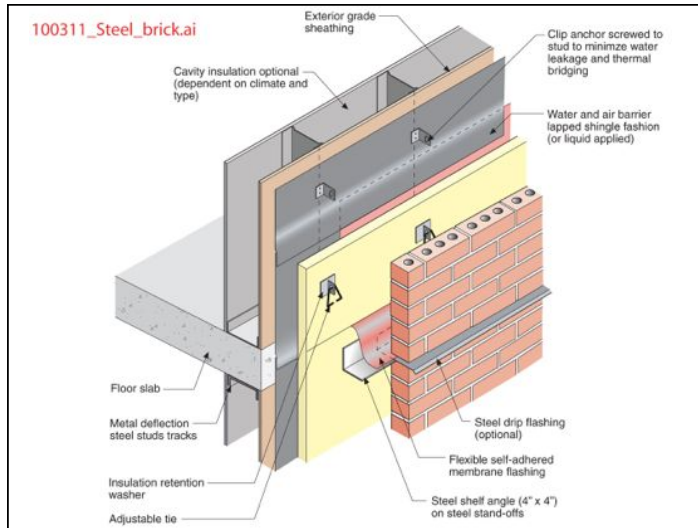
## “Self-sealing” Building paper

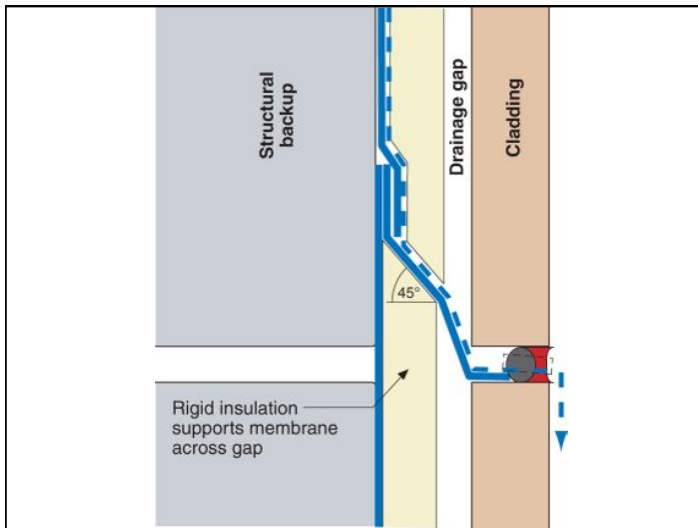
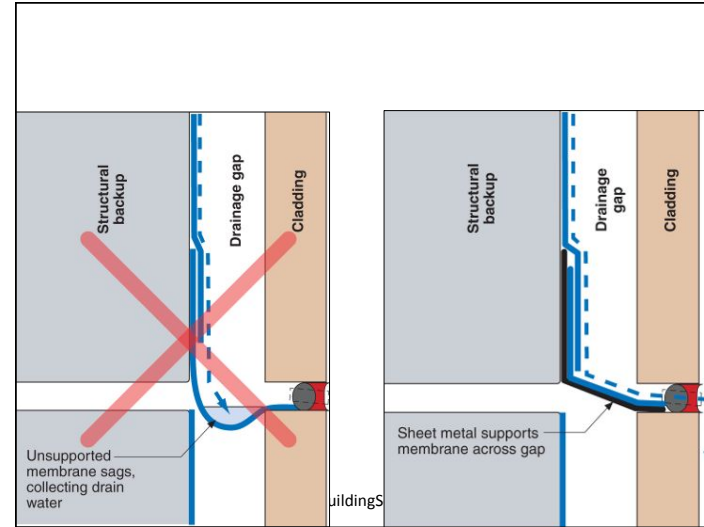
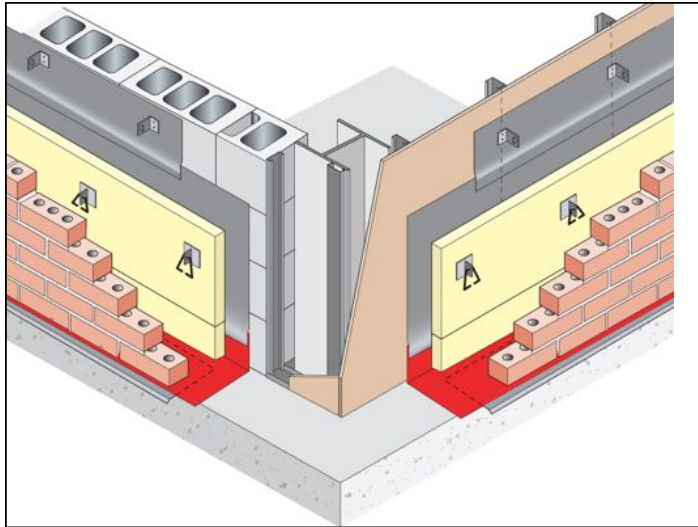
The diagram illustrates a cross-section of a building paper assembly. From top to bottom, the layers are: a highly vapor permeable hydrophobic layer (similar to poly olefins), a non-polar, semi-vapor permeable layer (similar to #30 asphalt impregnated felt), and an absorbing layer (unimpregnated felt or filter material). A nail is shown penetrating the assembly. Labels indicate 'Bulk water entry at nail shaft' and 'Diffusion to exterior through permeable layer'. A path of water is shown moving from the nail shaft into the absorbing layer, with a label: 'Capillary redistribution into absorbing layer providing preferential water path'.

- Pores in filler smaller than gap between nail and membrane
- Water enters composite through break in poly olefin skin along shaft of penetrating nail or staple
- Absorbing layer provides preferential water path wicking water laterally away from shaft or nail or staple; water does not penetrate semi-permeable layer









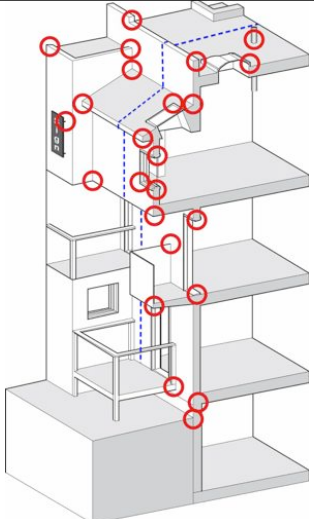


# Penetrations & Transitions

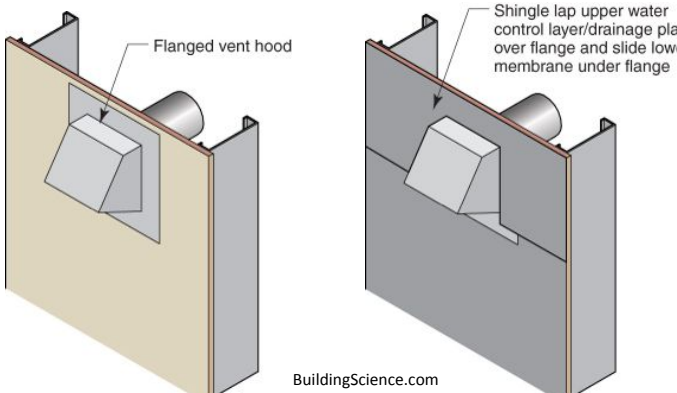
Details required at

1. Changes in plane
2. Changes in material
3. Changes in system / trade

Thus penetration, windows, rails, signs etc.



## Flanged Openings preferred



Flanged vent hood

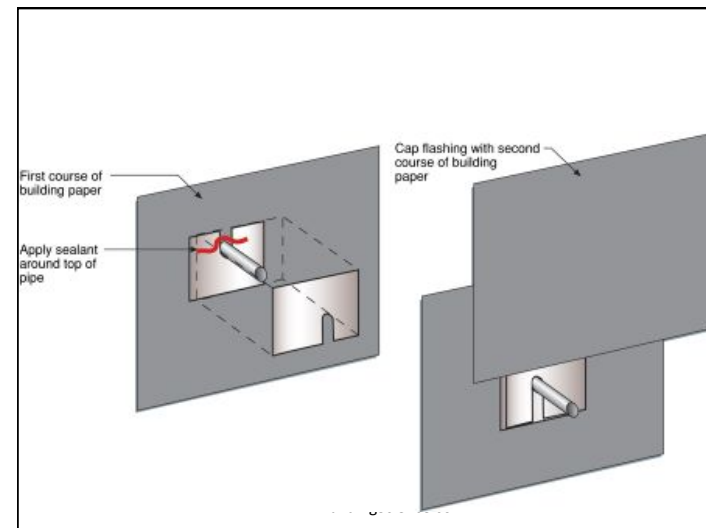
Shingle lap upper water control layer/drainage plane over flange and slide lower membrane under flange

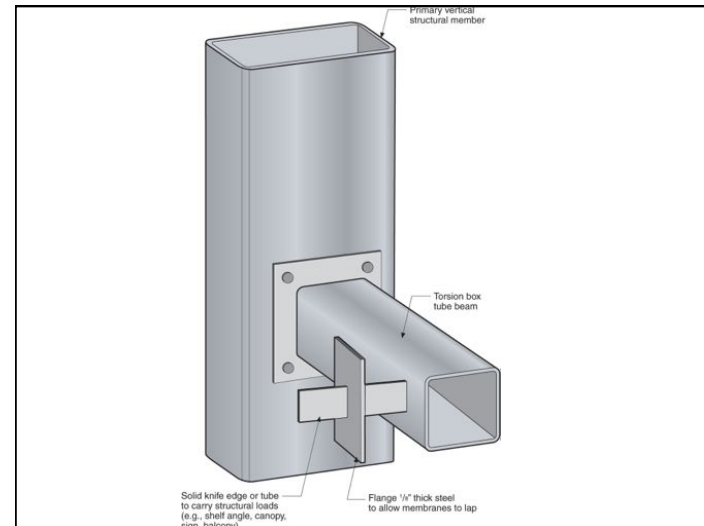
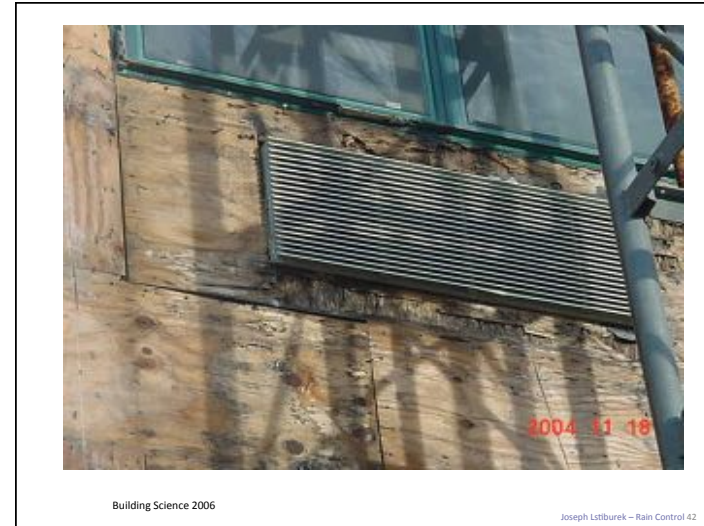
BuildingScience.com

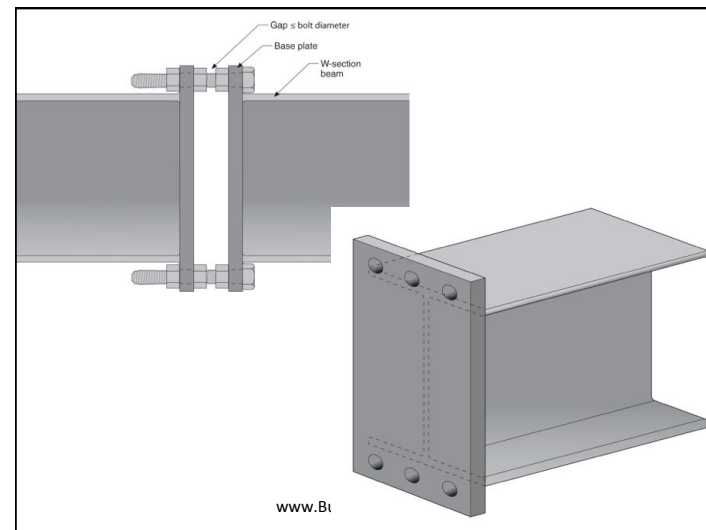
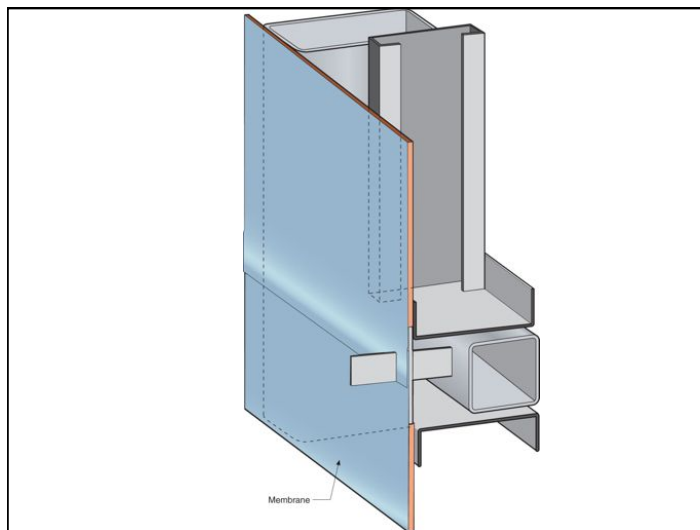
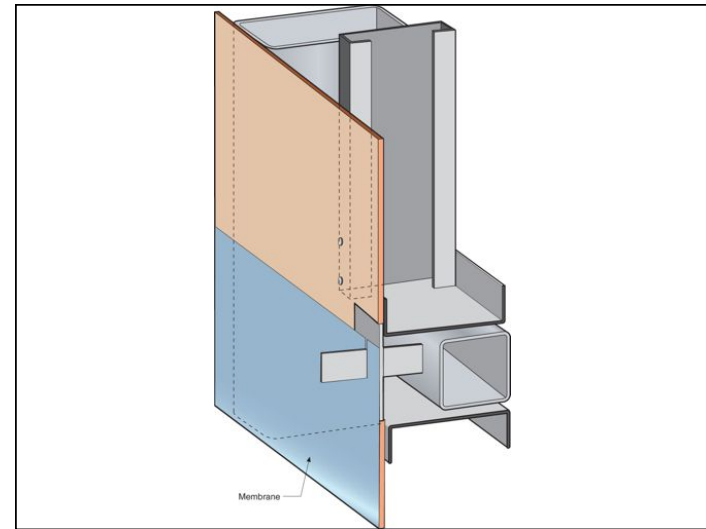
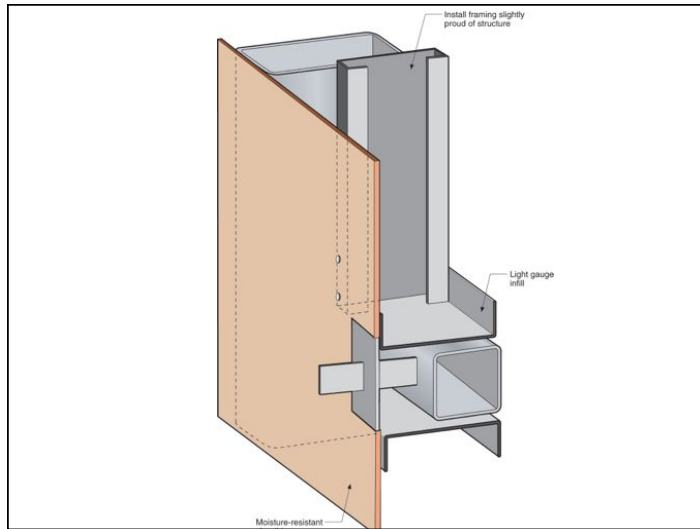


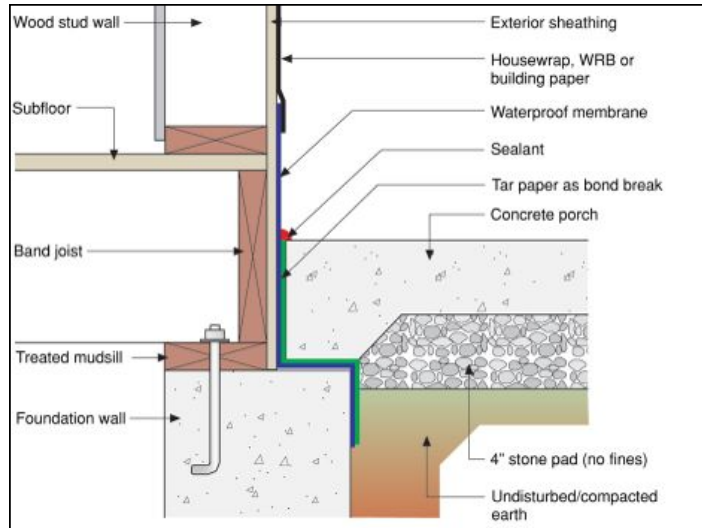
Building Science 2006

Joseph Lutzbeck - Rain Control 36









### Parapets

1931 Ramsey & Sleeper

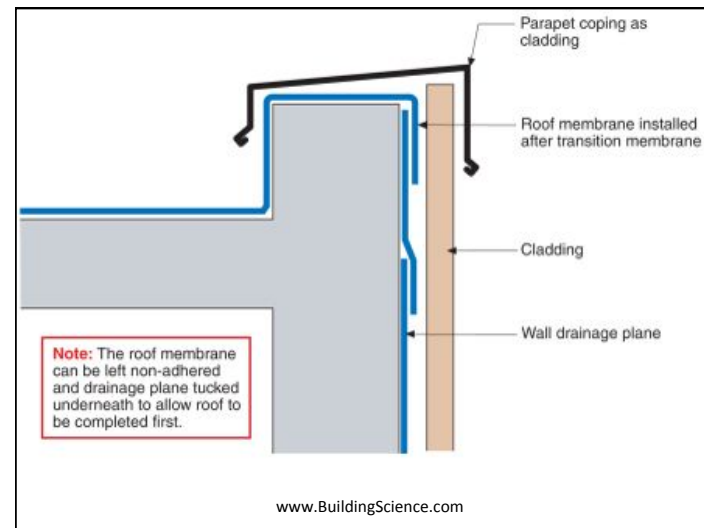
*Flash on cement mortar to provide second layer of lead on each side.*

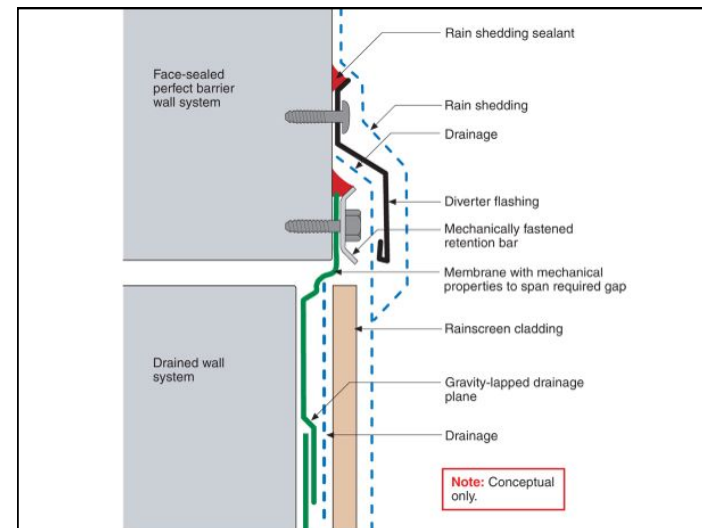
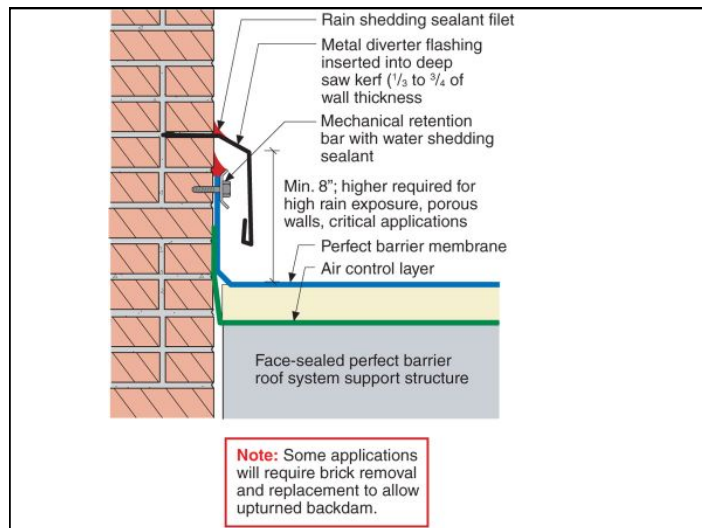
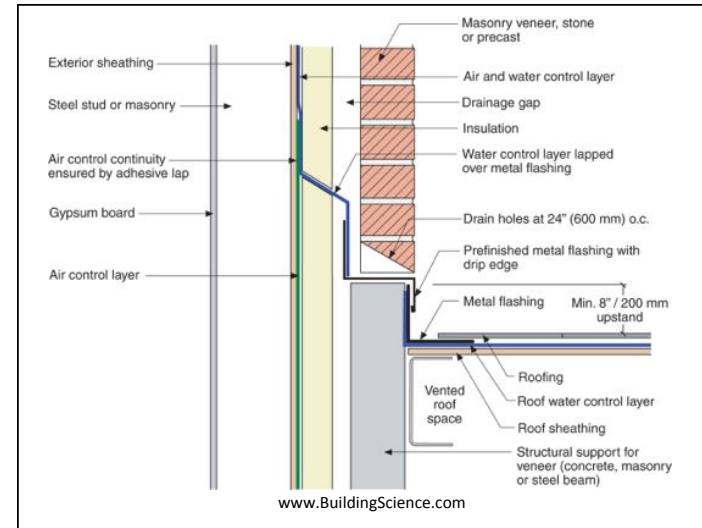
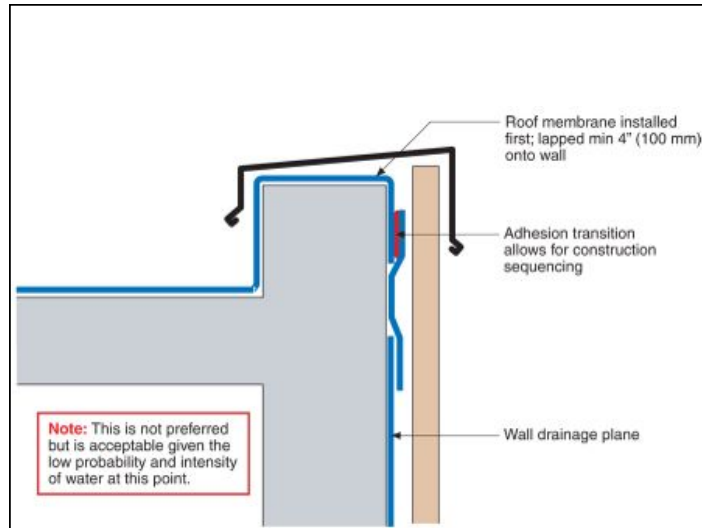
*When flashing the wall a hole shall be cut in the side of it so the wall will not be water tight.*

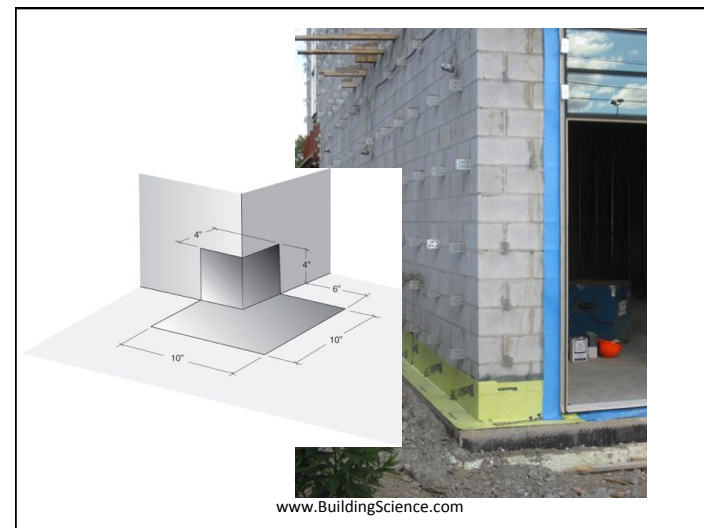
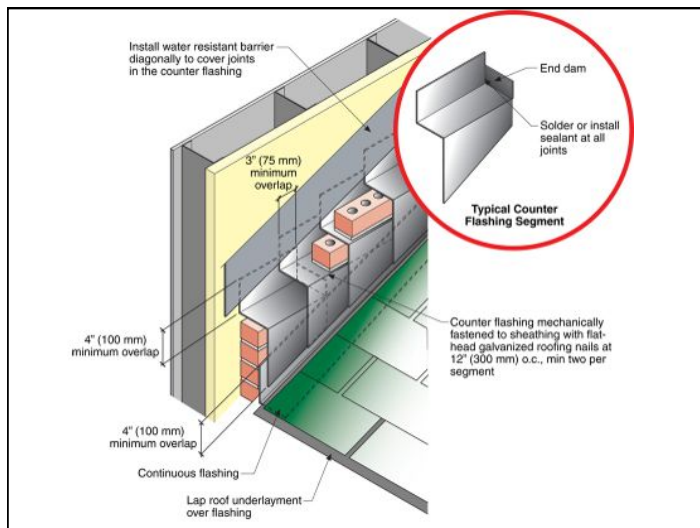
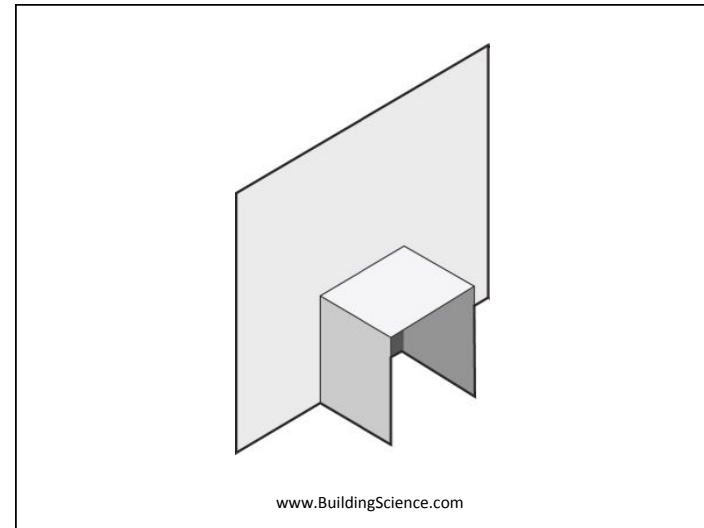
*Flashing shall be installed so water can drain off.*

**FLASHING FOR BRICK WALL MORE THAN ONE FOOT ABOVE COUNTER FLASHING**

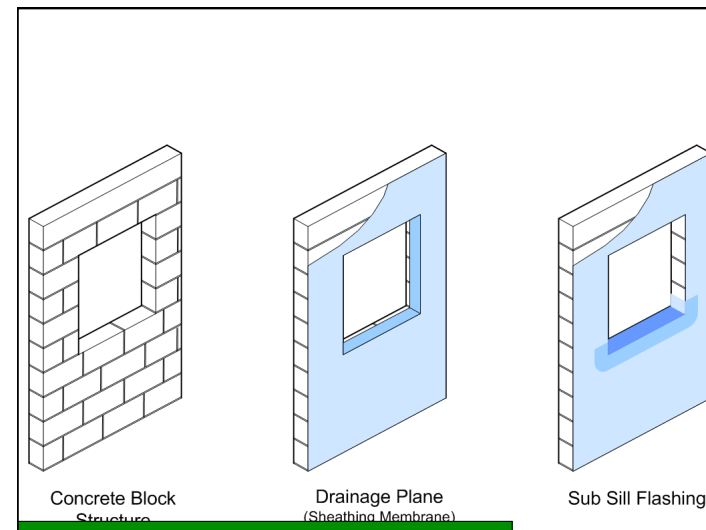
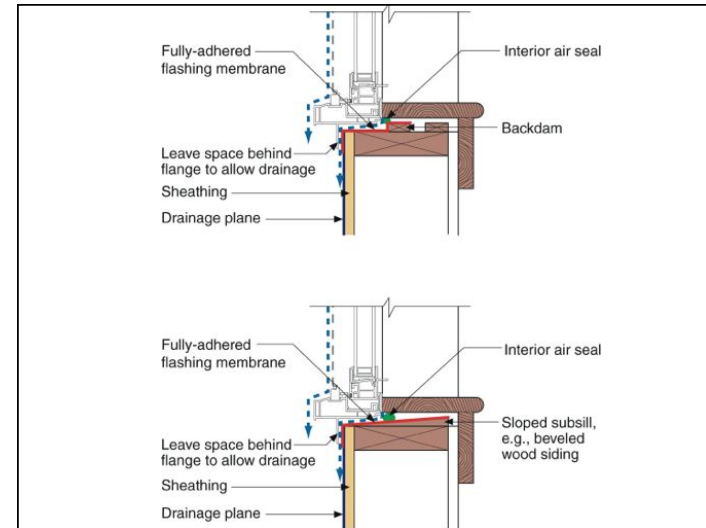
- Coping leaks at joints
- Provide a sealed waterproof second layer
- Metal acts as finish and protection



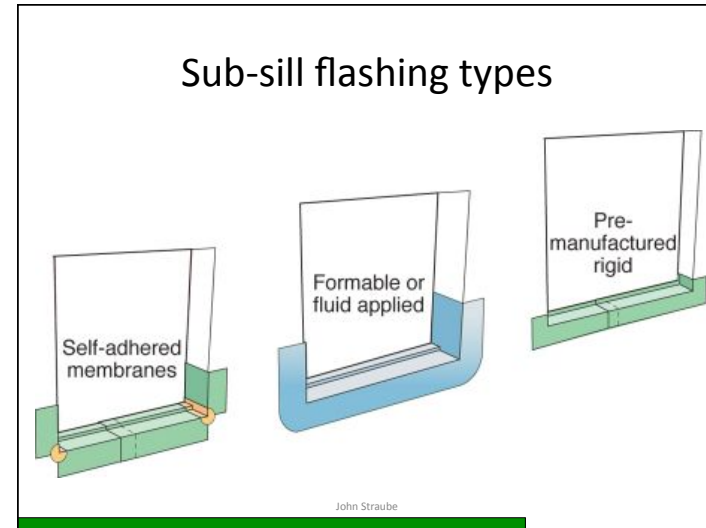
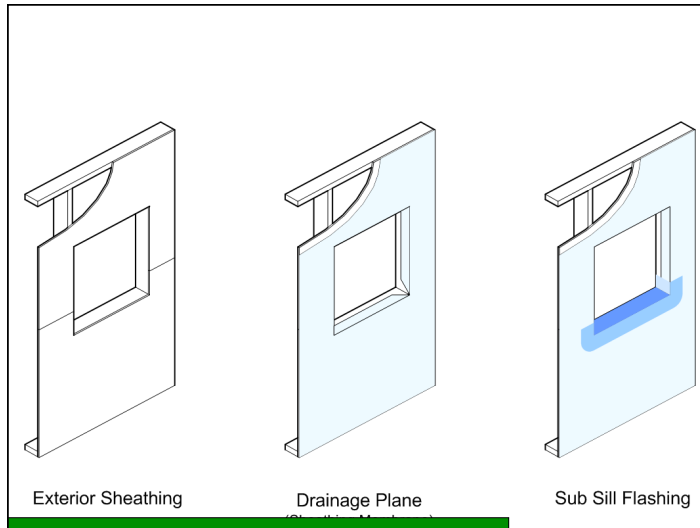


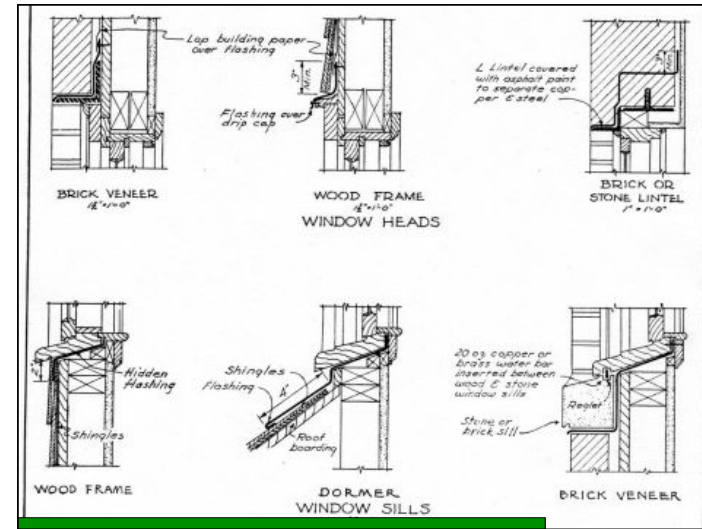
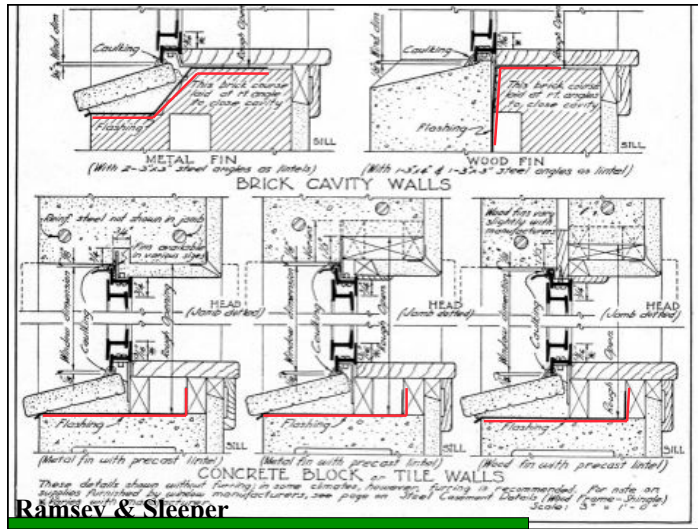


# Windows & Doors

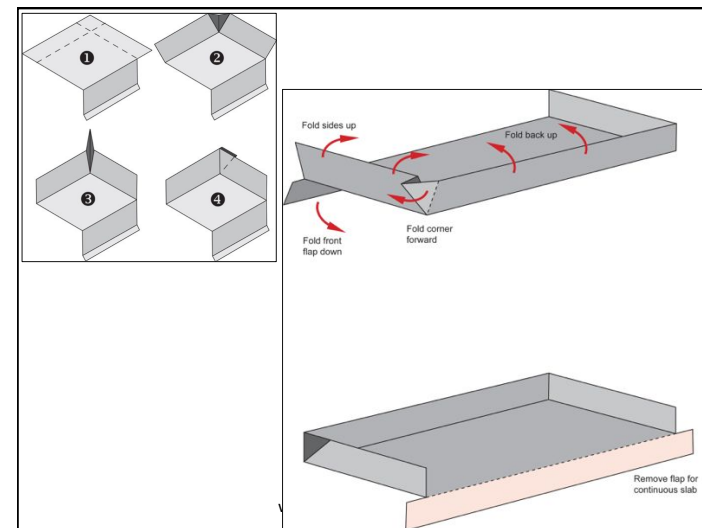
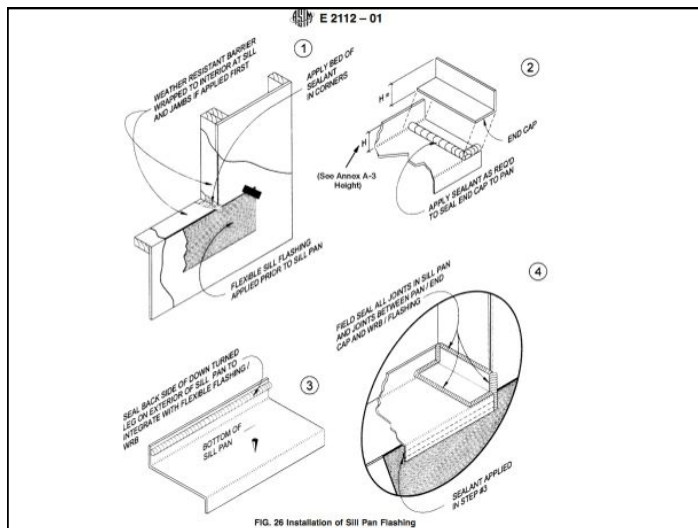


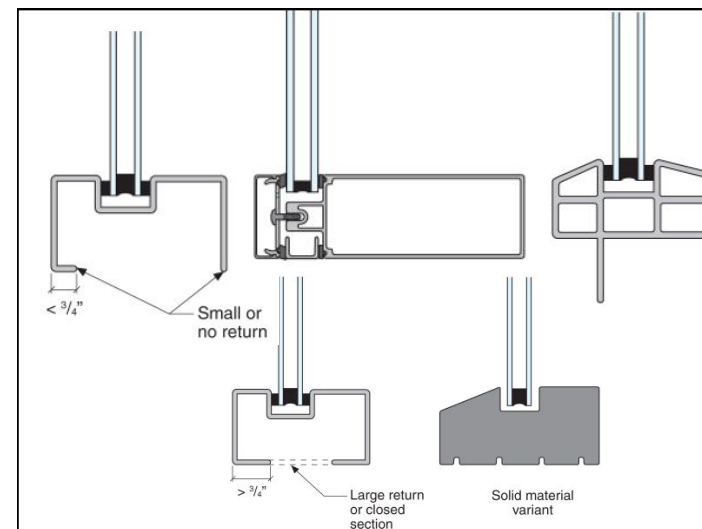
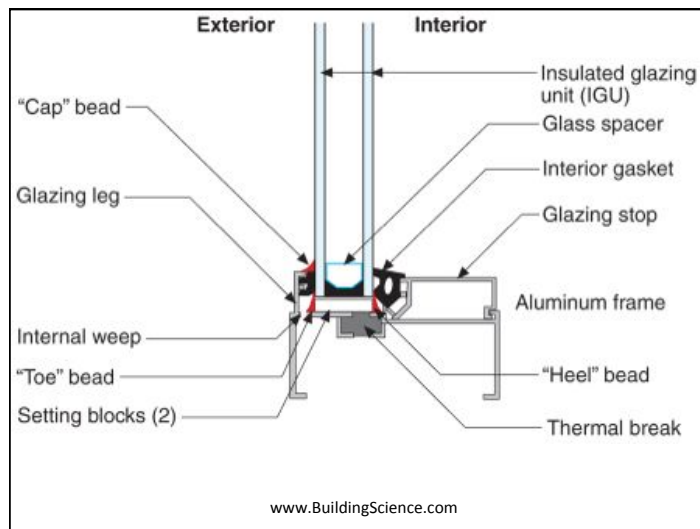
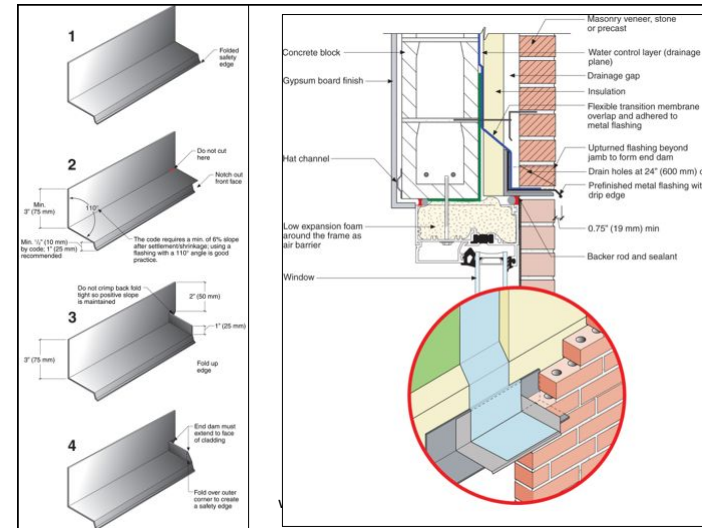
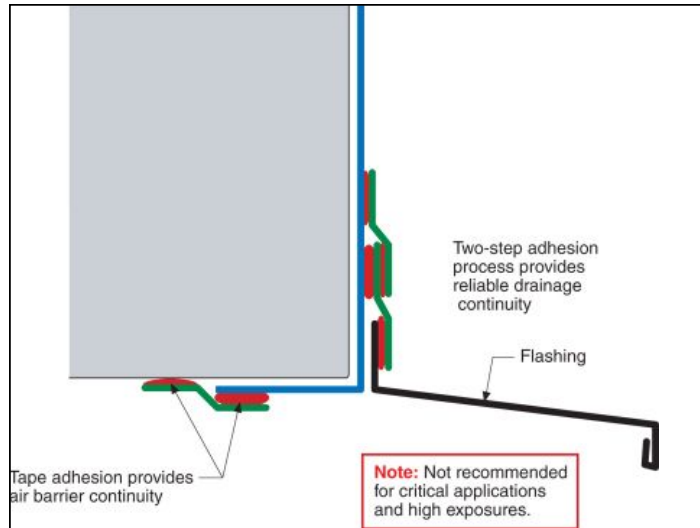


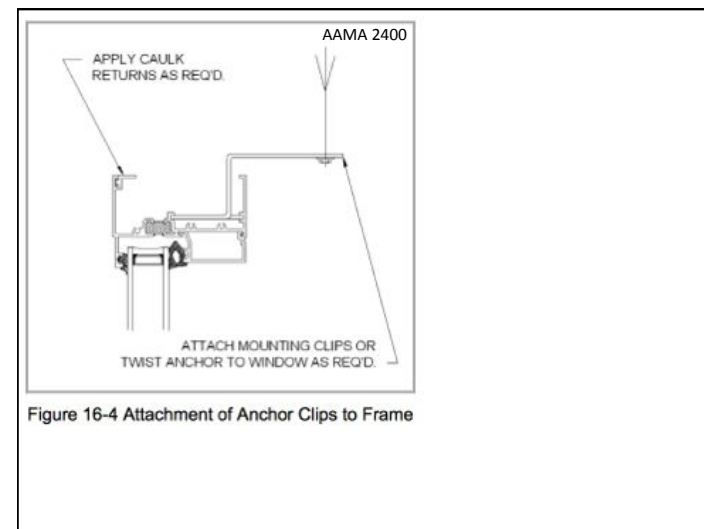
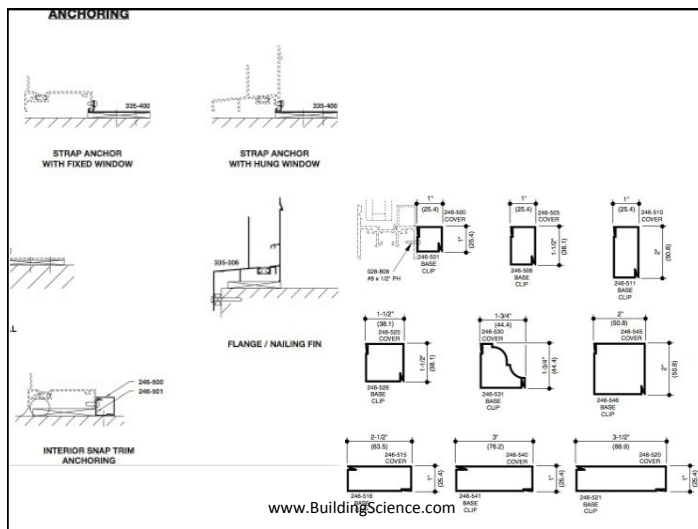
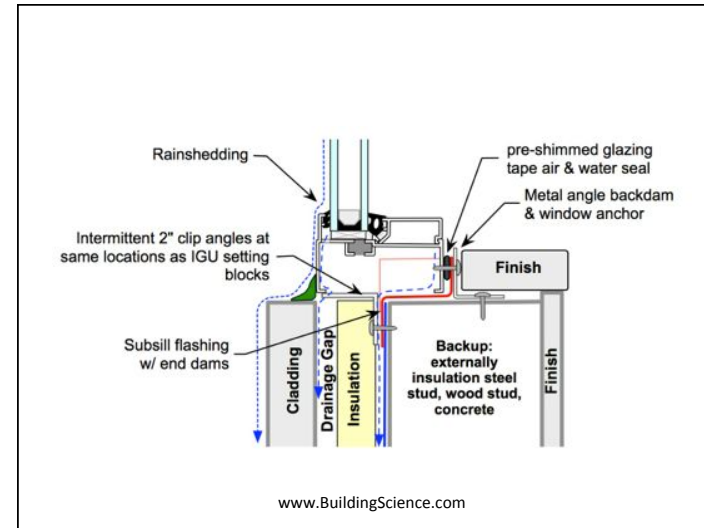
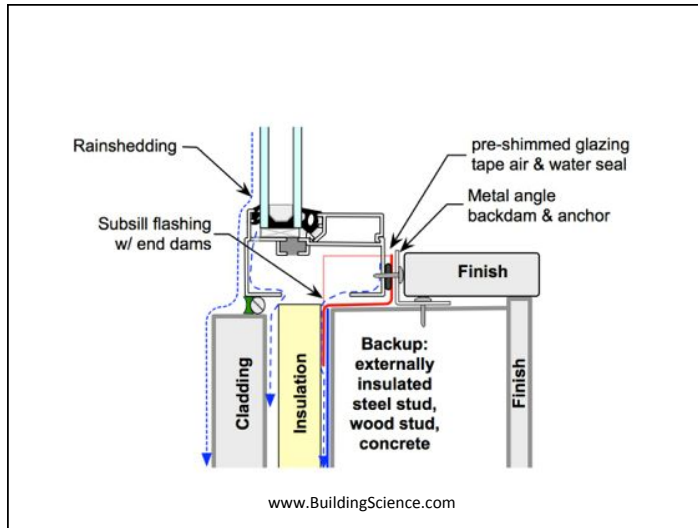


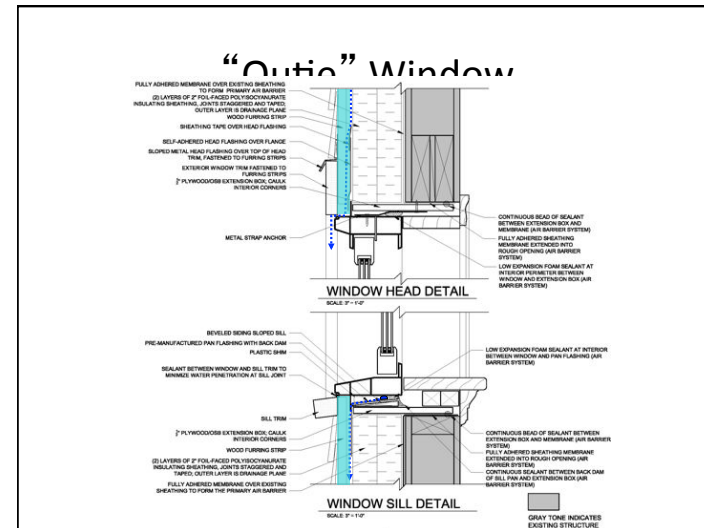
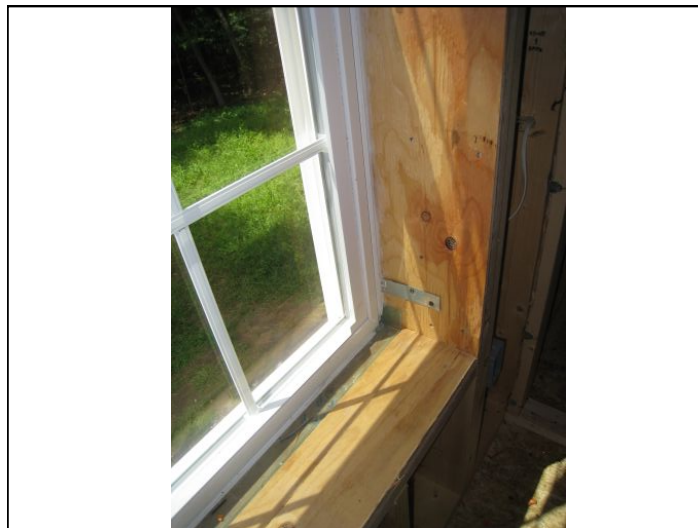
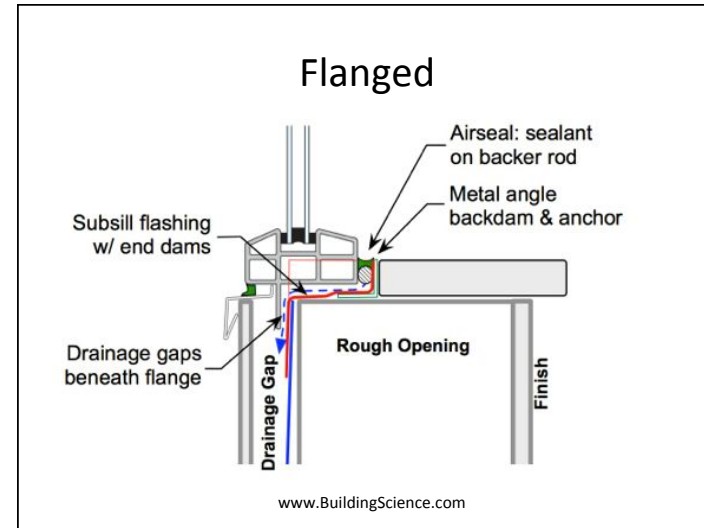
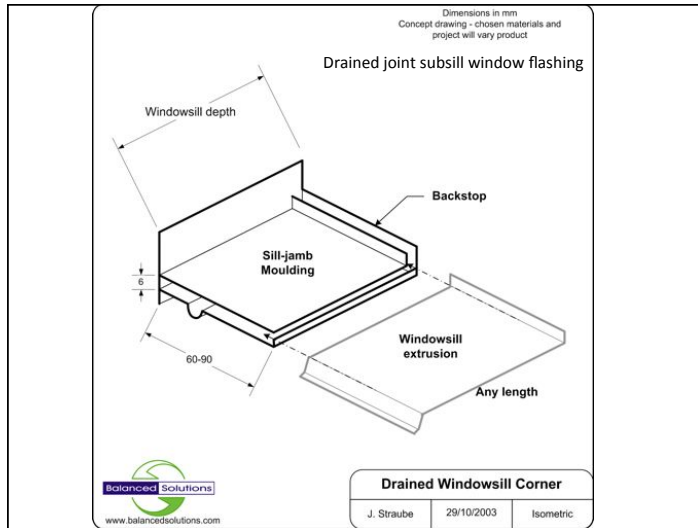


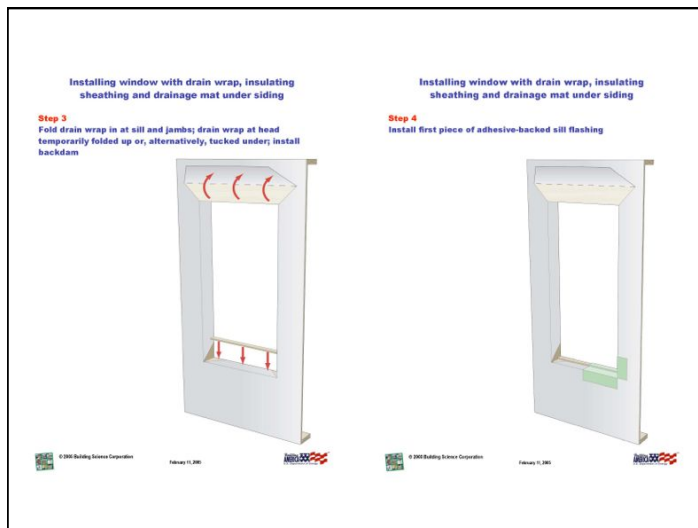
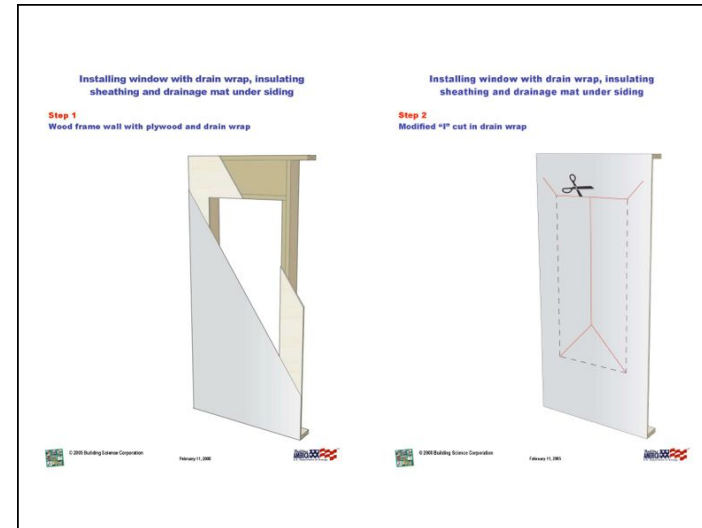
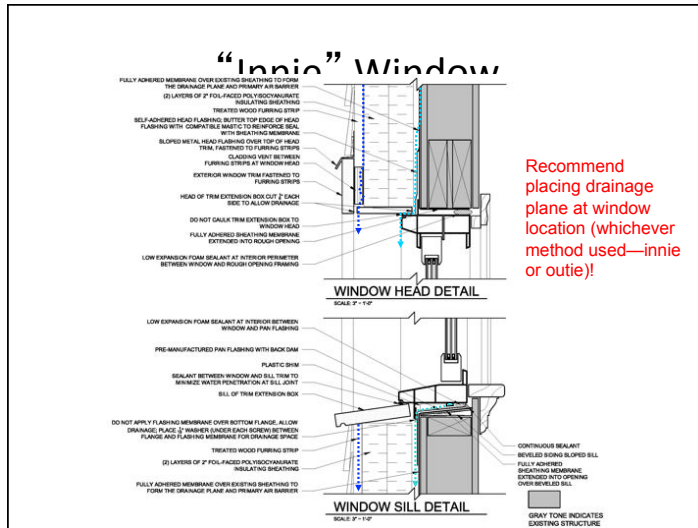
Ramsey & Sleener

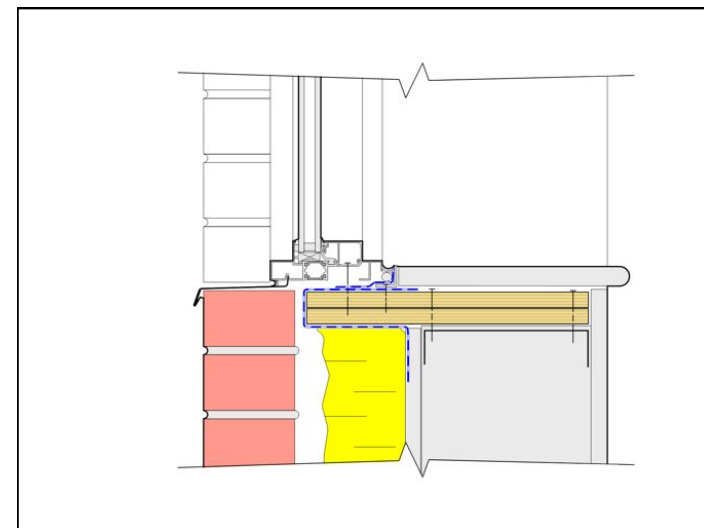
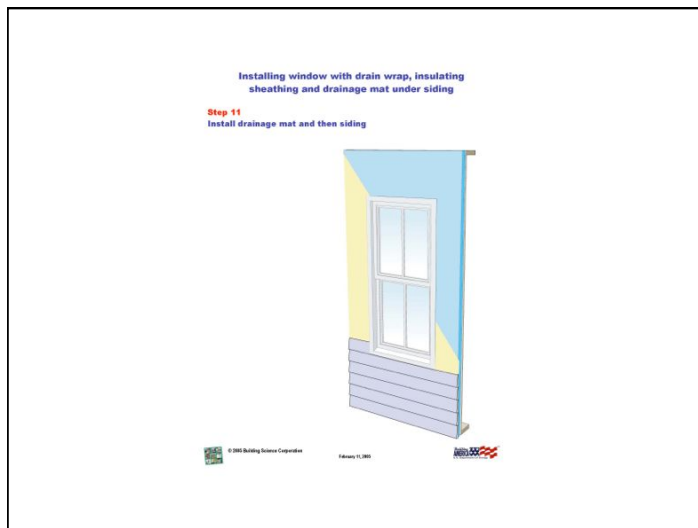


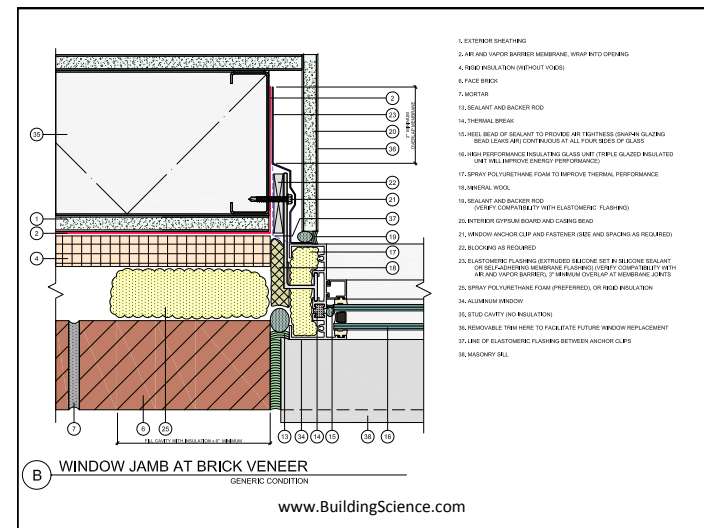
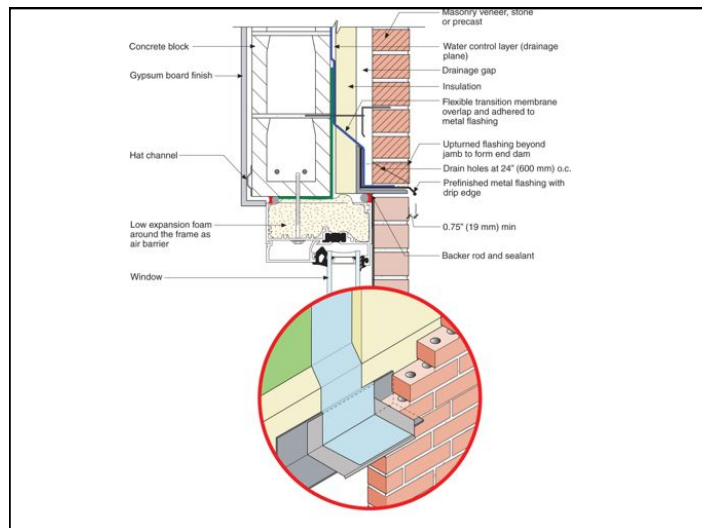
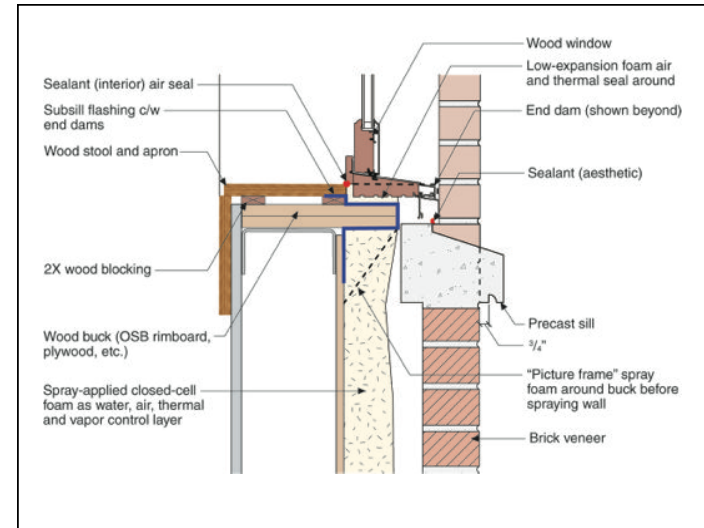
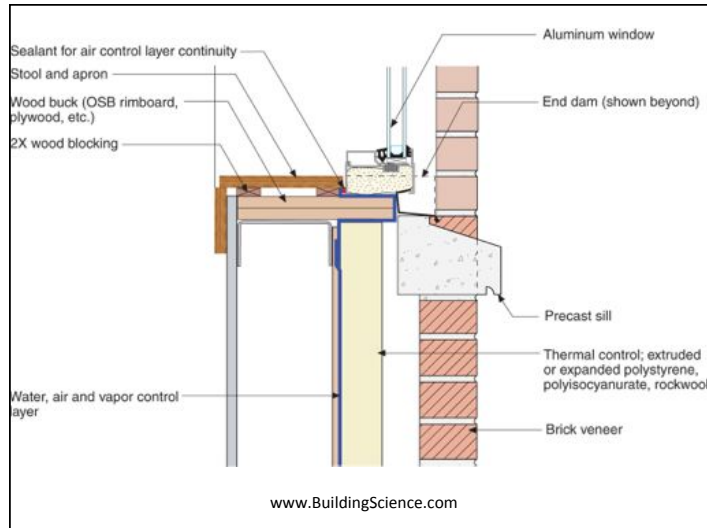




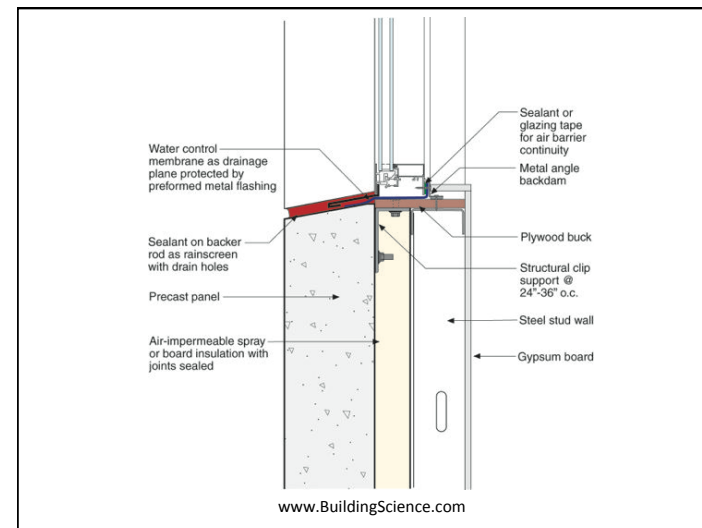
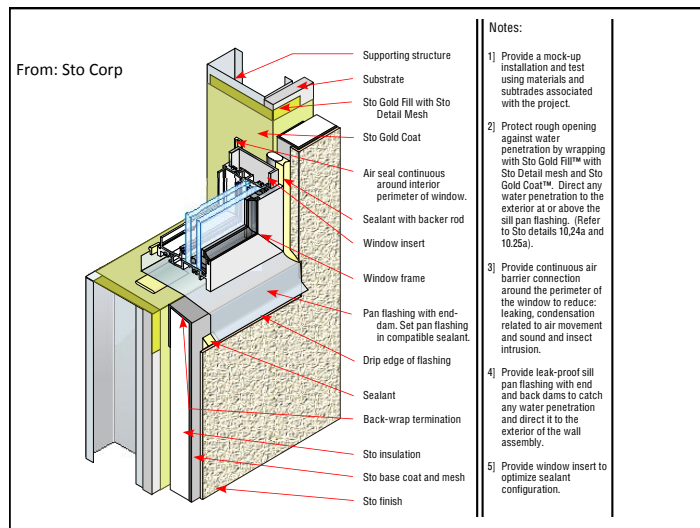
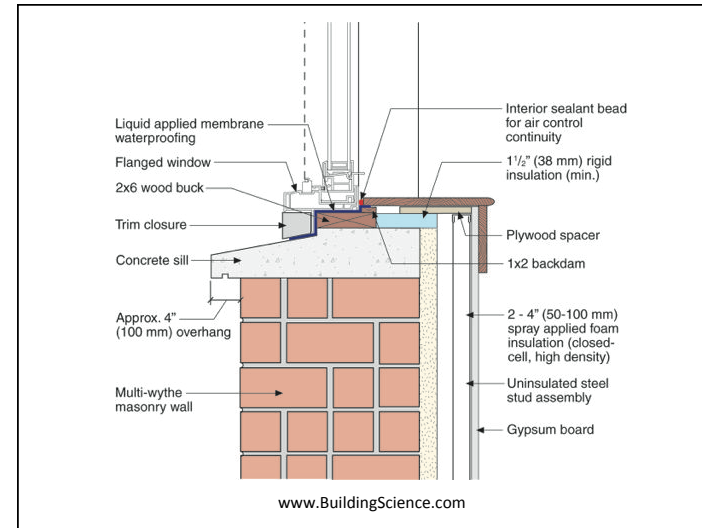
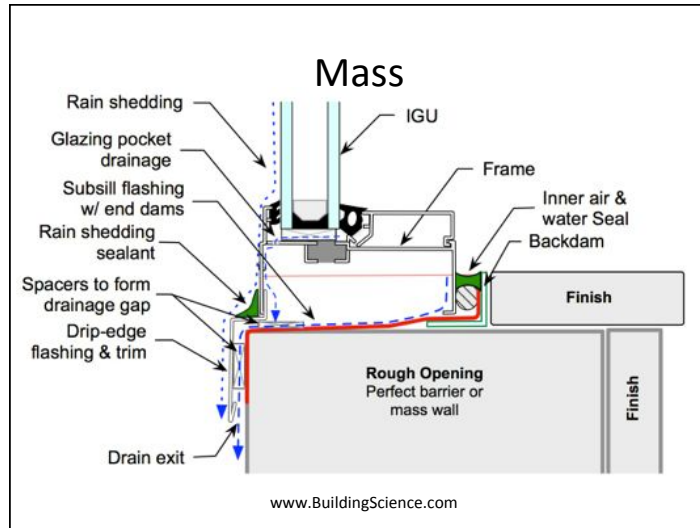


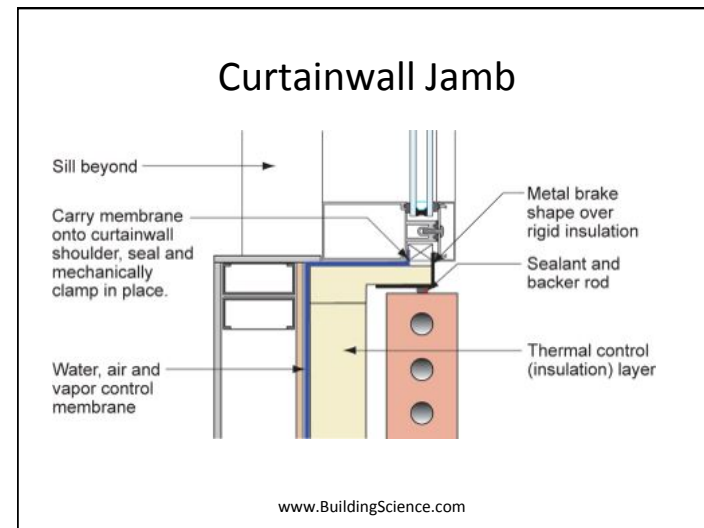
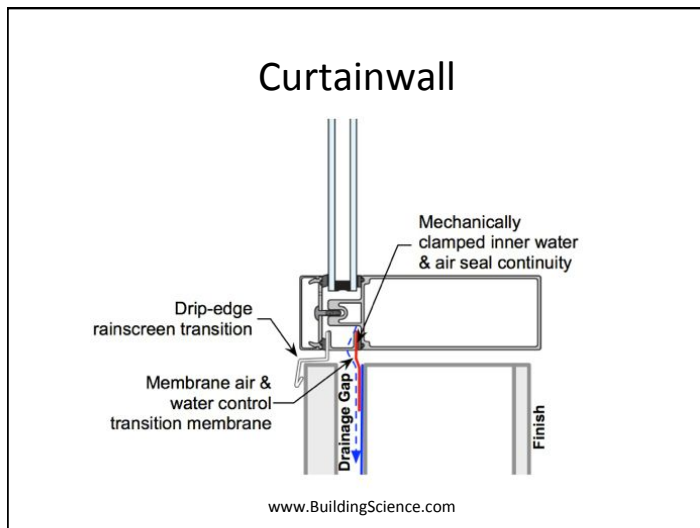
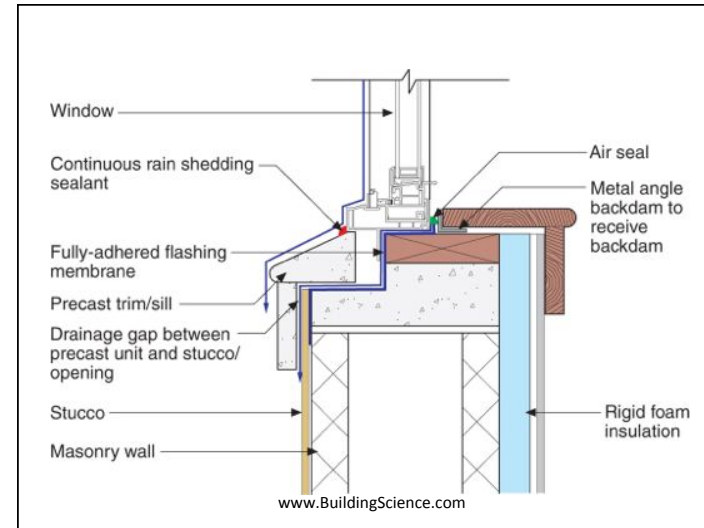
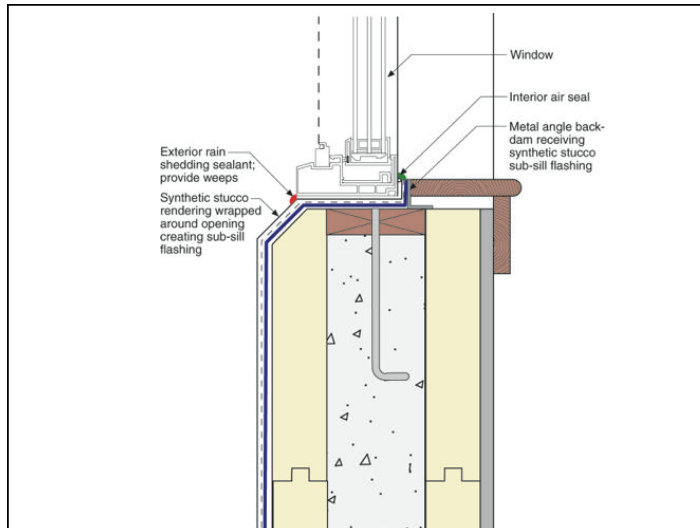


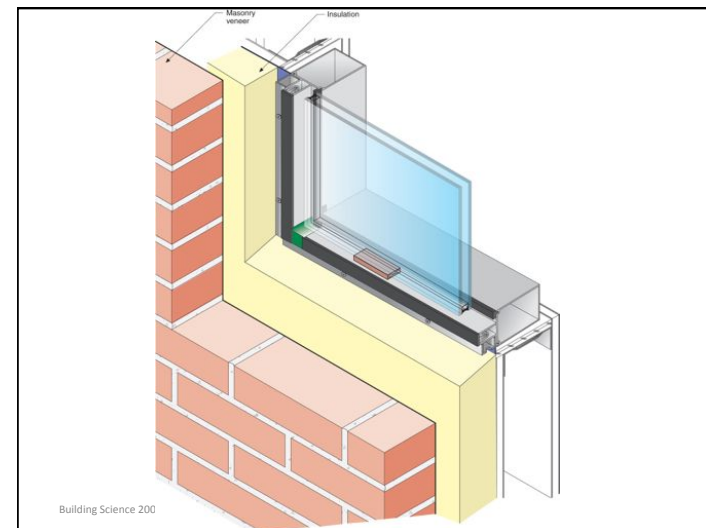
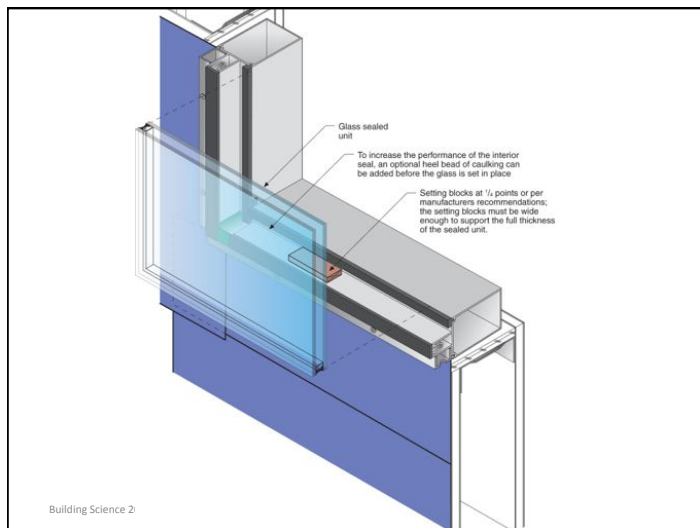
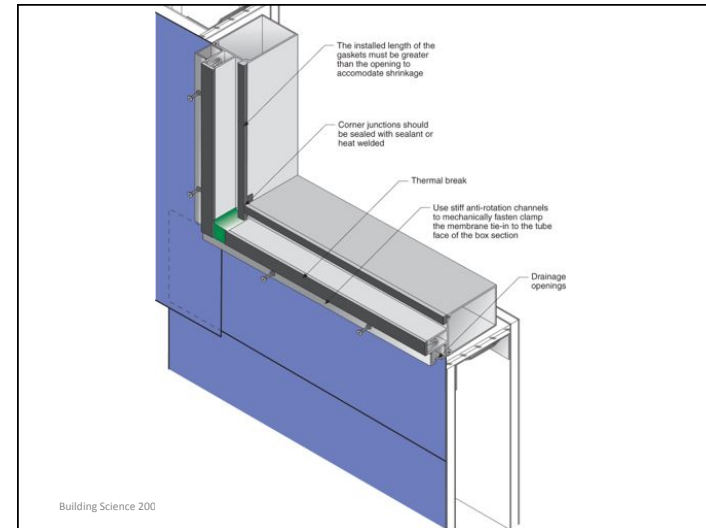
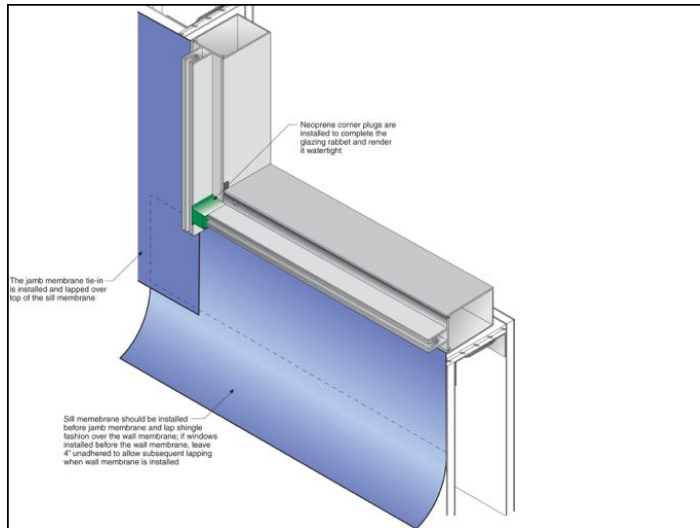


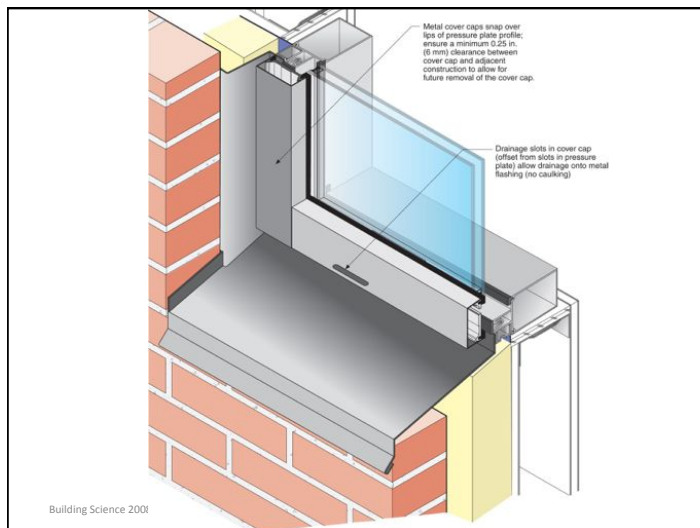
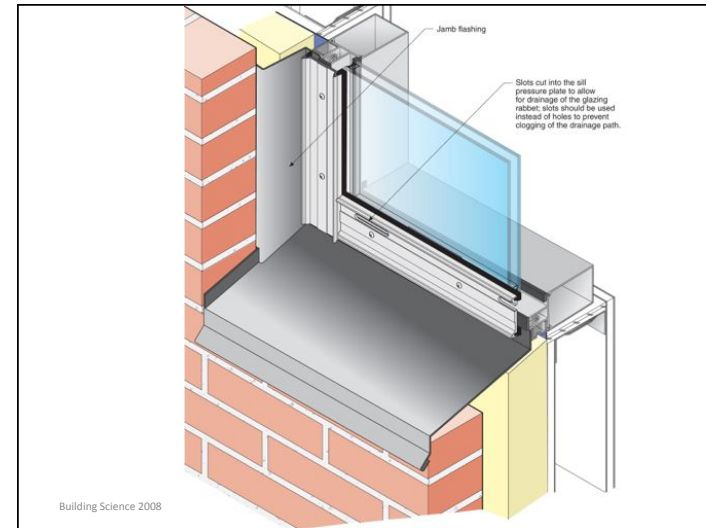
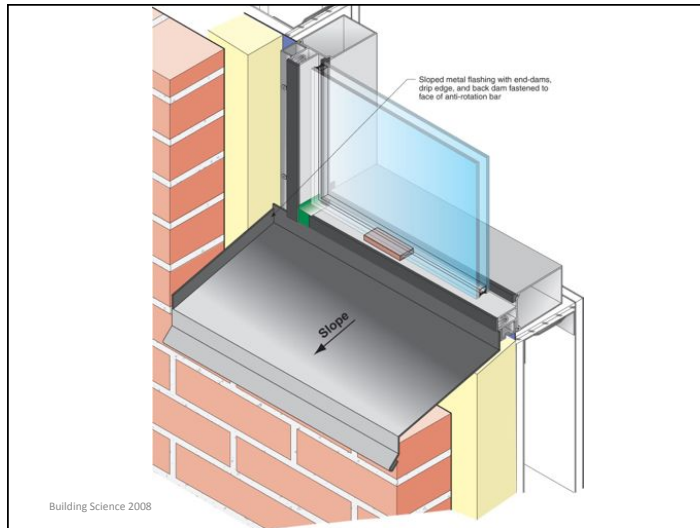


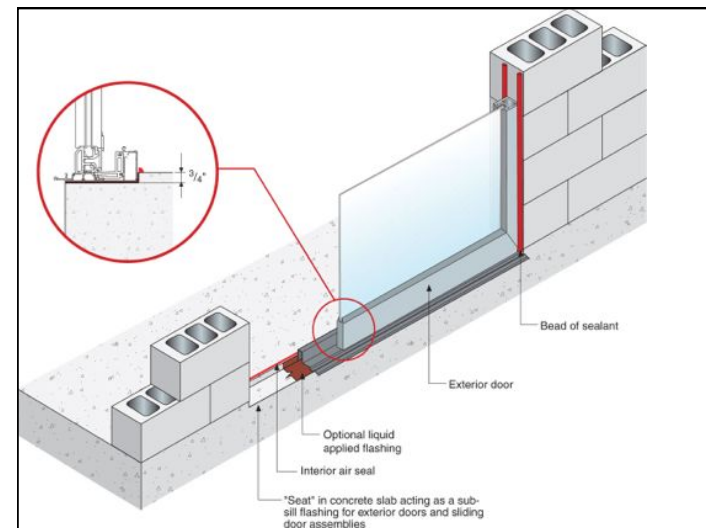
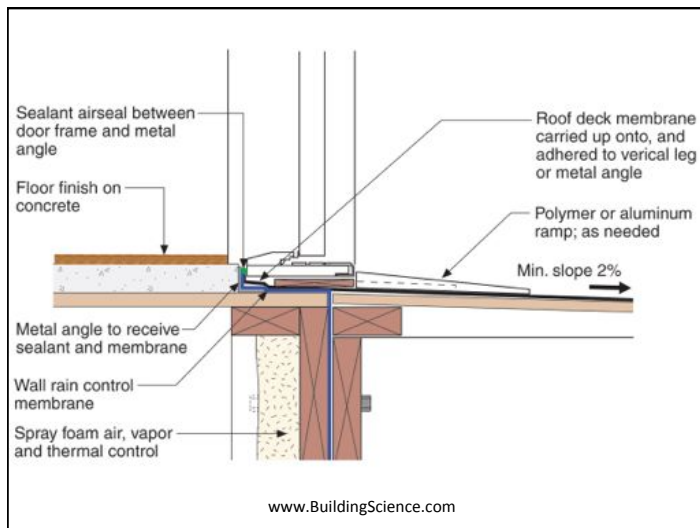
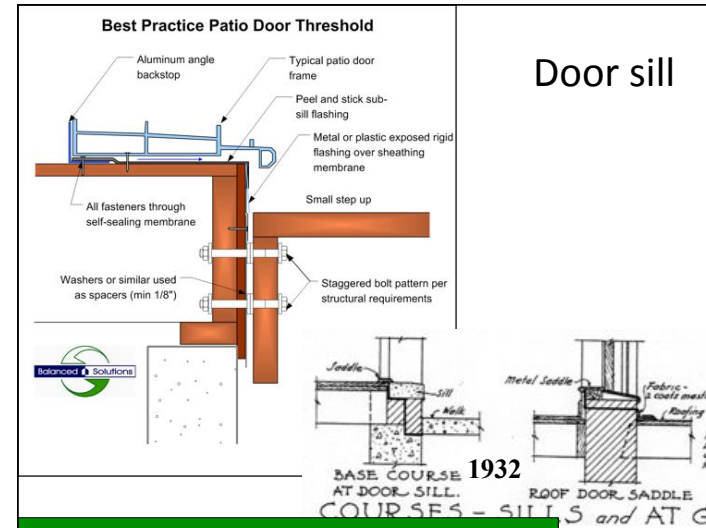


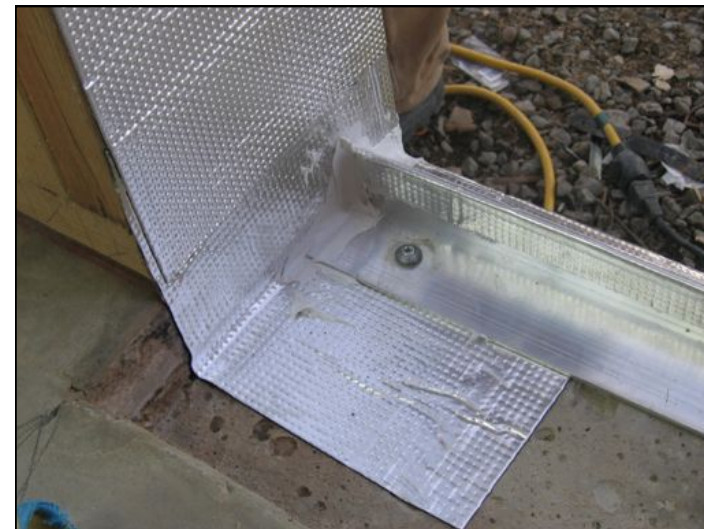
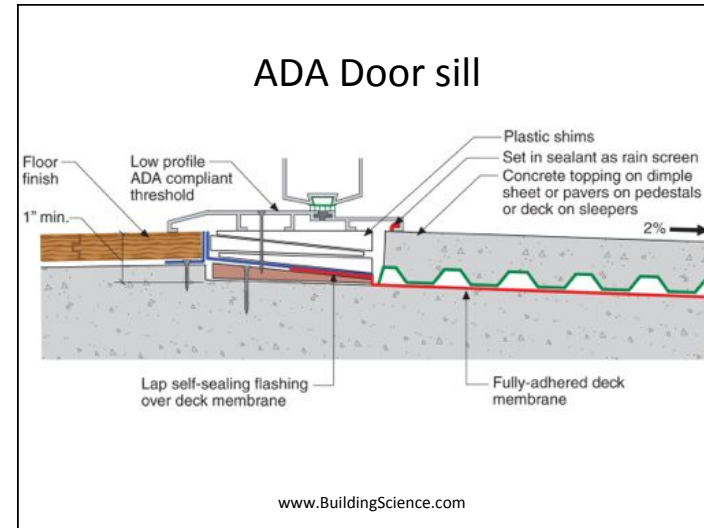
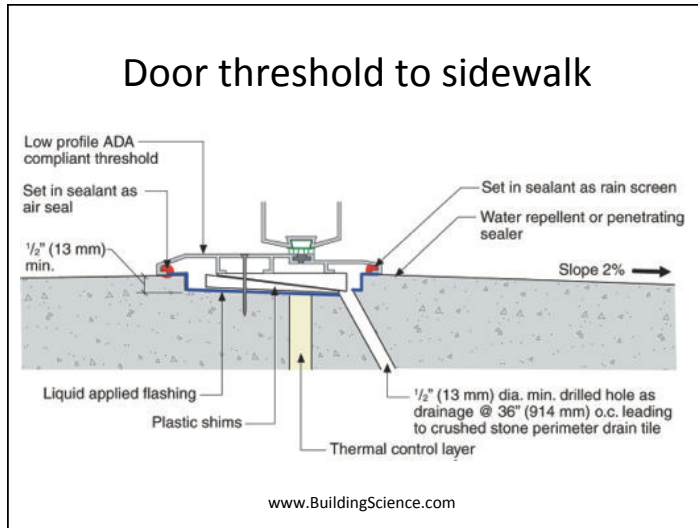












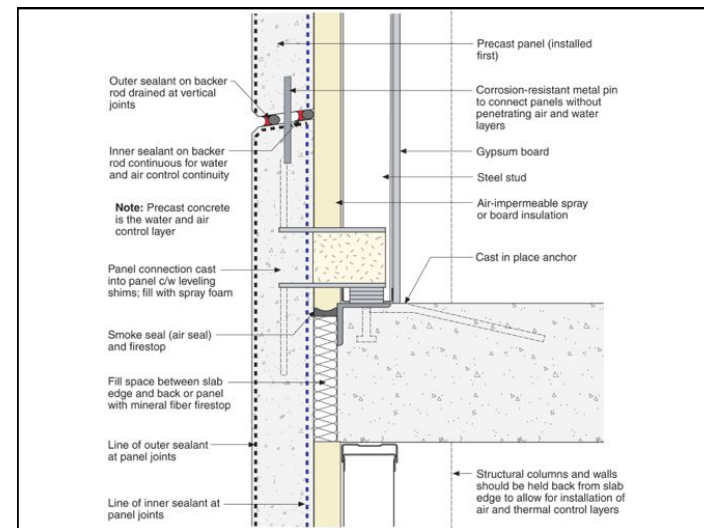
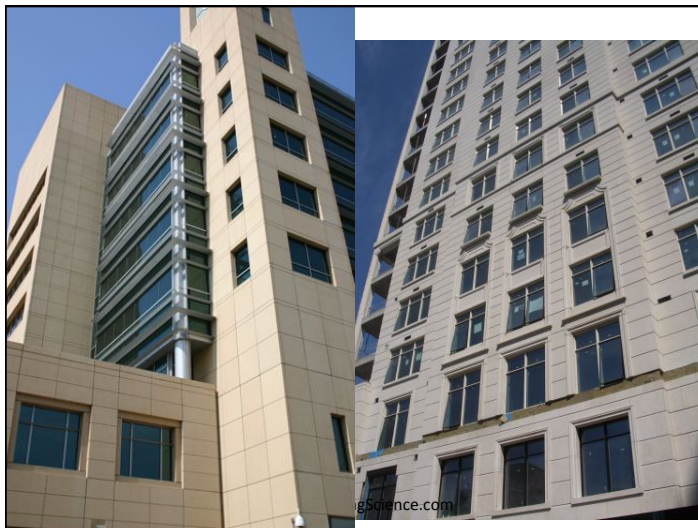
## Precast Concrete

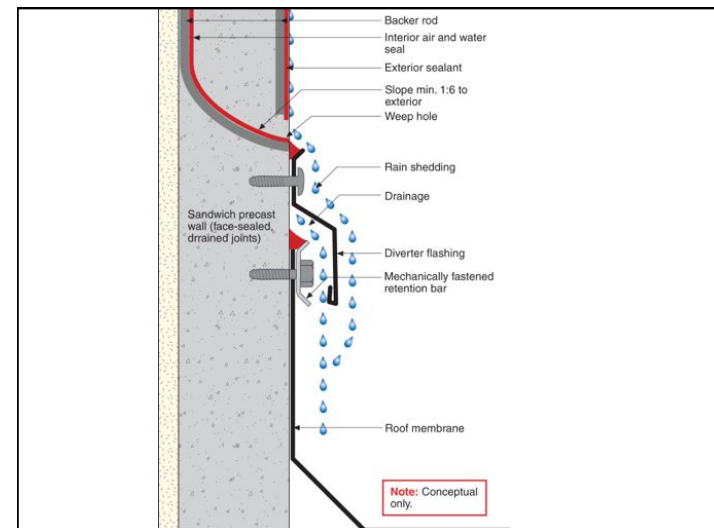
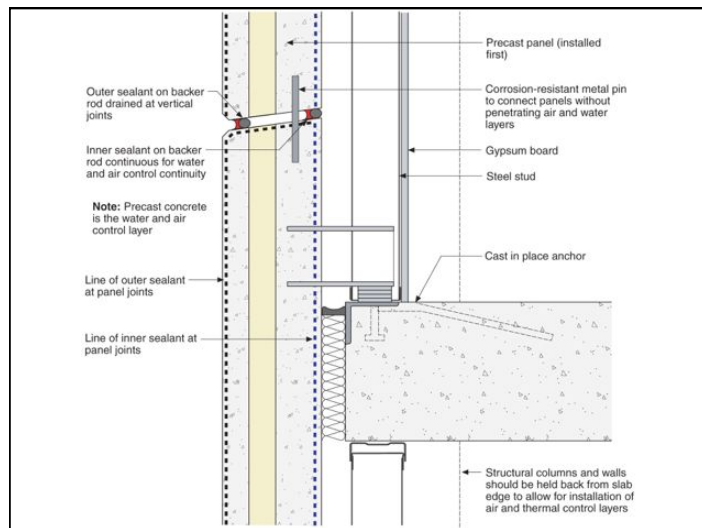
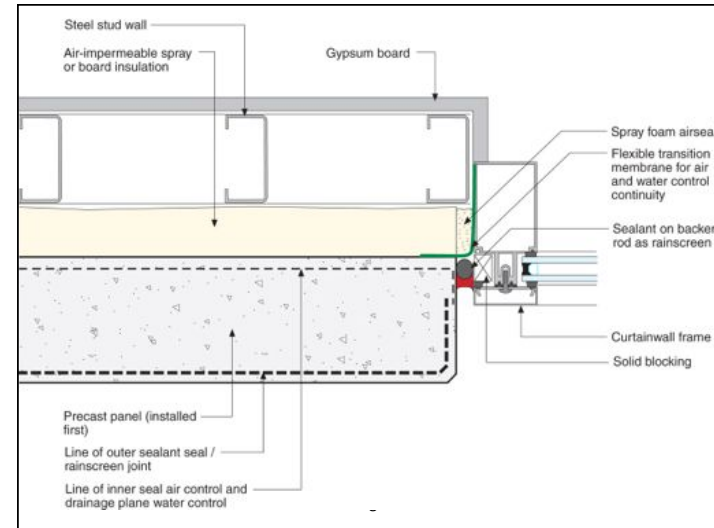
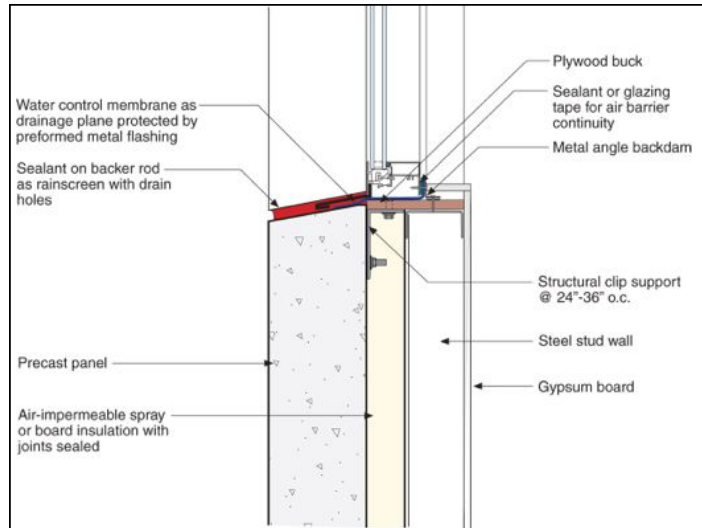
www.BuildingScience.com

## Precast

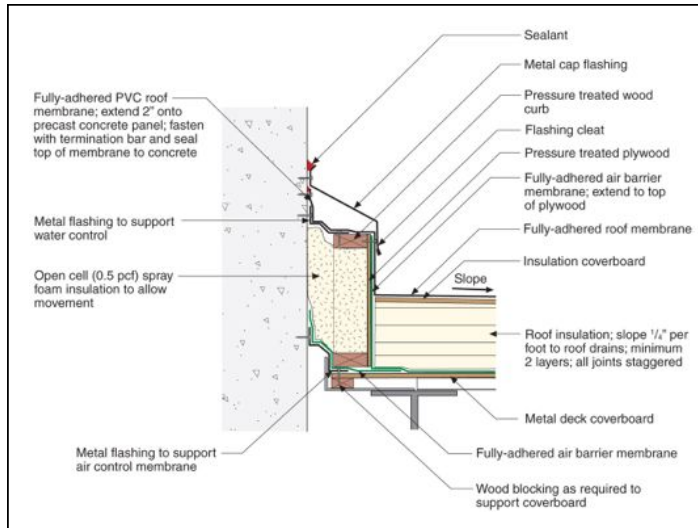
- Quality, factory-cast concrete is water-tight
- Beware site-cast cold-joints, form ties
- All Joints & Penetrations should be drained

www.BuildingScience.com









## EIFS Stucco

[www.BuildingScience.com](http://www.BuildingScience.com)

## EIFS Stucco

- EIFS or Stucco on mass substrates give few problems
  - Concrete
  - CMU
  - Solid brick masonry

[www.BuildingScience.com](http://www.BuildingScience.com)

### BASIC EIFS COMPONENTS

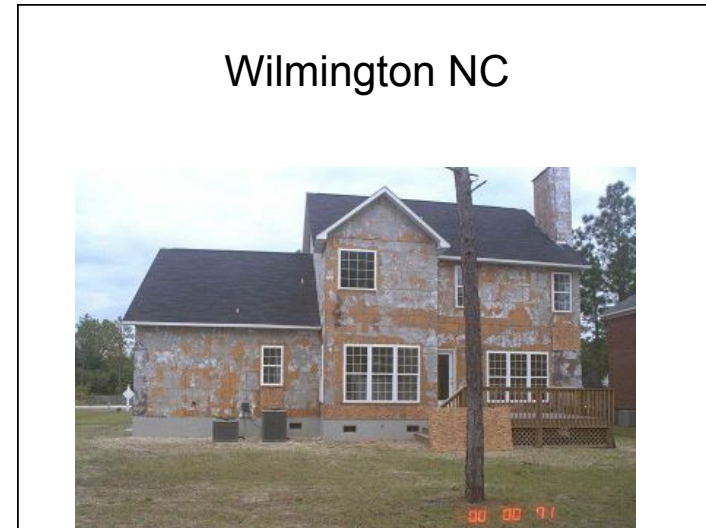
Components of Exterior Insulation and Finish Systems for Residential Use

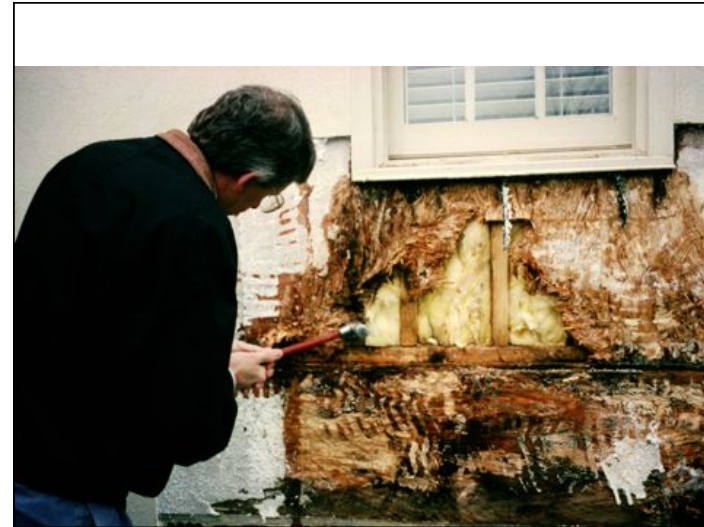
Labels in the diagram include:

- Substrate (e.g., plywood)
- Adhesive/Attachment
- Insulation Board
- Reinforcing Mesh
- Base Coat w/Reinforcing Mesh Embedded
- Finish Coat

SOLID WALL SECTION

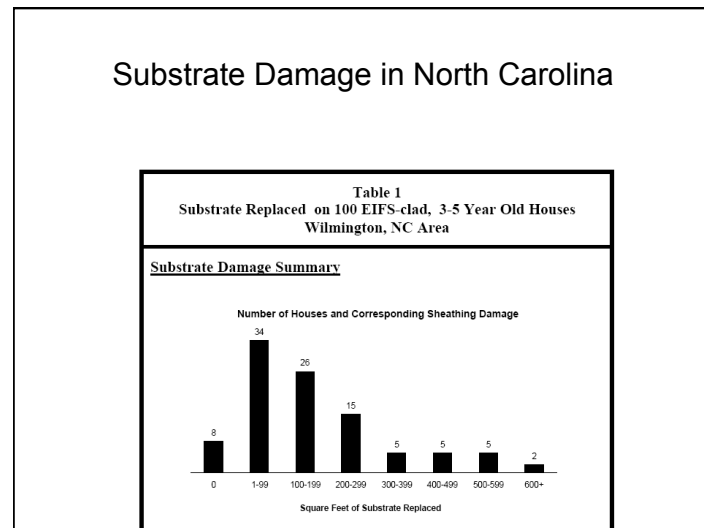
Source: EIFS Industry Members Association (EISMA)  
John Straube 2005





**Substrate + moisture = problem**

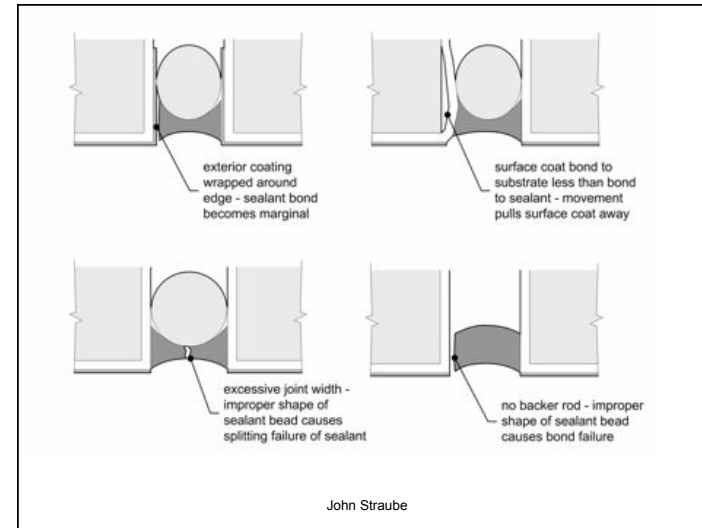
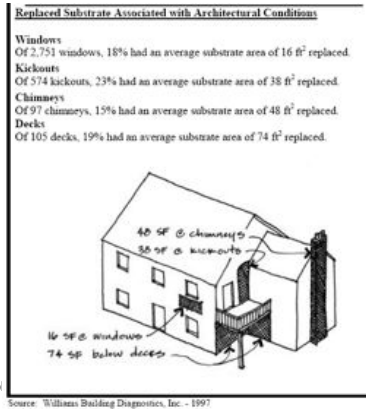
- Moisture sensitive substrates are a problem



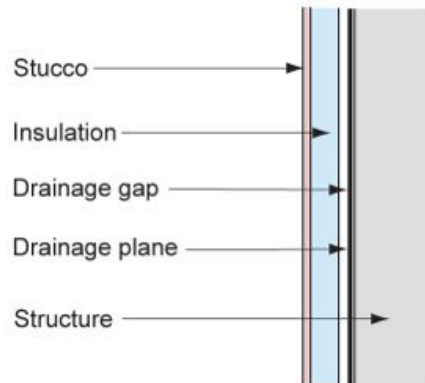
## EIFS Damage Locations

Conclusions:

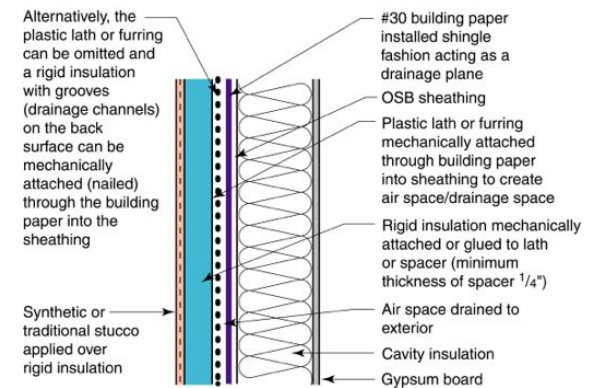
- Windows =common
- Kickouts =high %
- Decks =large area



## Drained Stucco / EIFS



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