

Bayer Building Sciences

# Spray Polyurethane Foam

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Building Enclosures

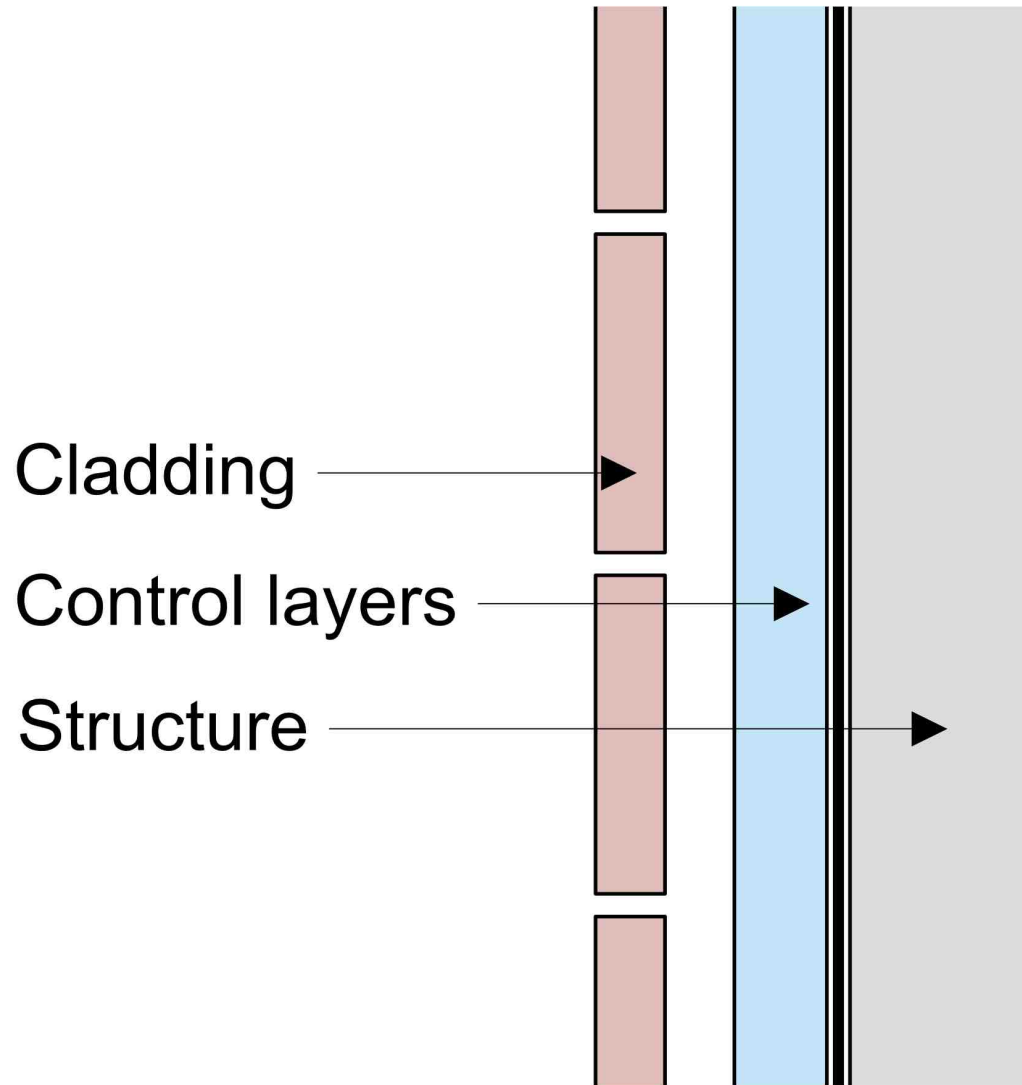
# The Perfect Wall

Water Control Layer

Air Control Layer

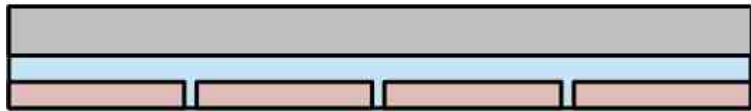
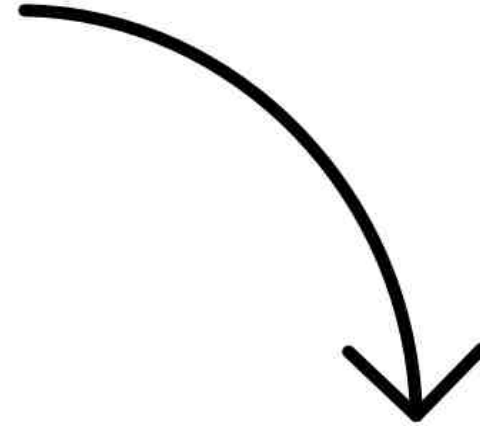
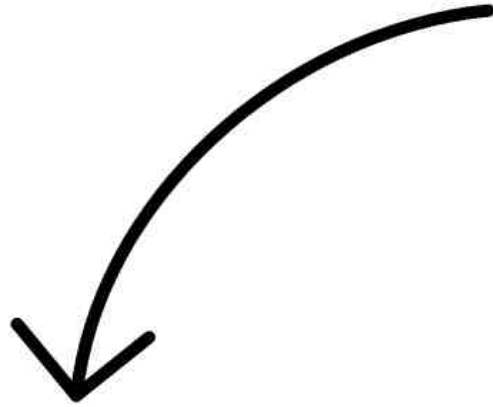
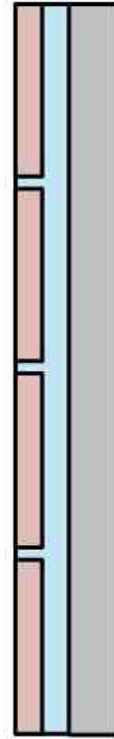
Vapor Control Layer

Thermal Control Layer

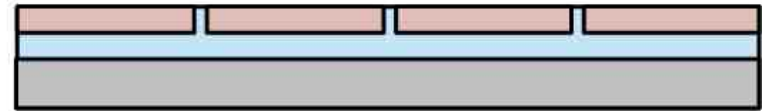




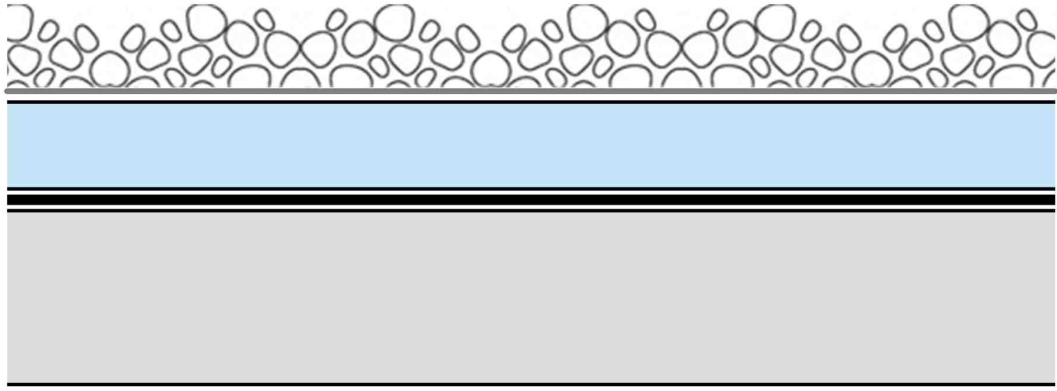
**Wall**



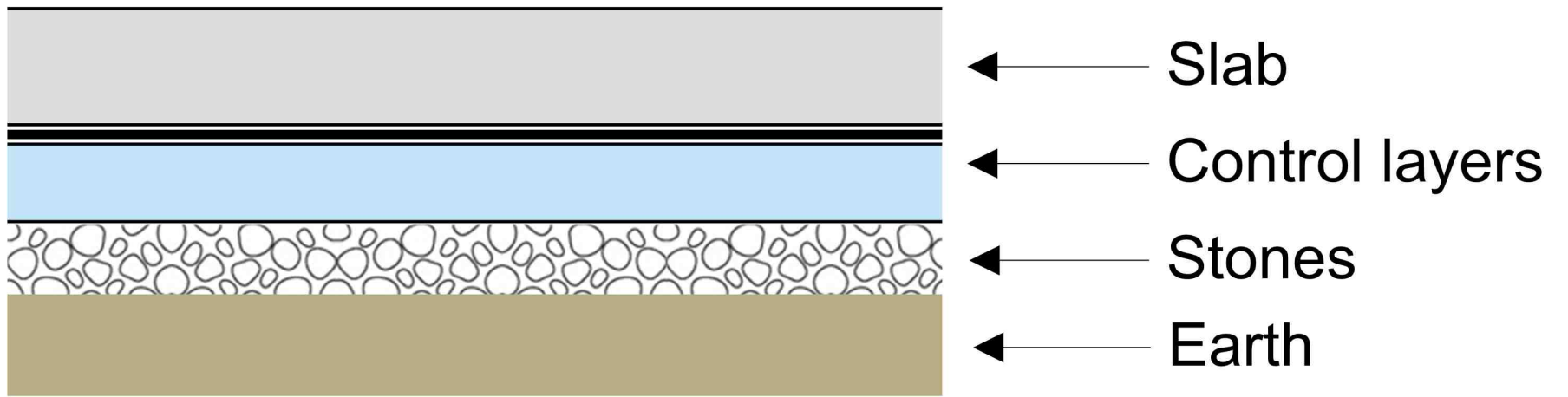
**Slab**

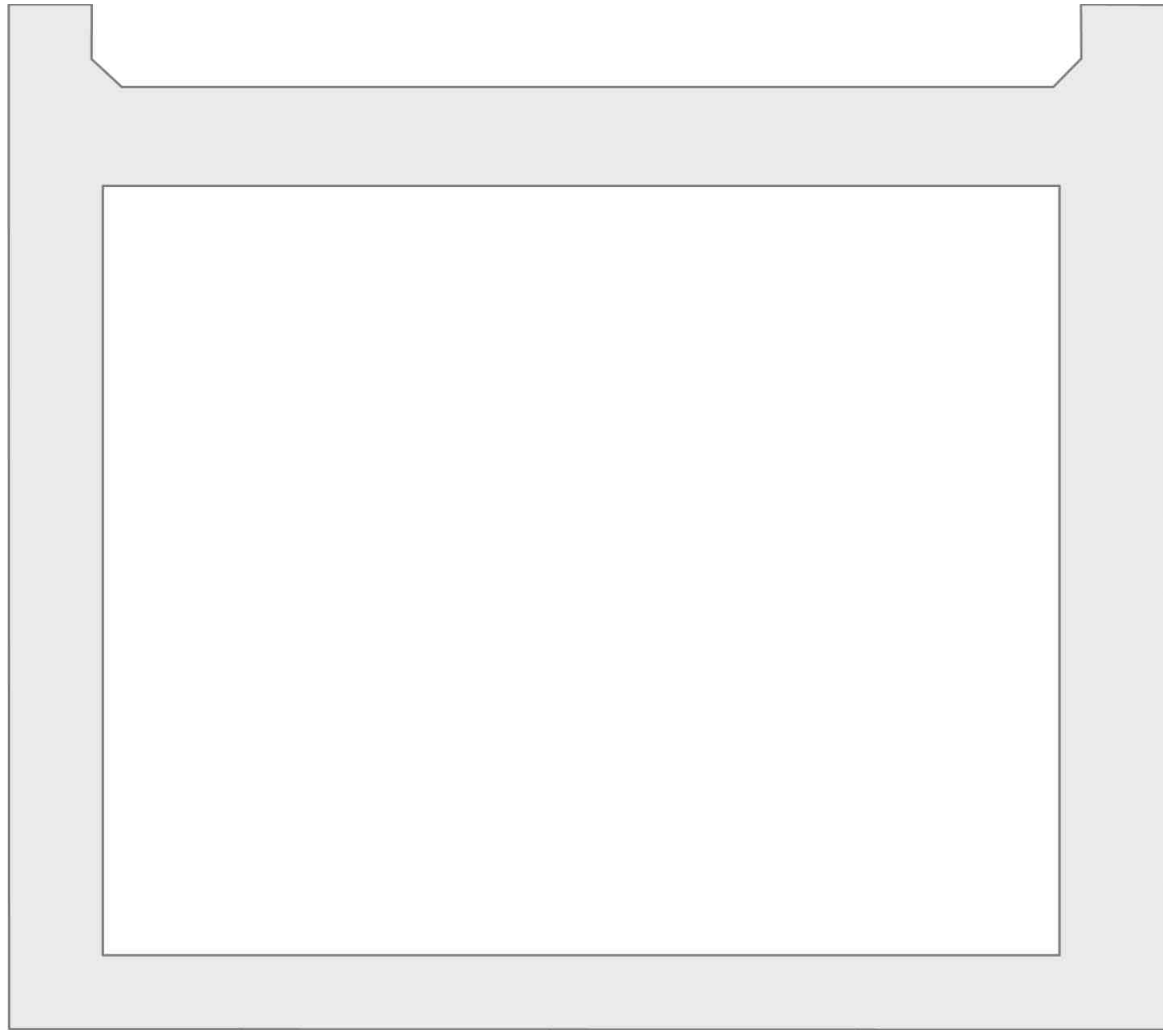


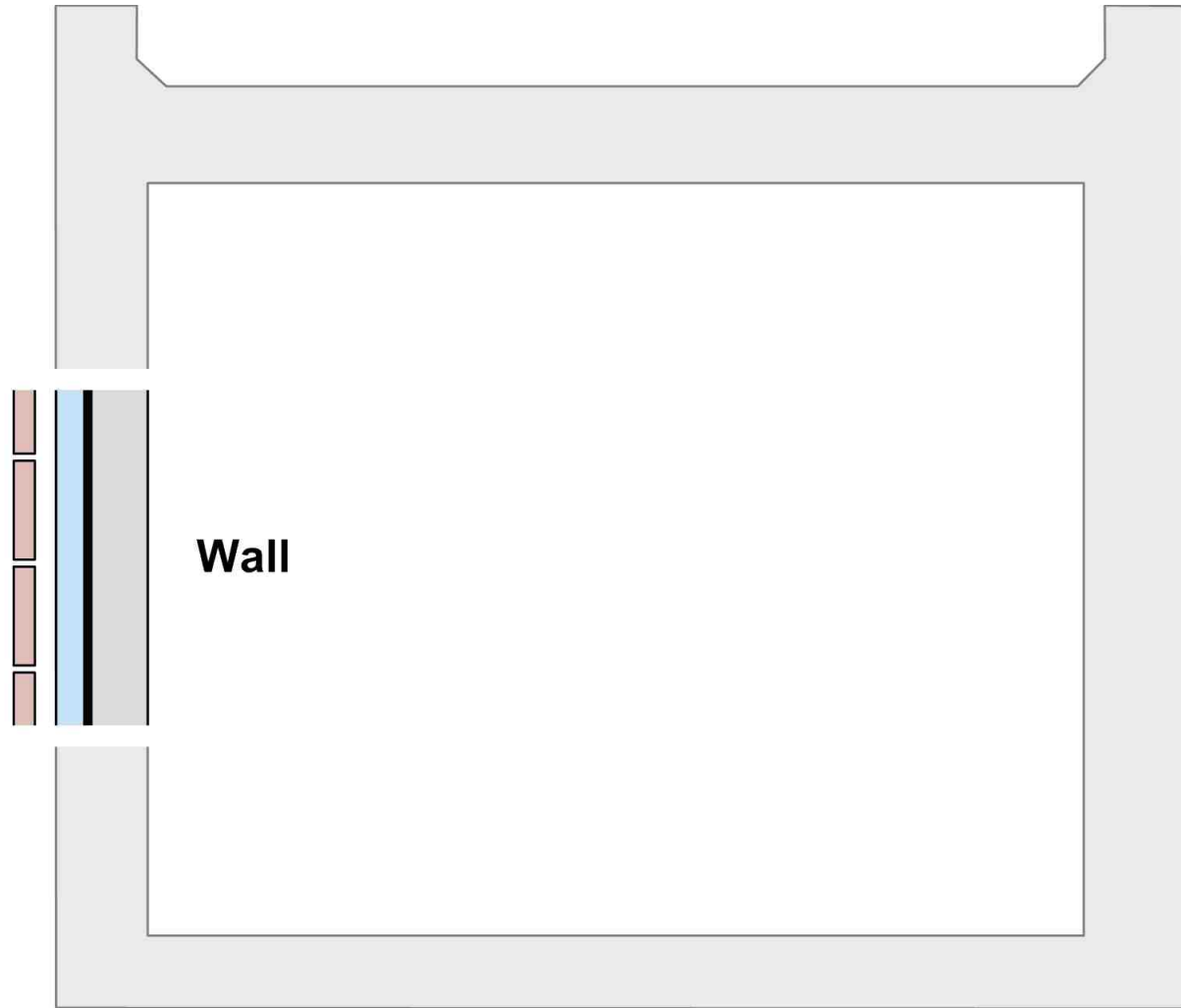
**Roof**

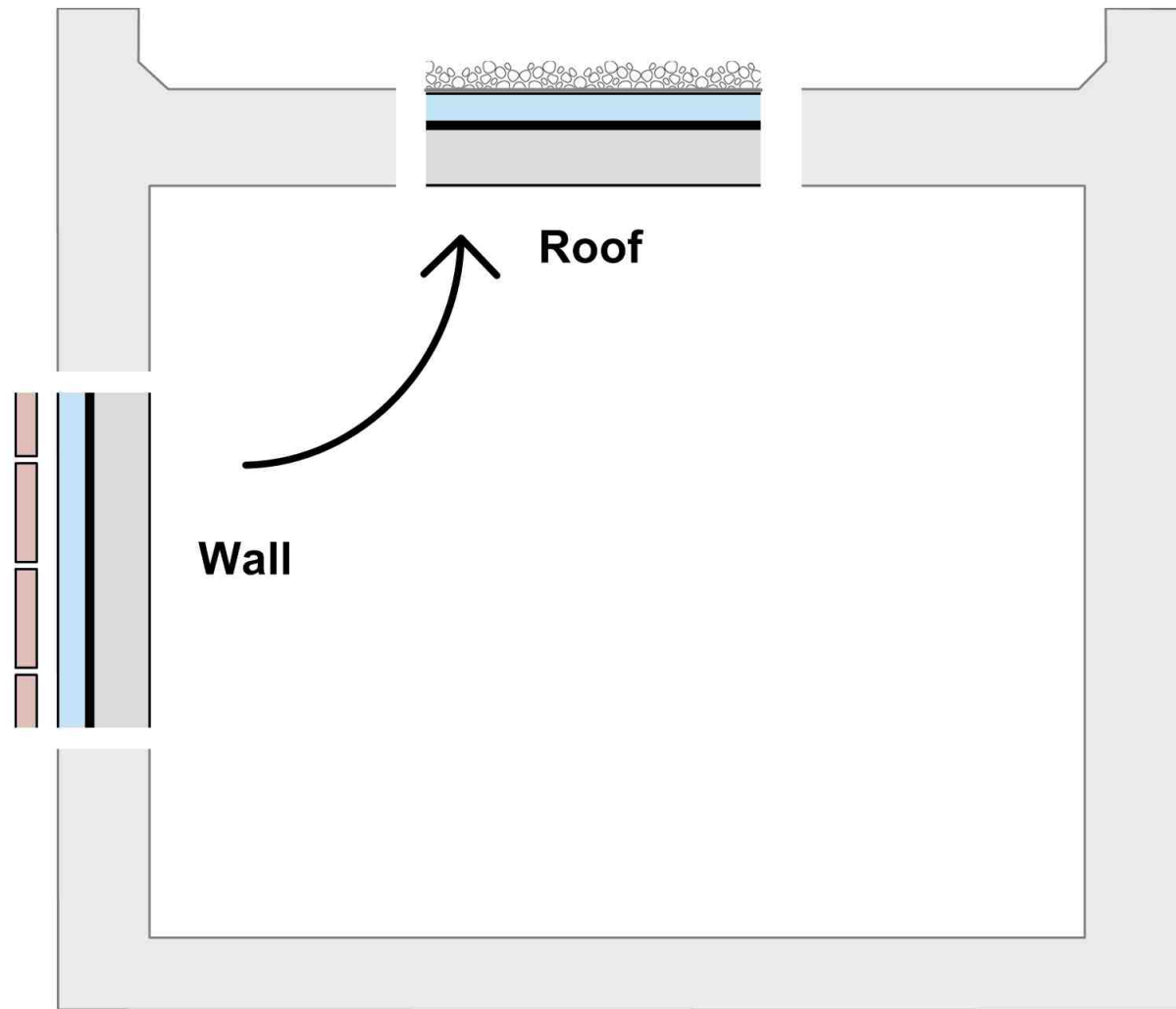


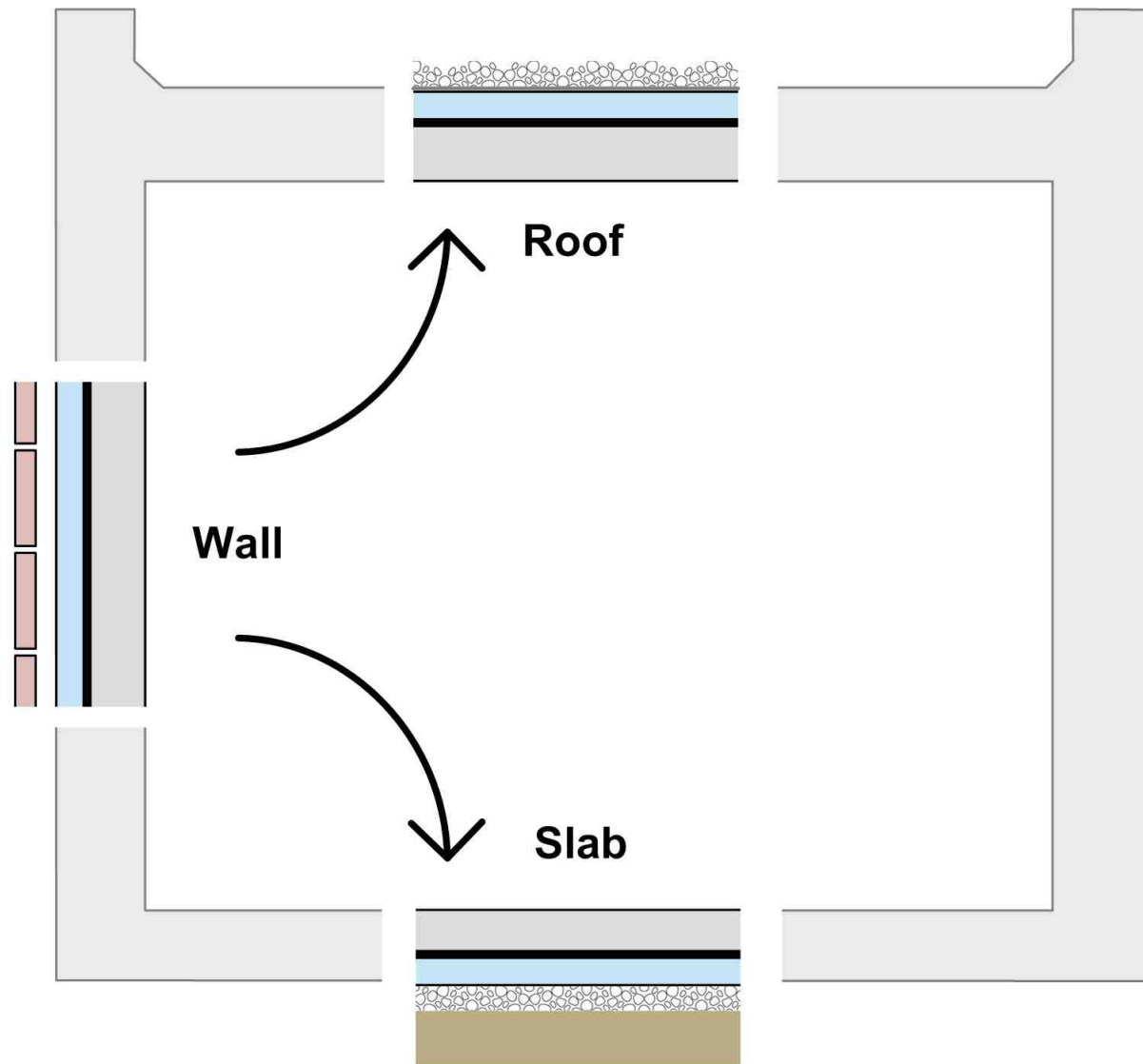
- ← Ballast
- ← Filter fabric
- ← Control layers
- ← Roof structure

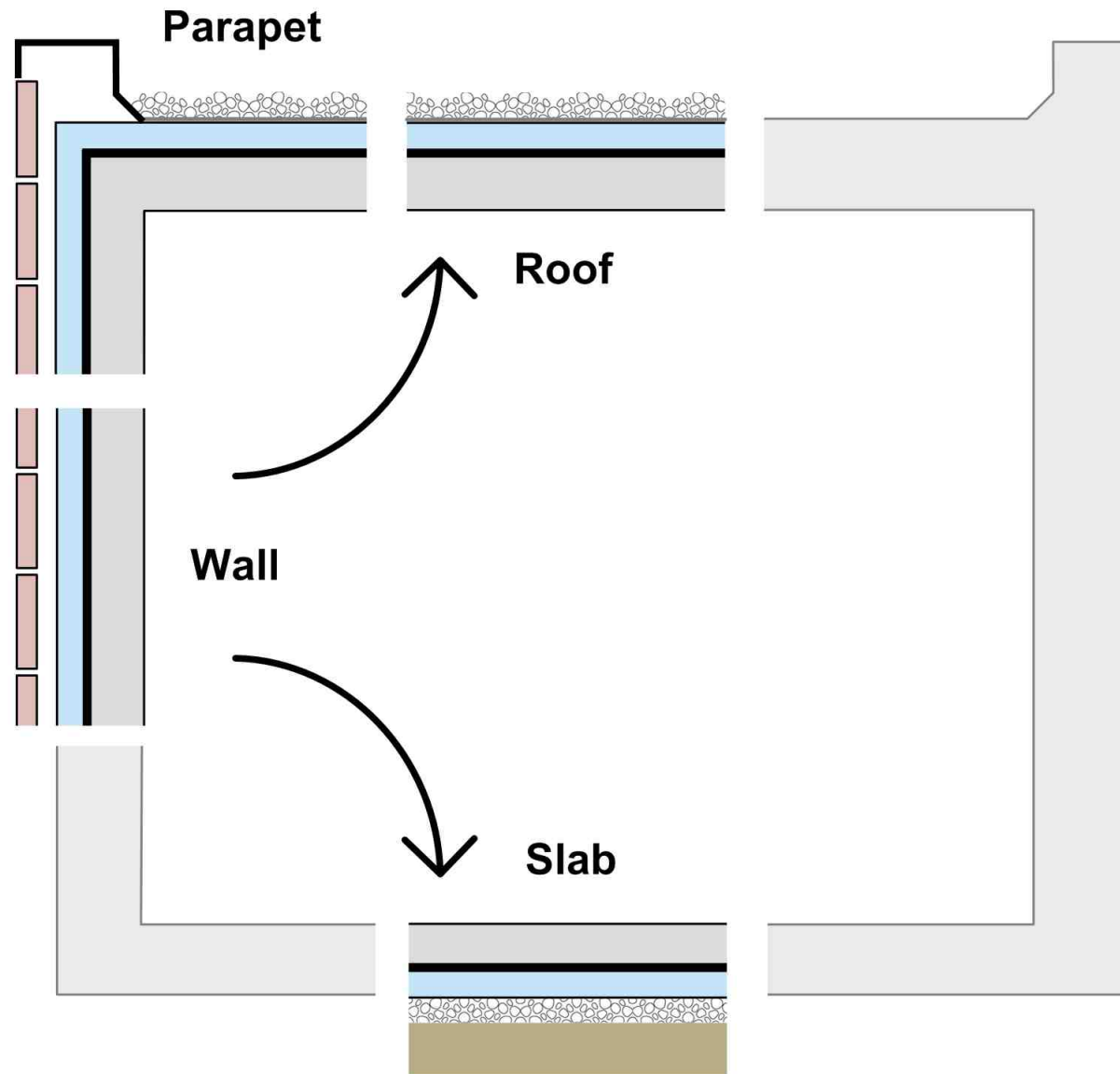




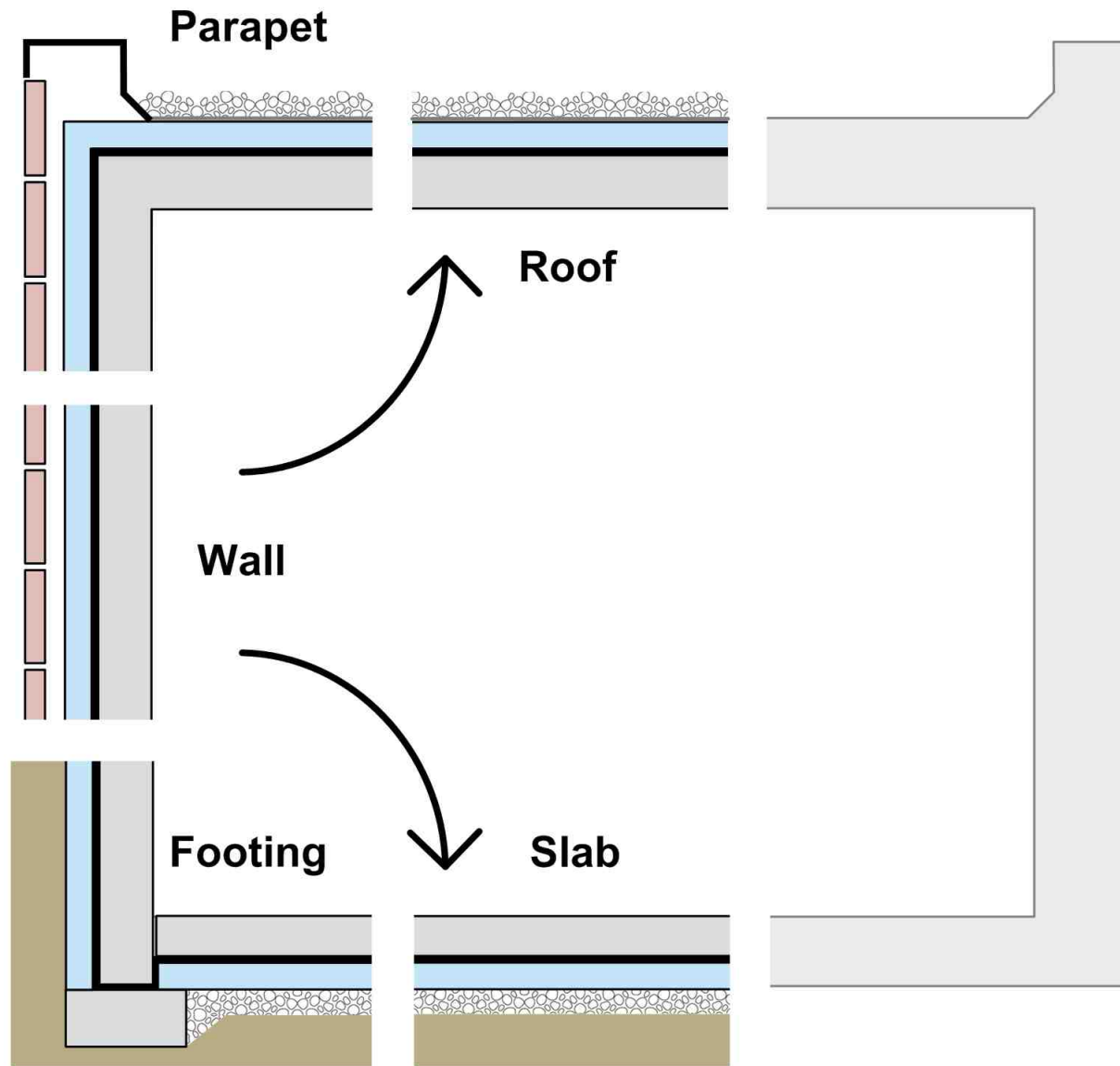


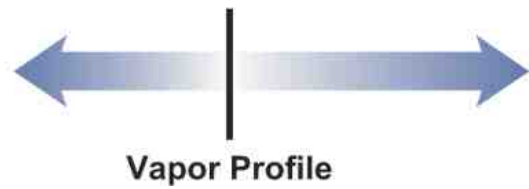
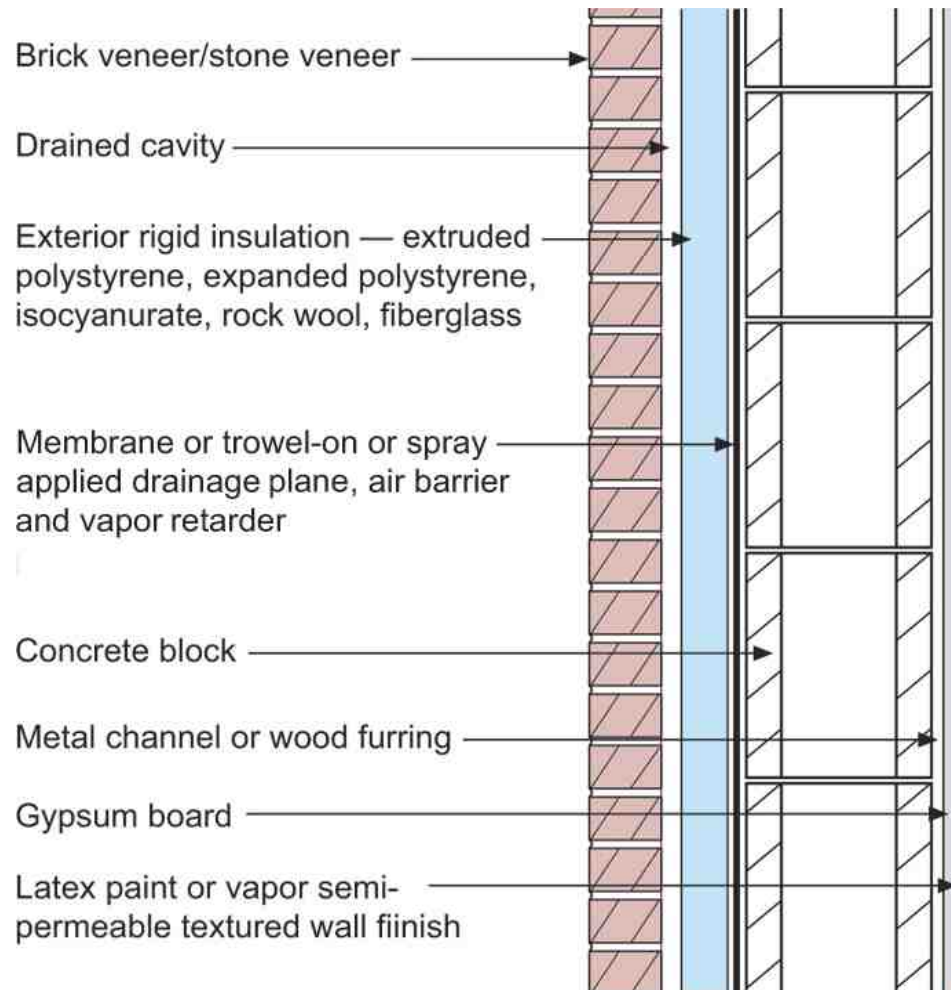


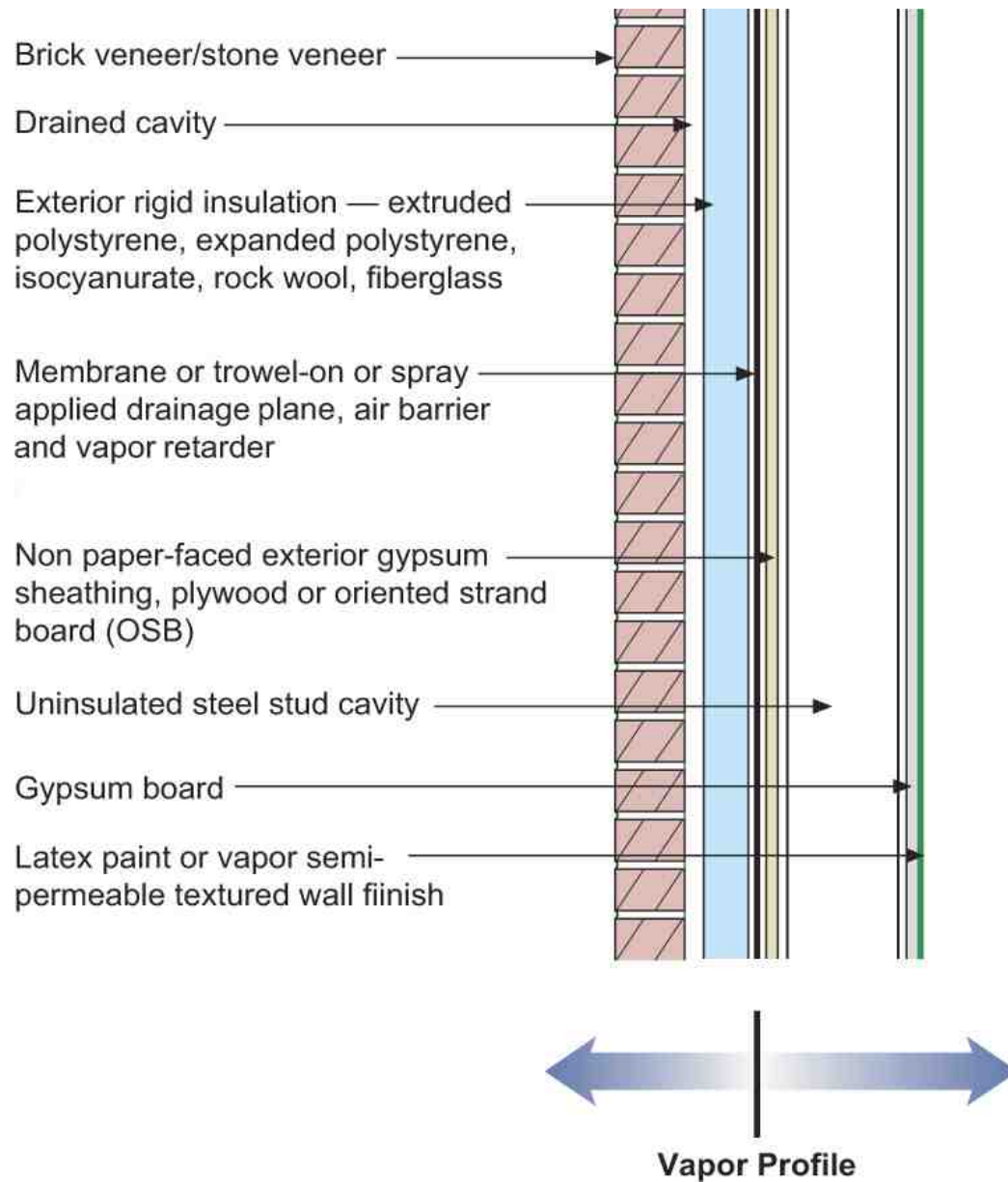


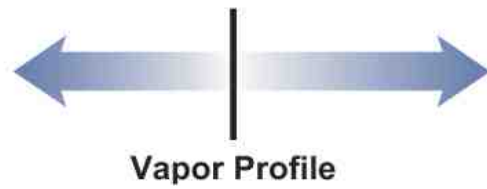
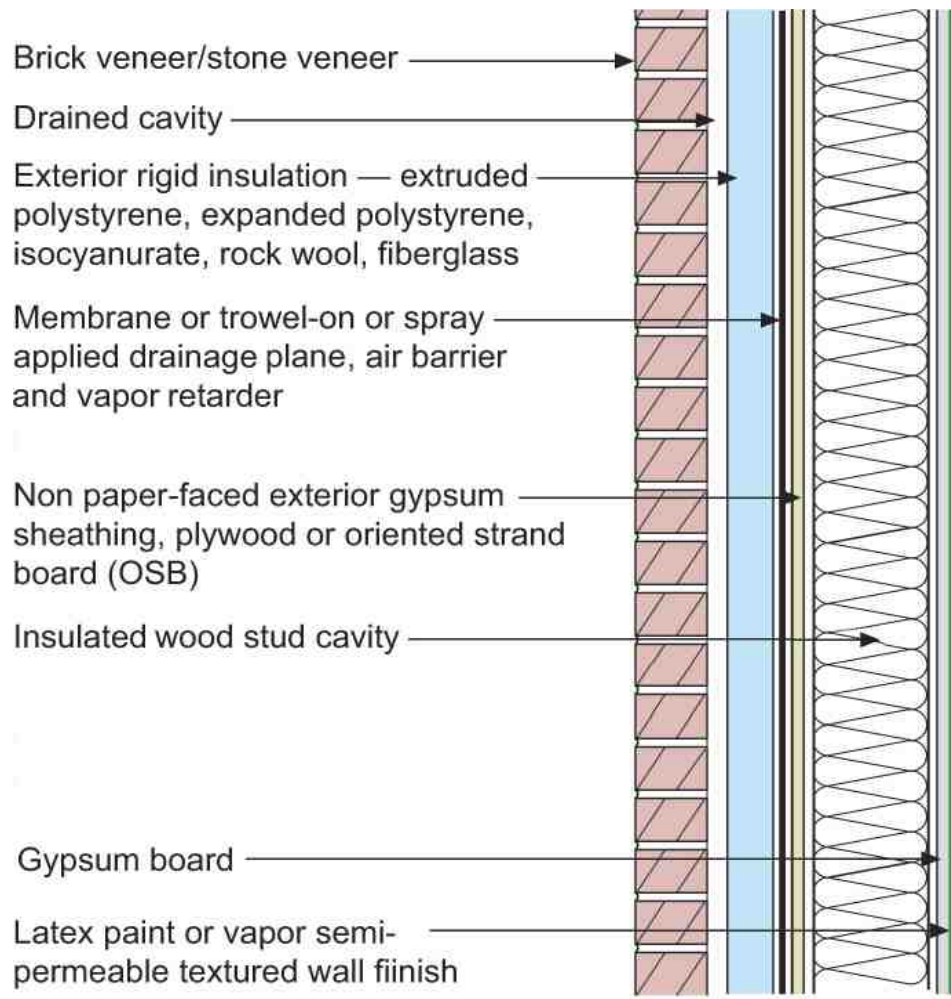






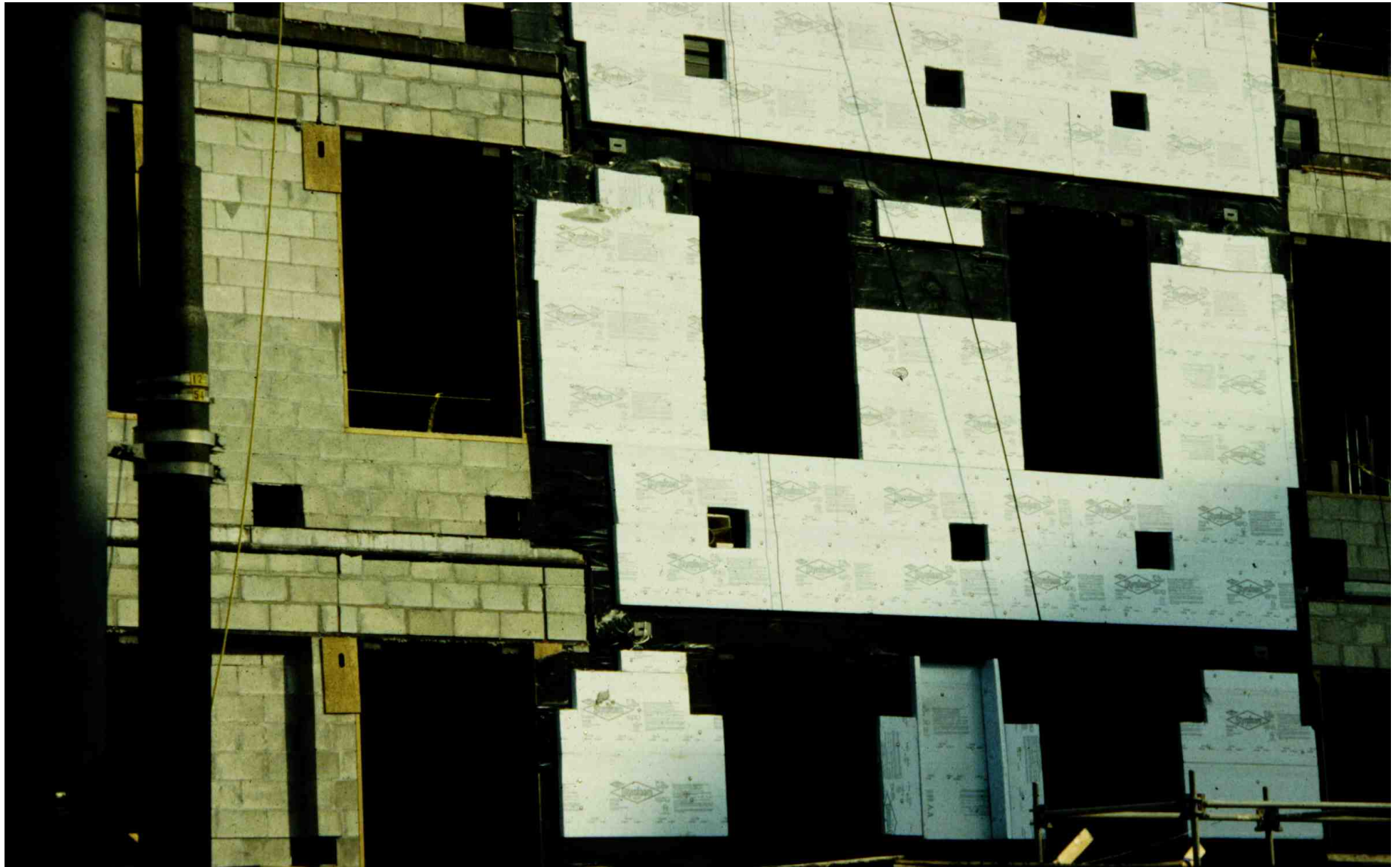












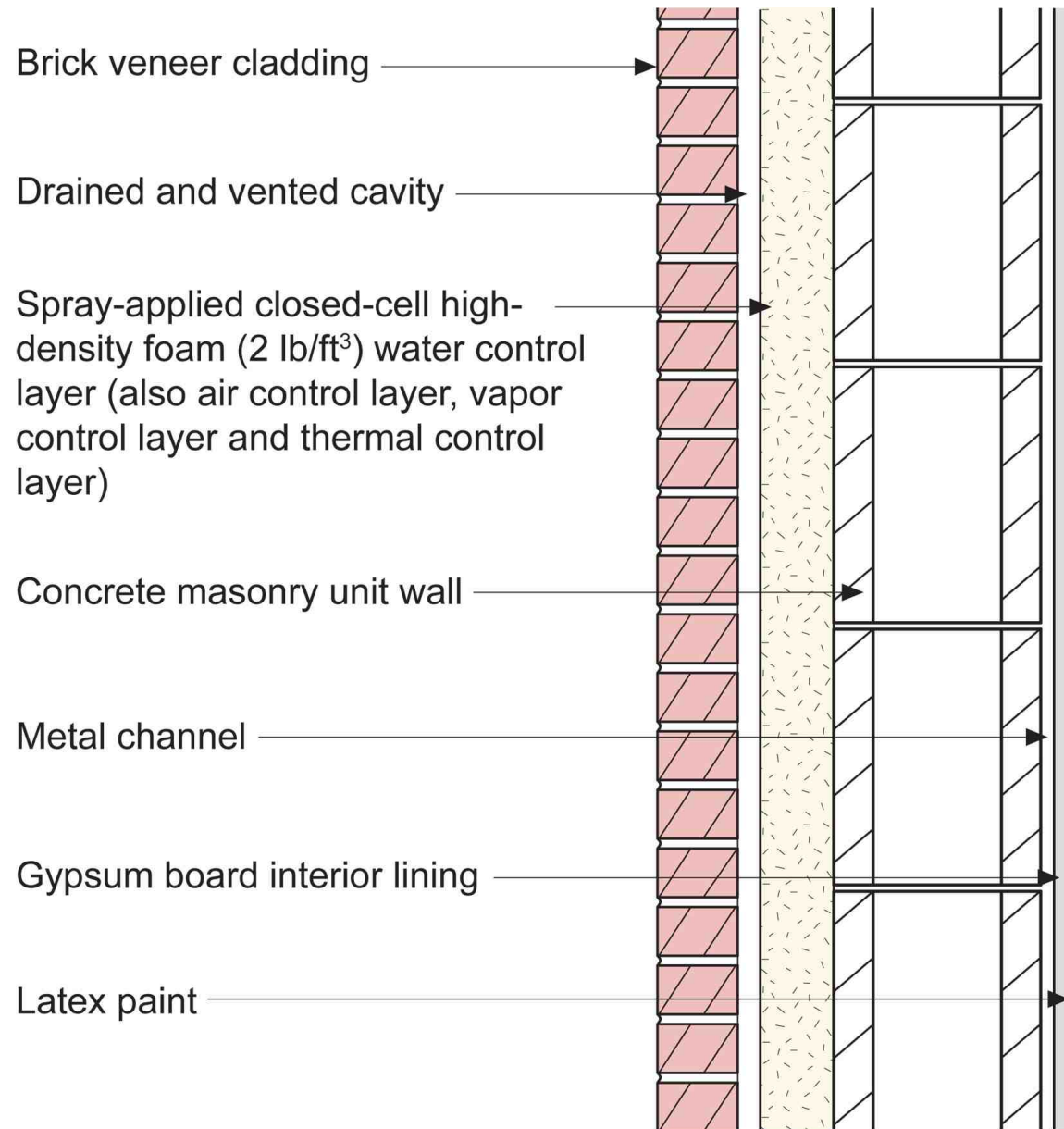


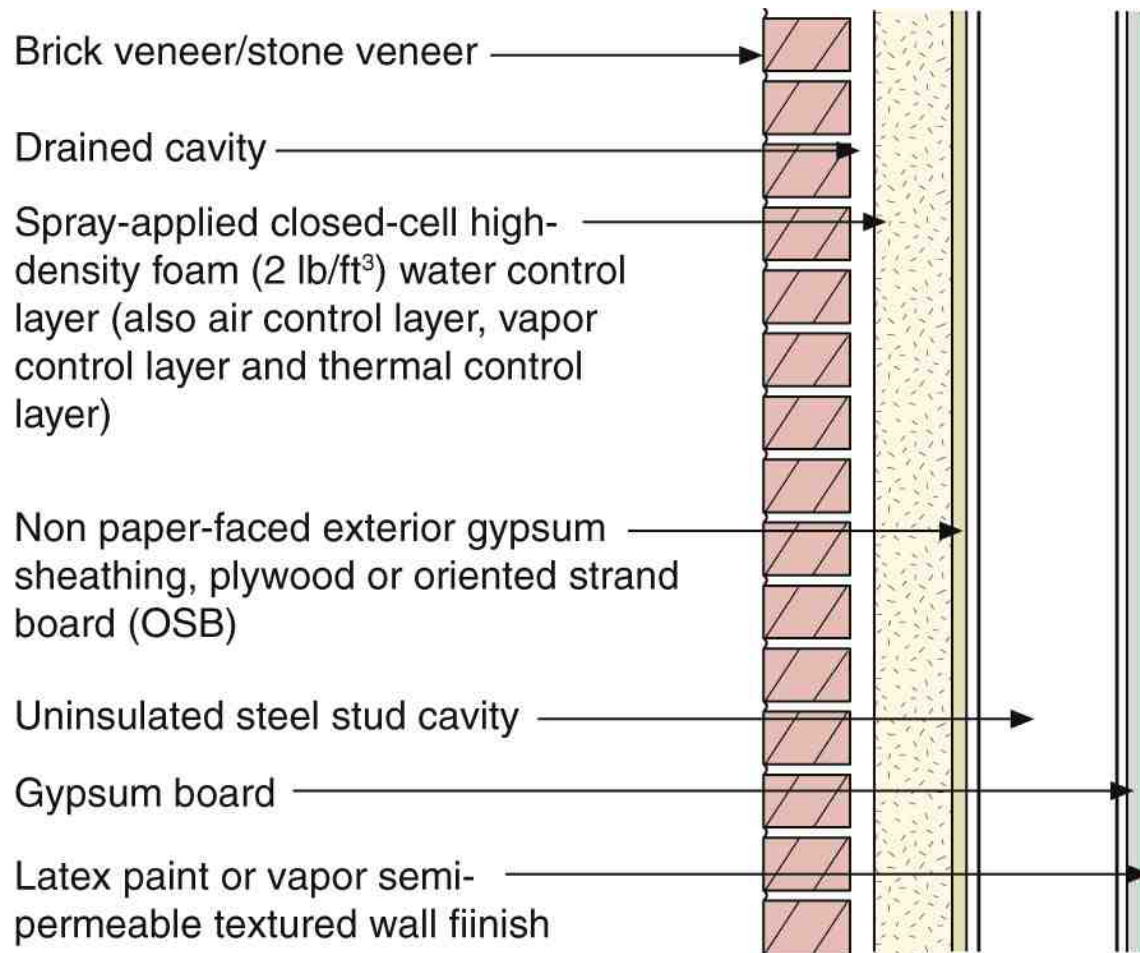


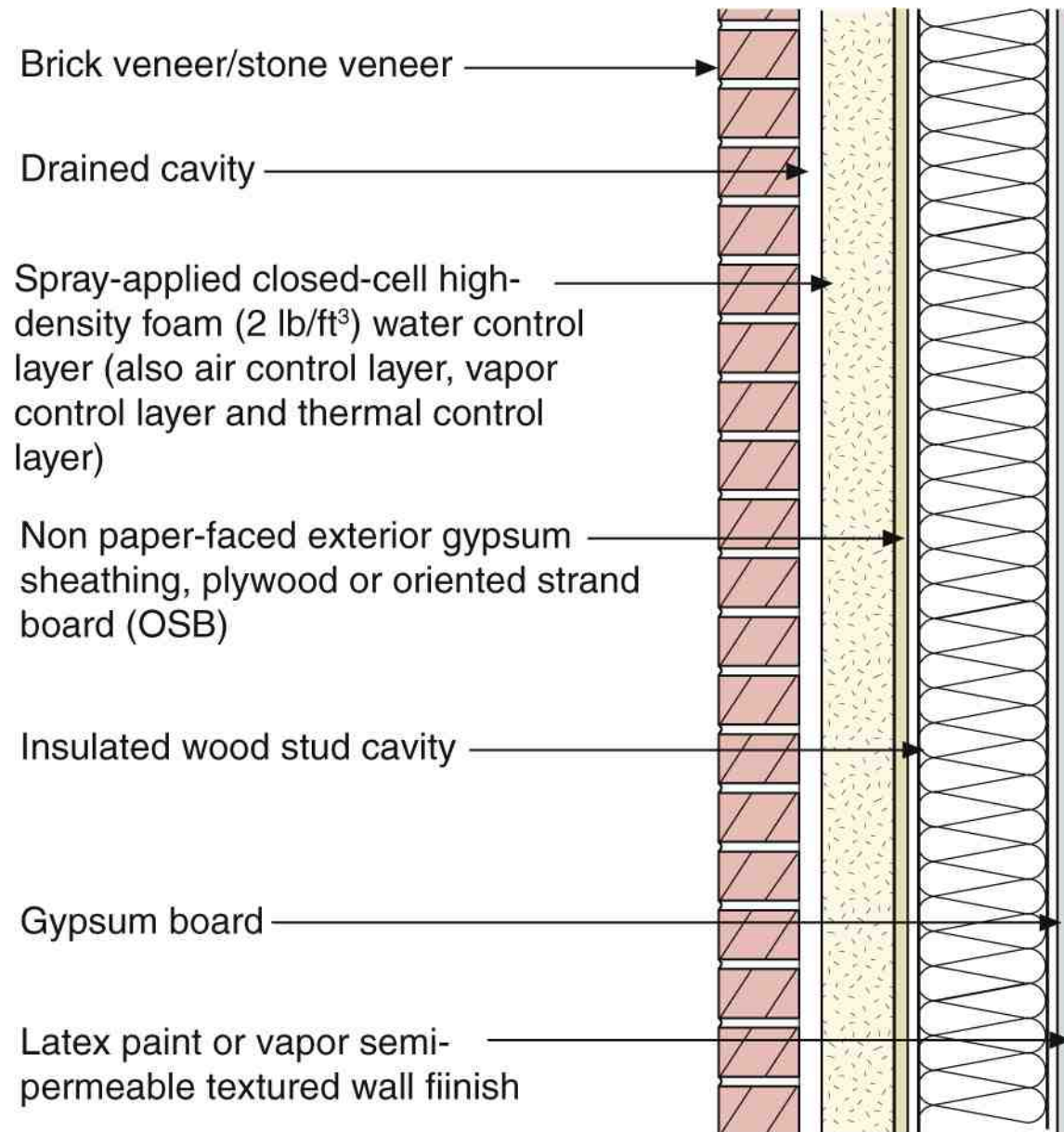


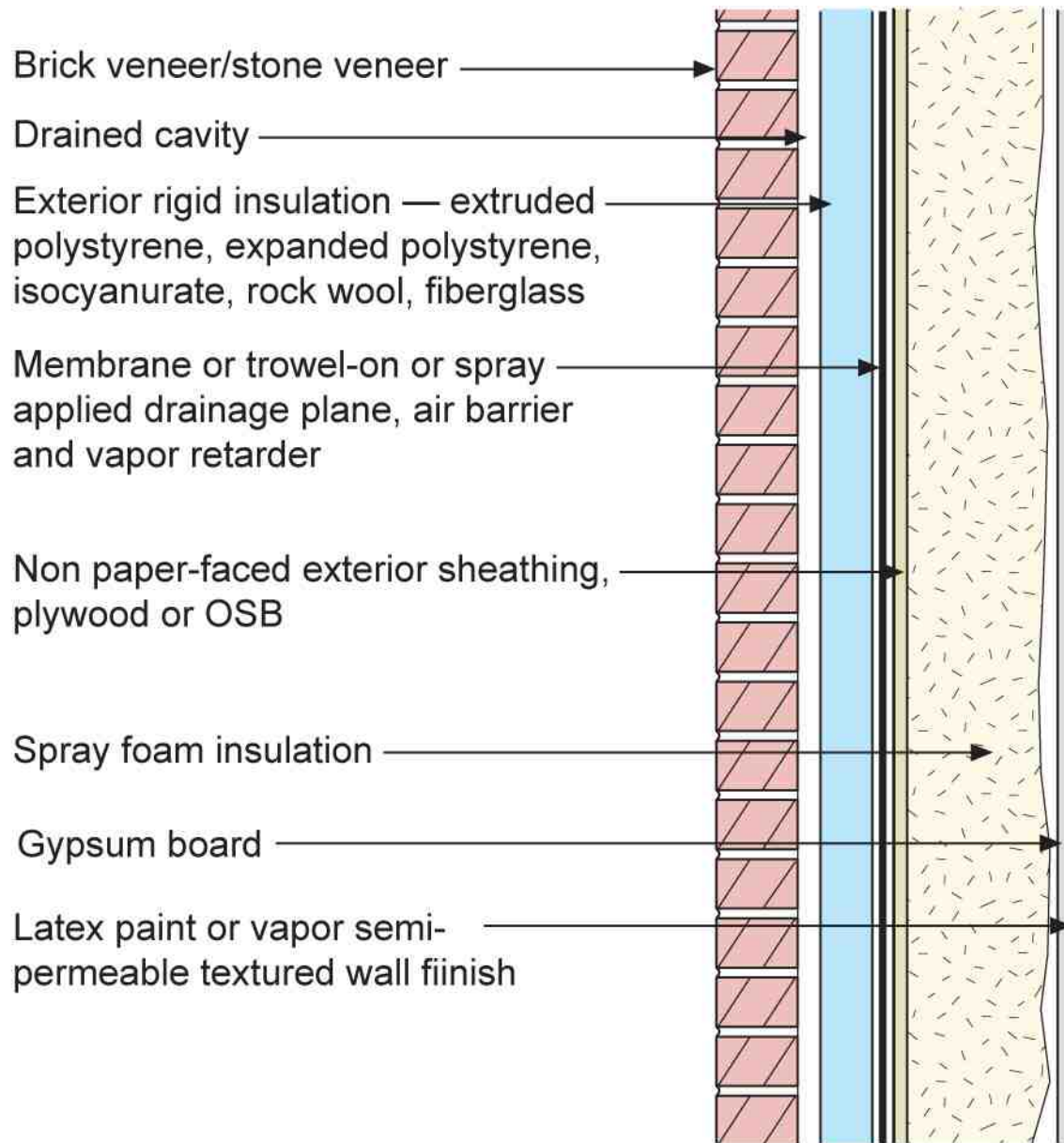




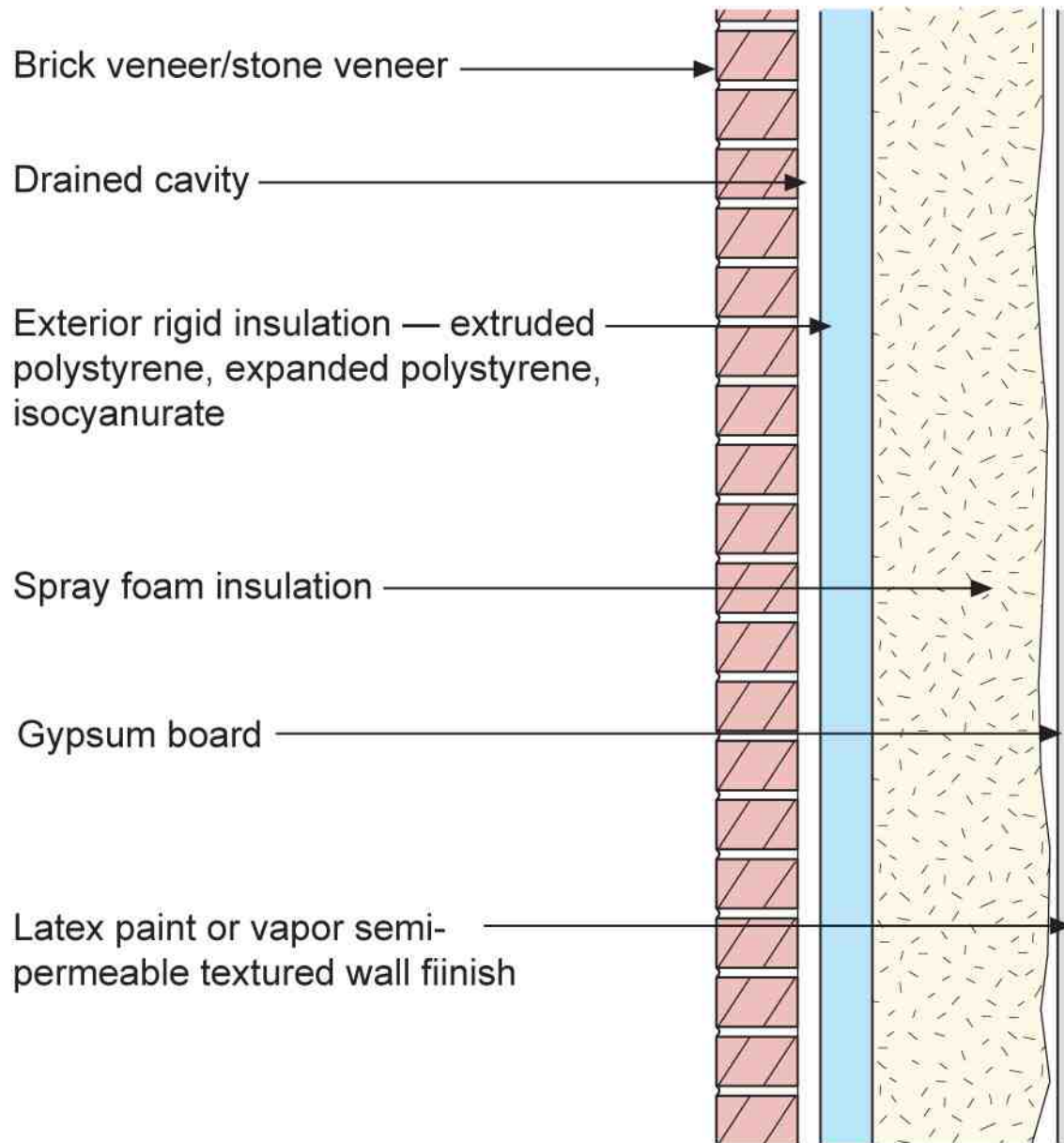


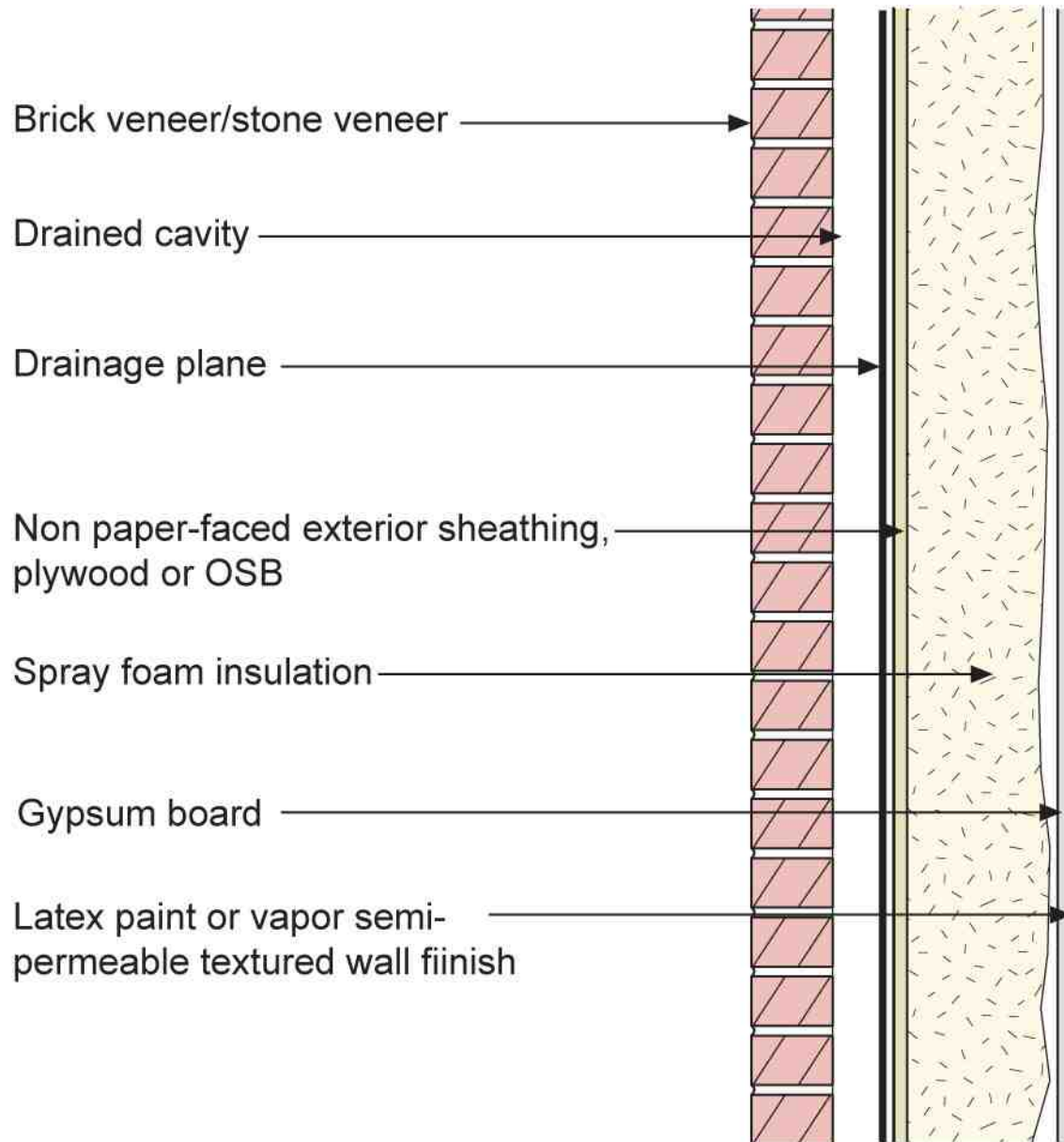


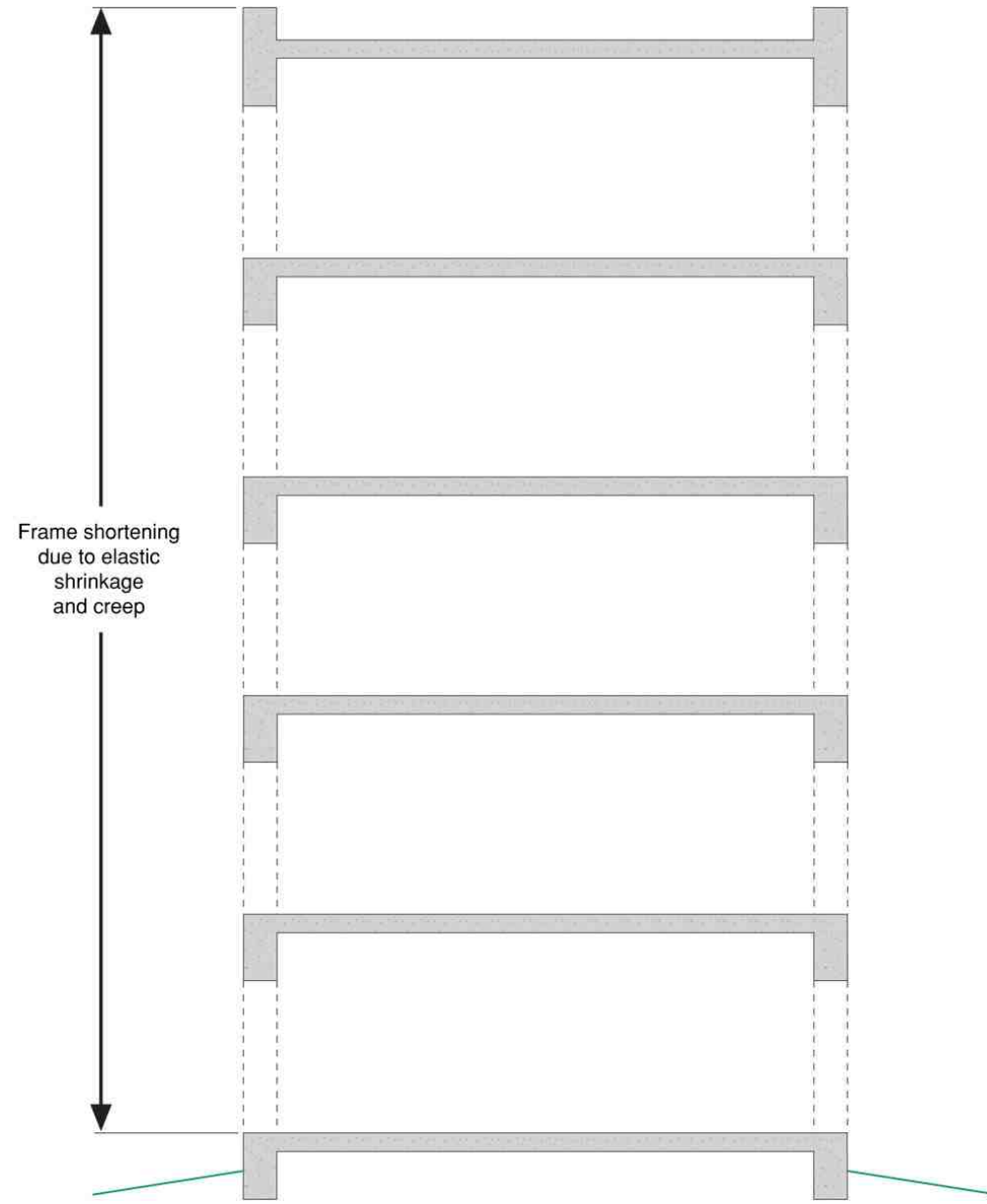




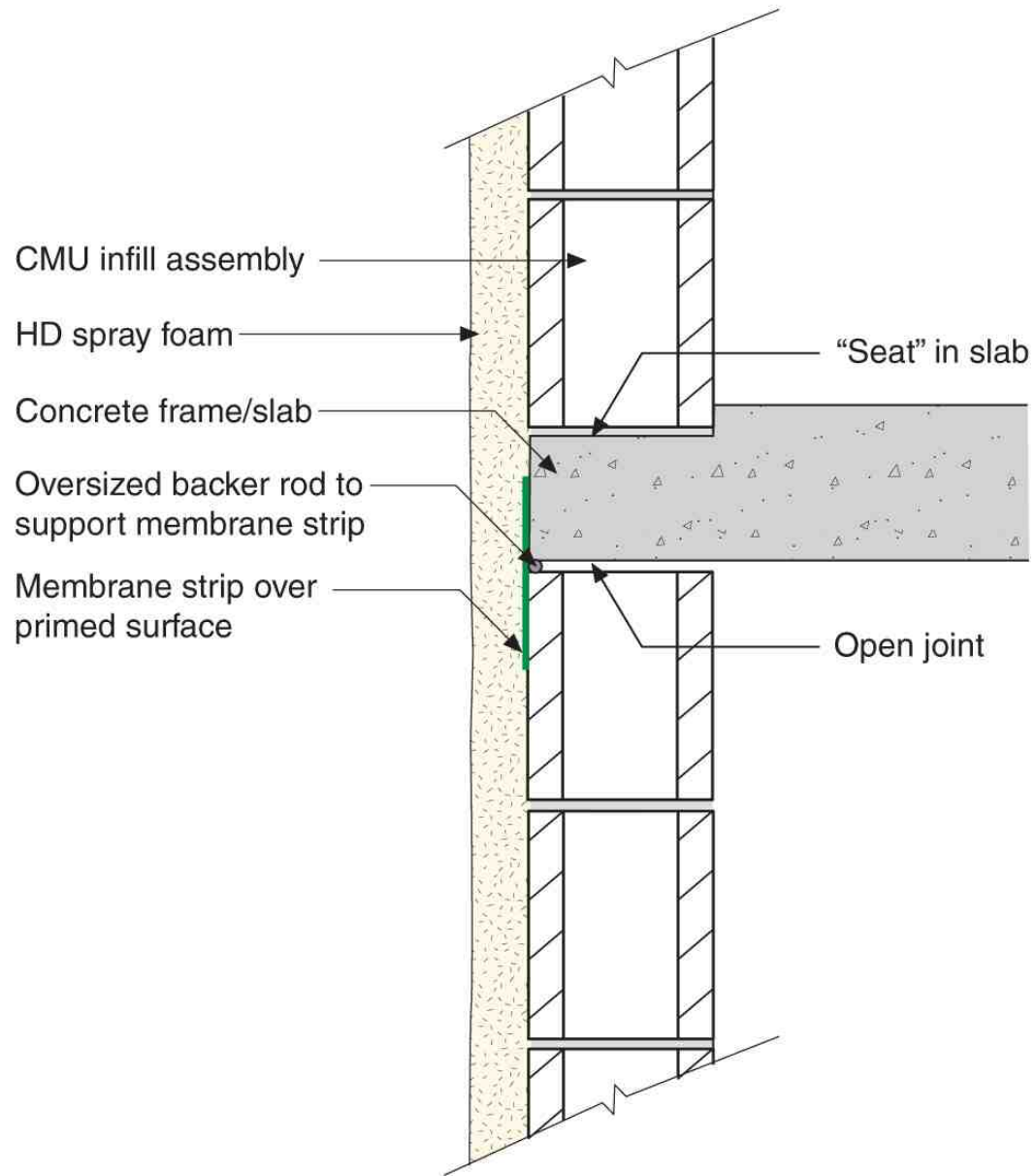


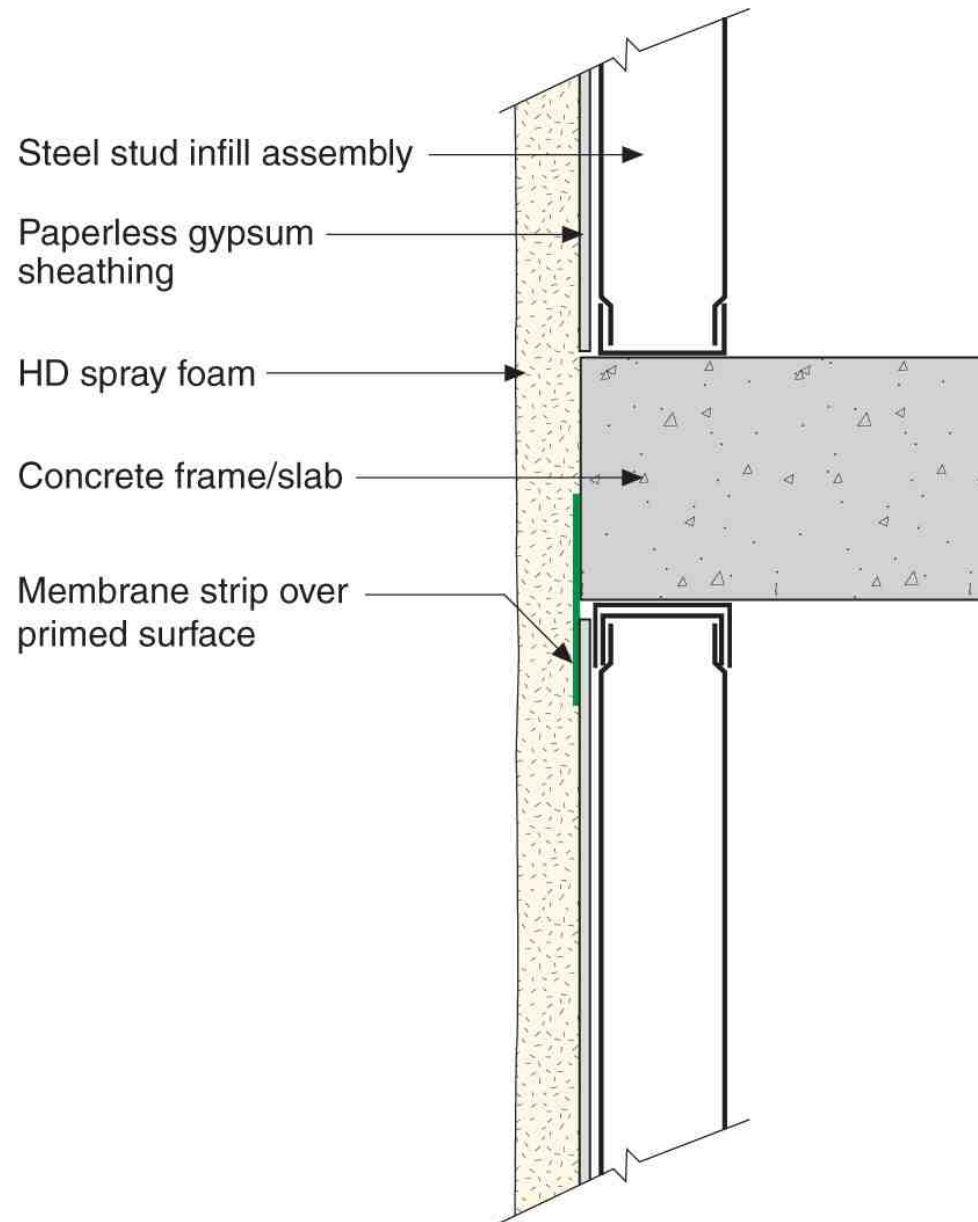


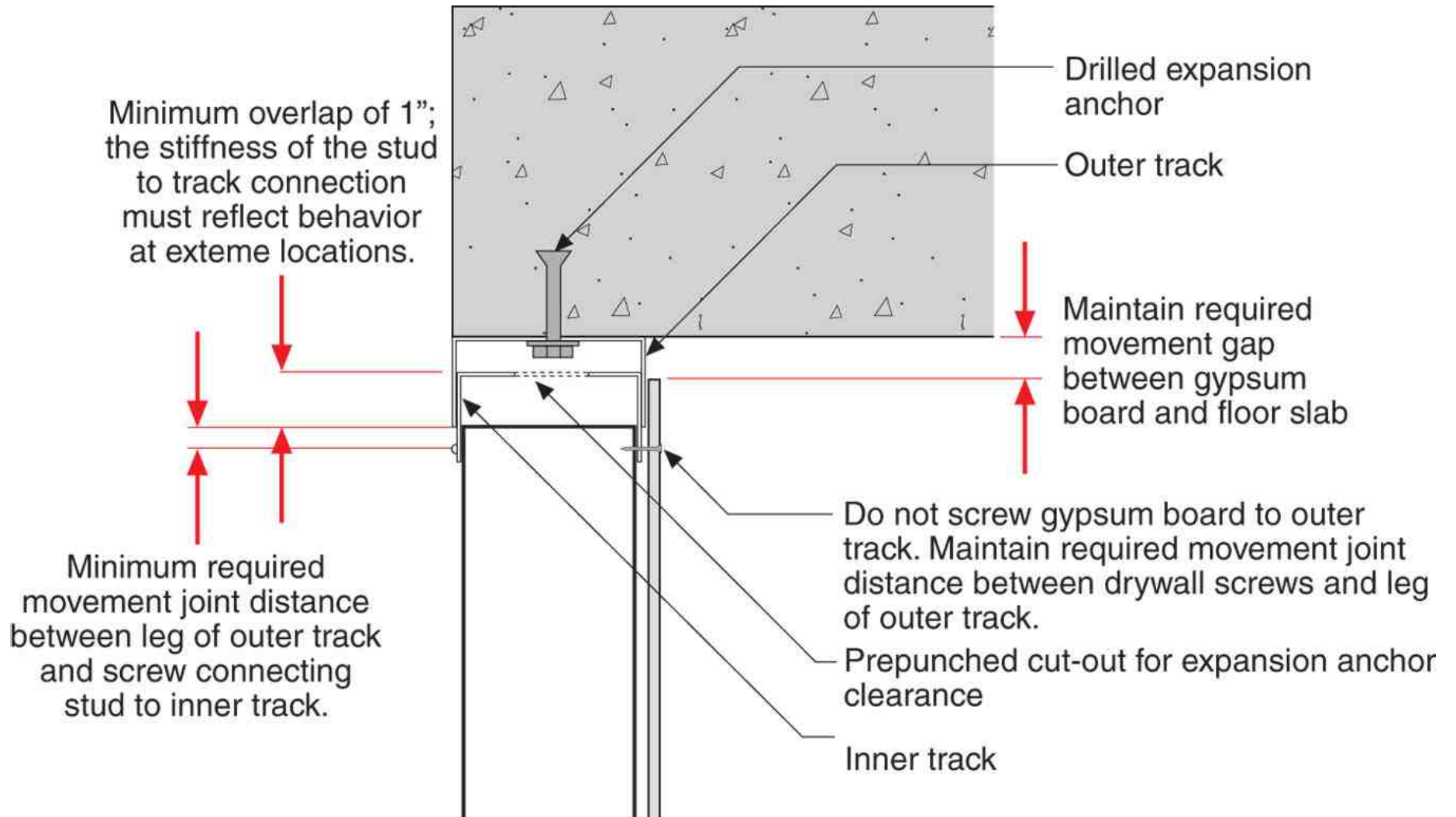








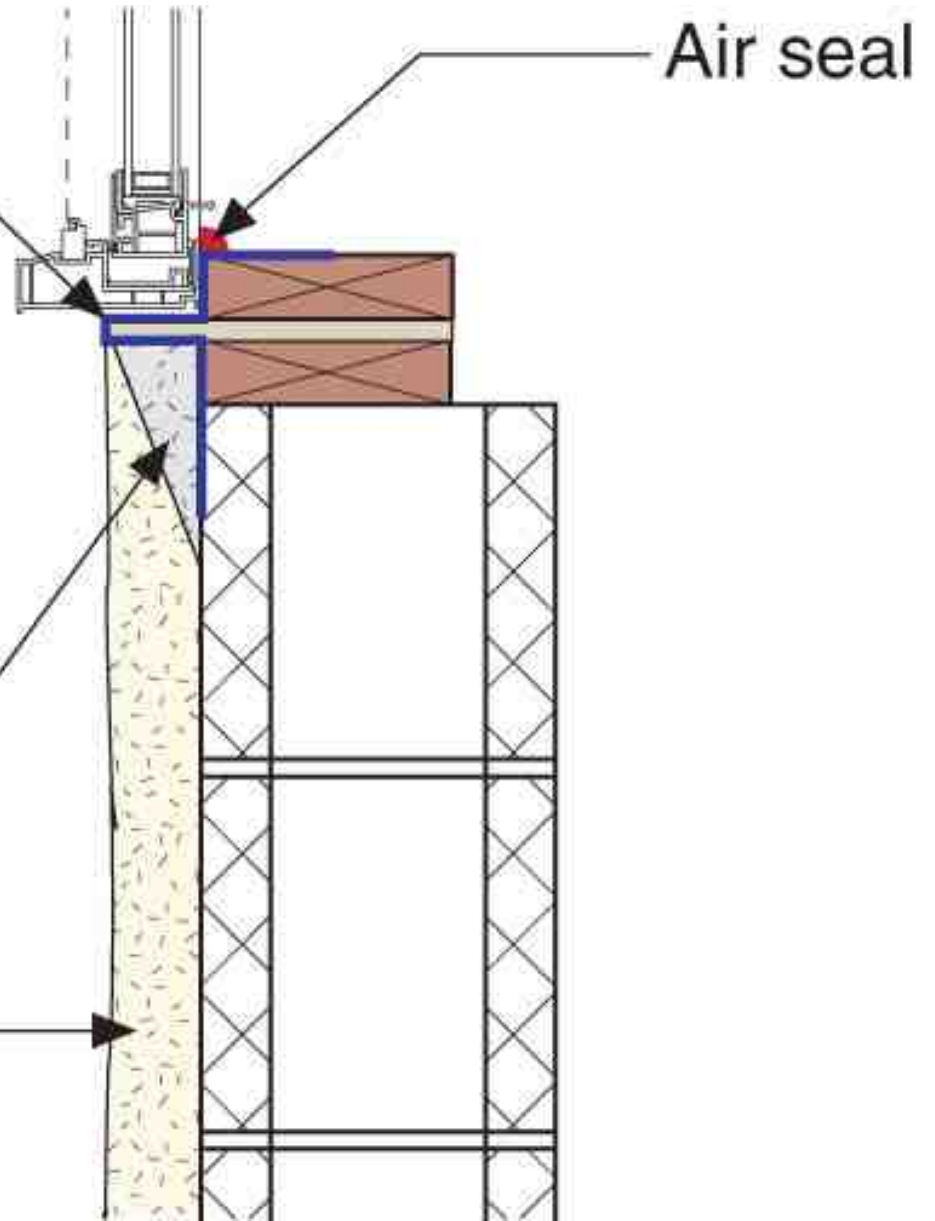




Liquid-applied membrane lining, sub-sill window flashing, air and water barrier transition membrane

HD spray foam "filet" to be applied before rest of foam

HD spray foam



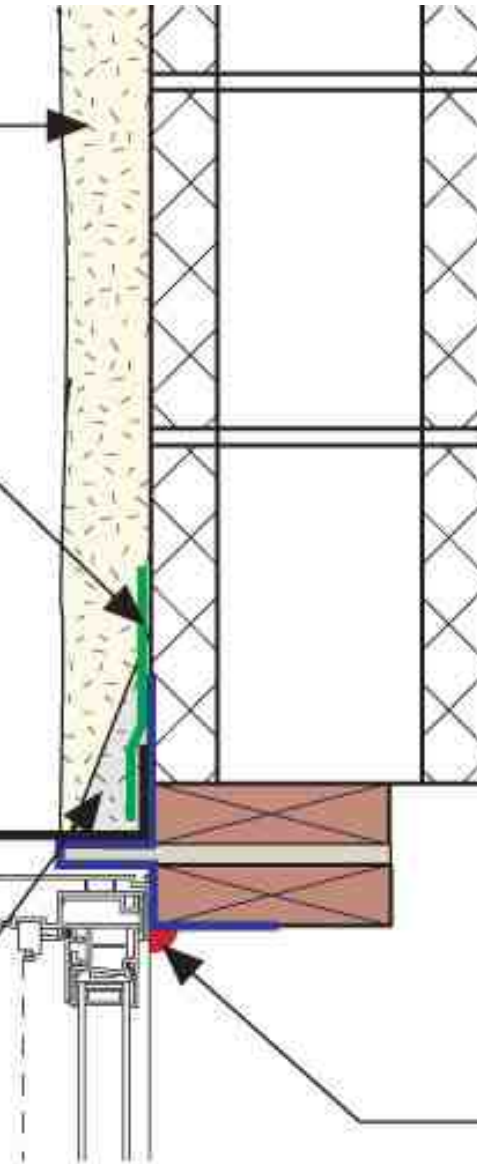
HD spray foam

Liquid-applied  
membrane lining,  
window flashing,  
air and water barrier  
transition membrane

Flashing

HD spray foam "filet"  
to be applied before  
rest of foam

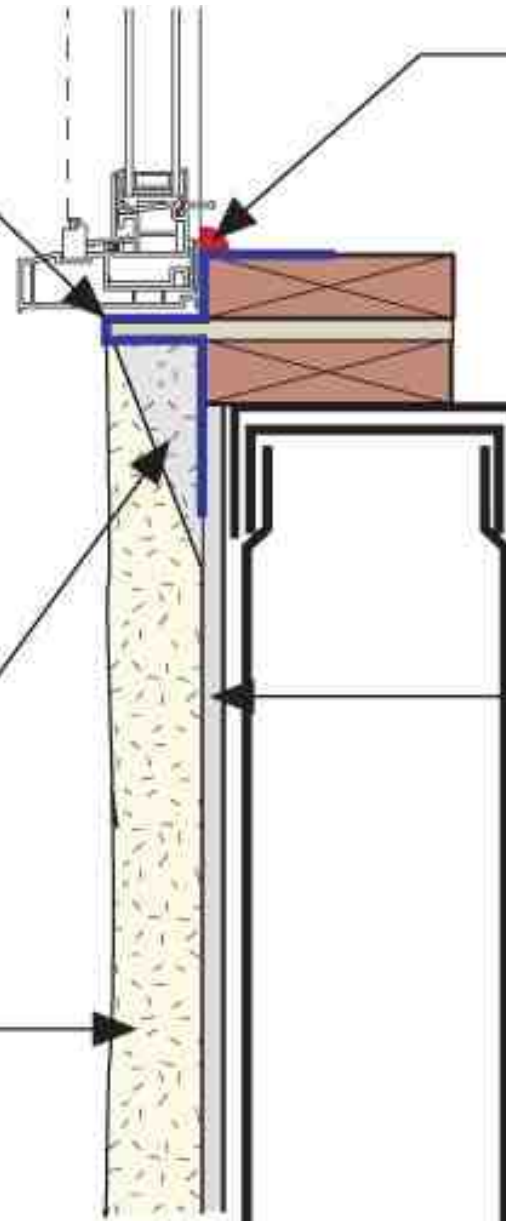
Air seal



Liquid-applied membrane lining, sub-sill window flashing, air and water barrier transition membrane

HD spray foam "filet" to be applied before rest of foam

HD spray foam



Air seal

Paperless gypsum sheathing



HD spray foam

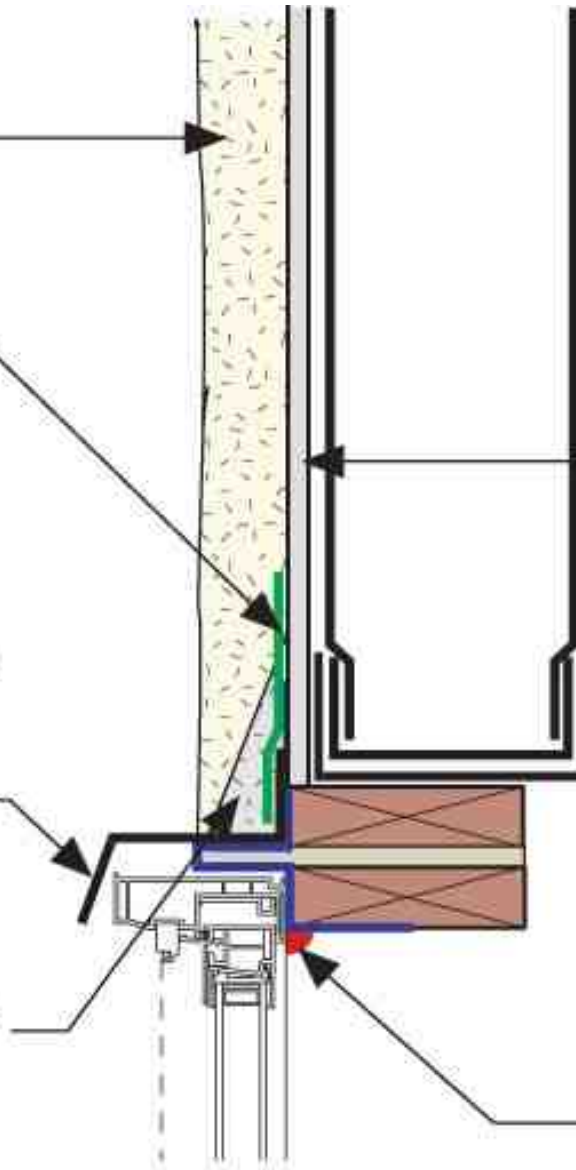
Liquid-applied  
membrane lining,  
window flashing,  
air and water barrier  
transition membrane

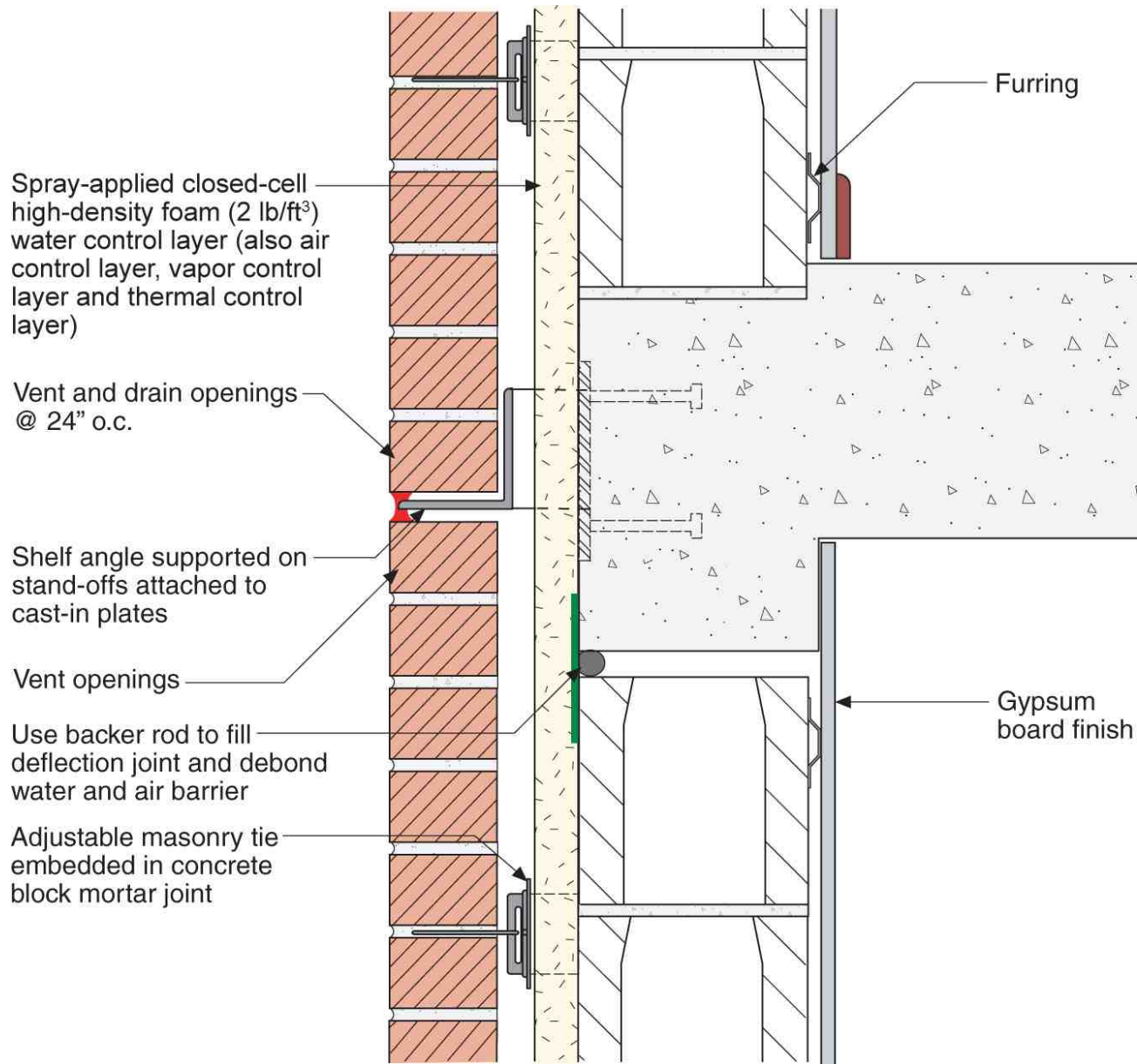
Flashing

HD spray foam "filet"  
to be applied before  
rest of foam

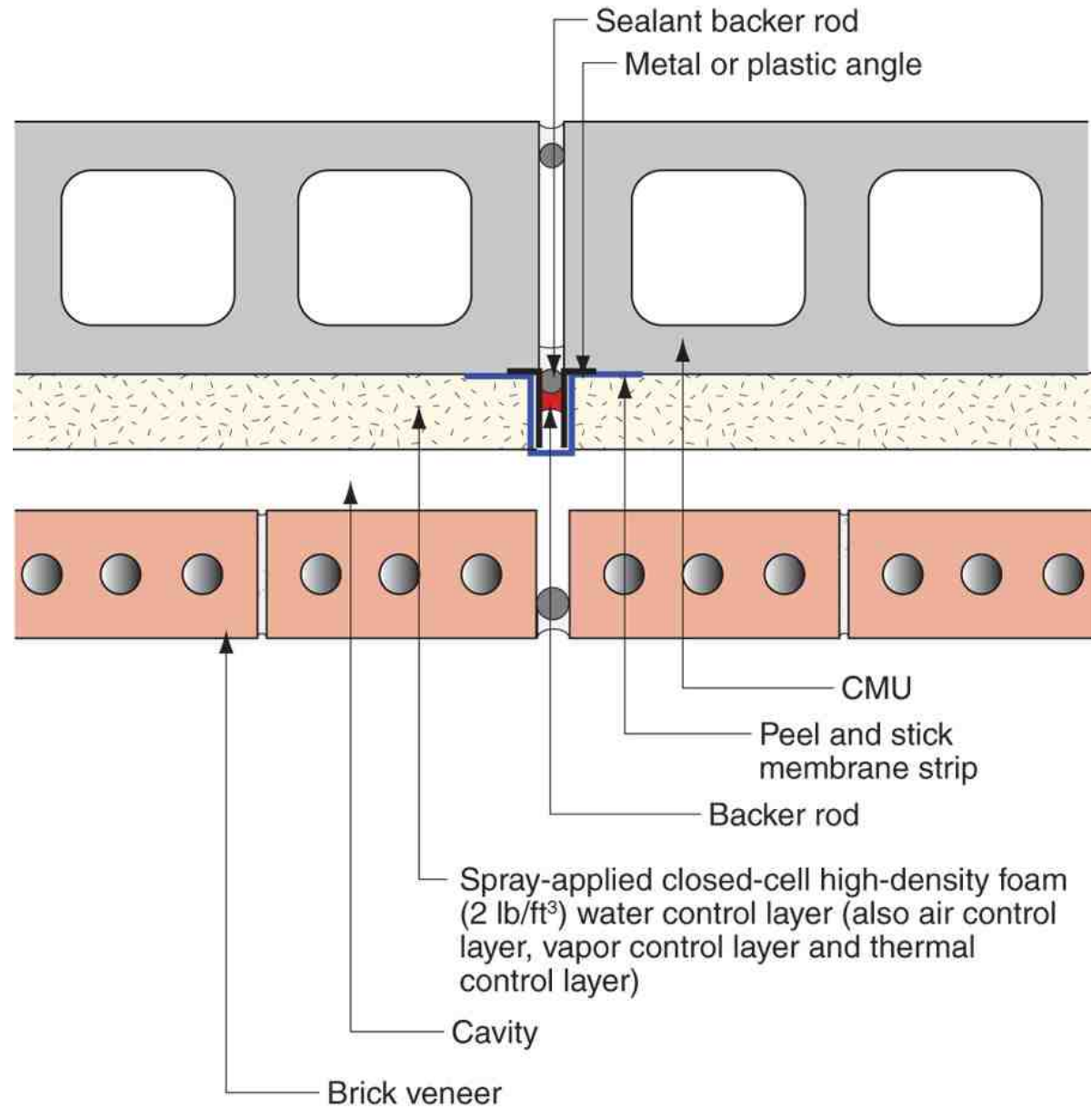
Paperless  
gypsum  
sheathing

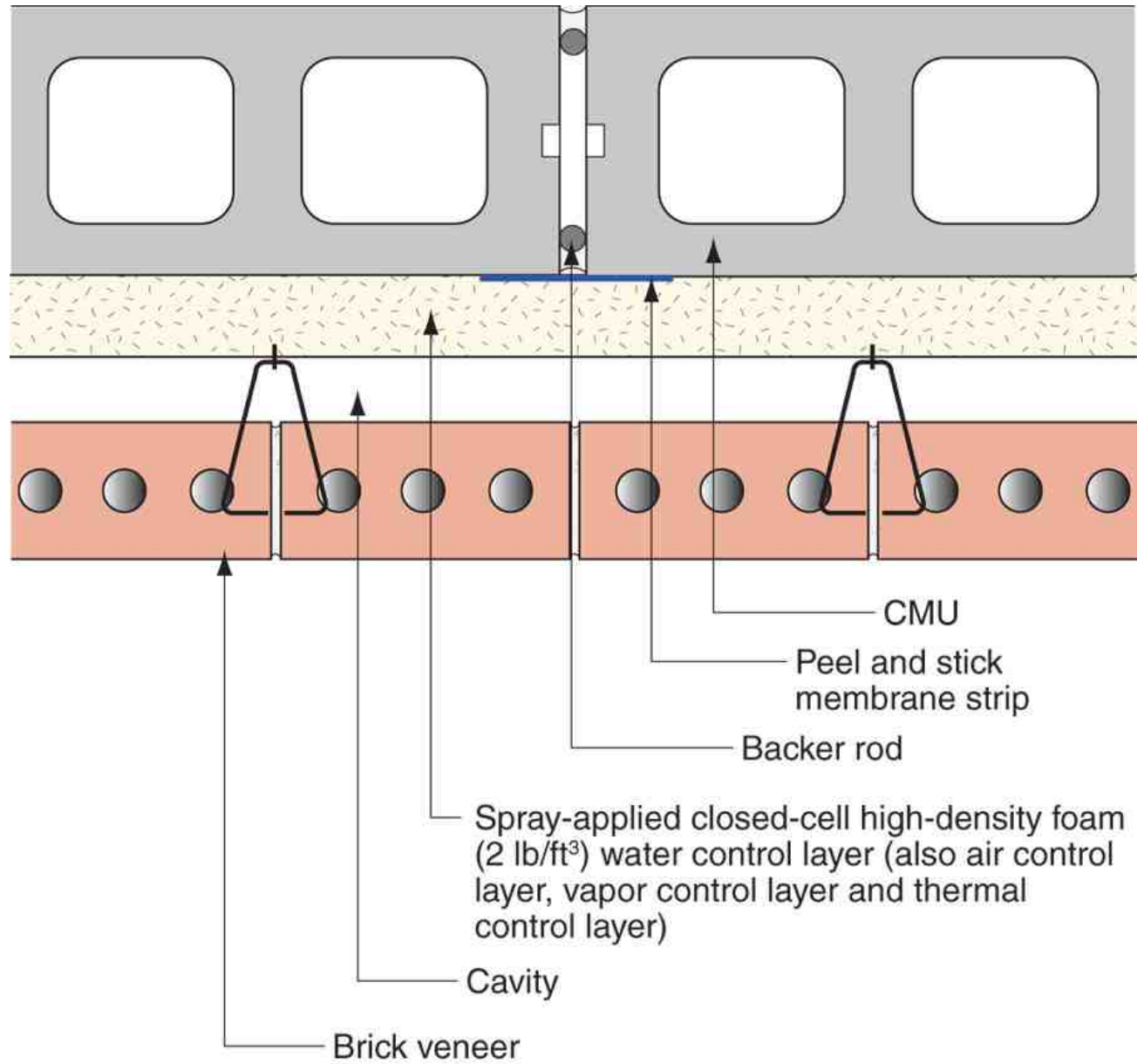
Air seal

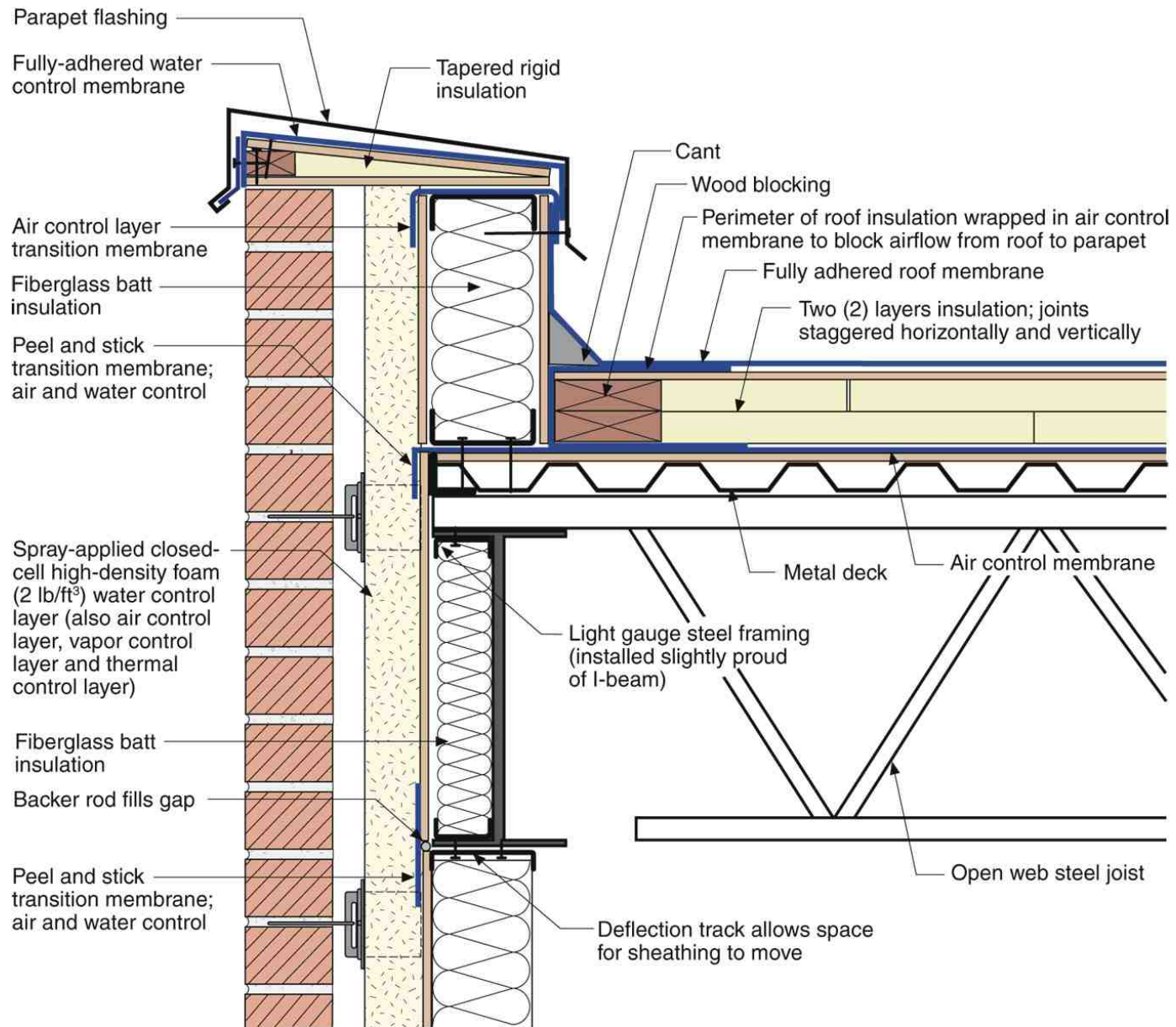


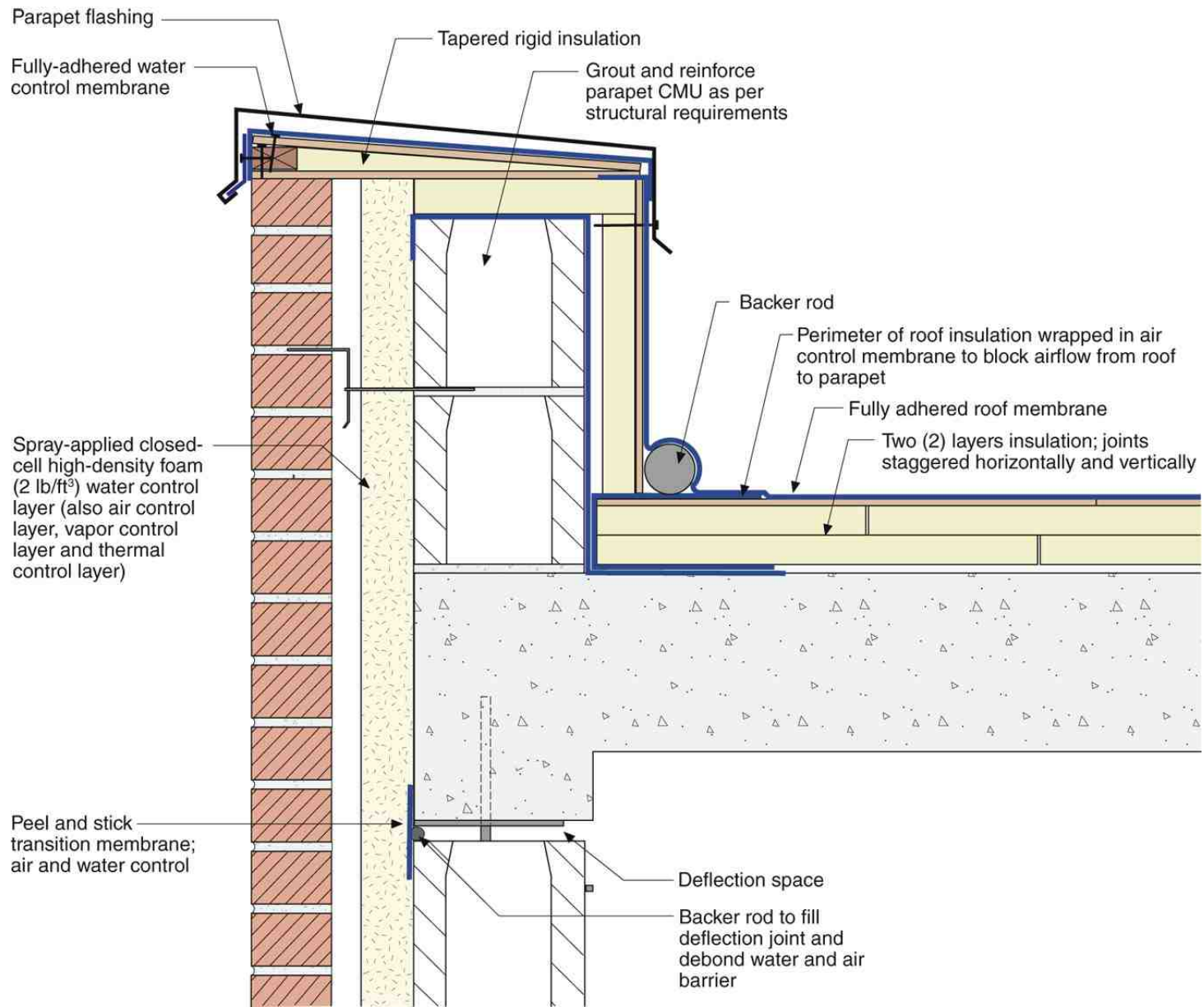


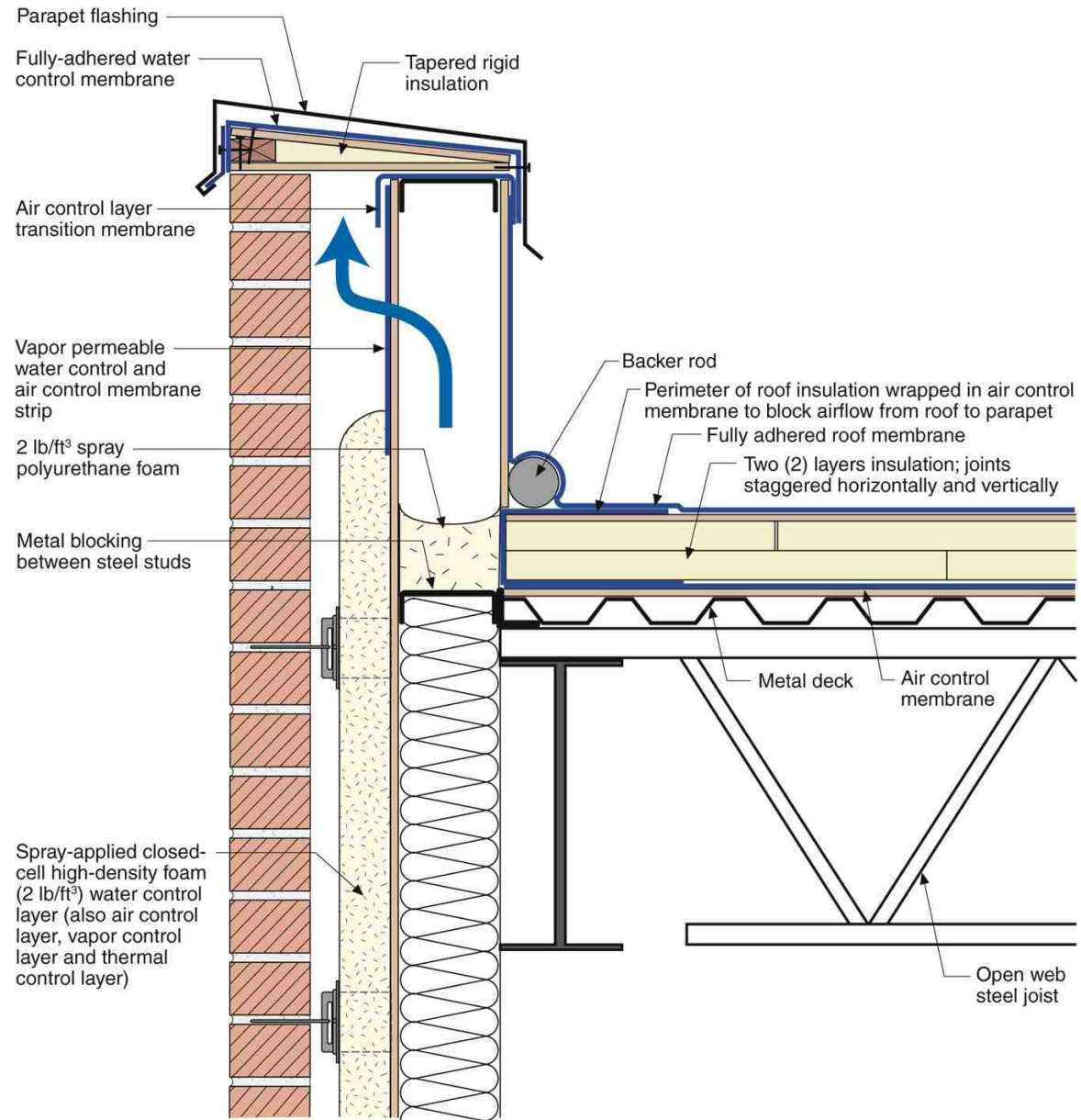




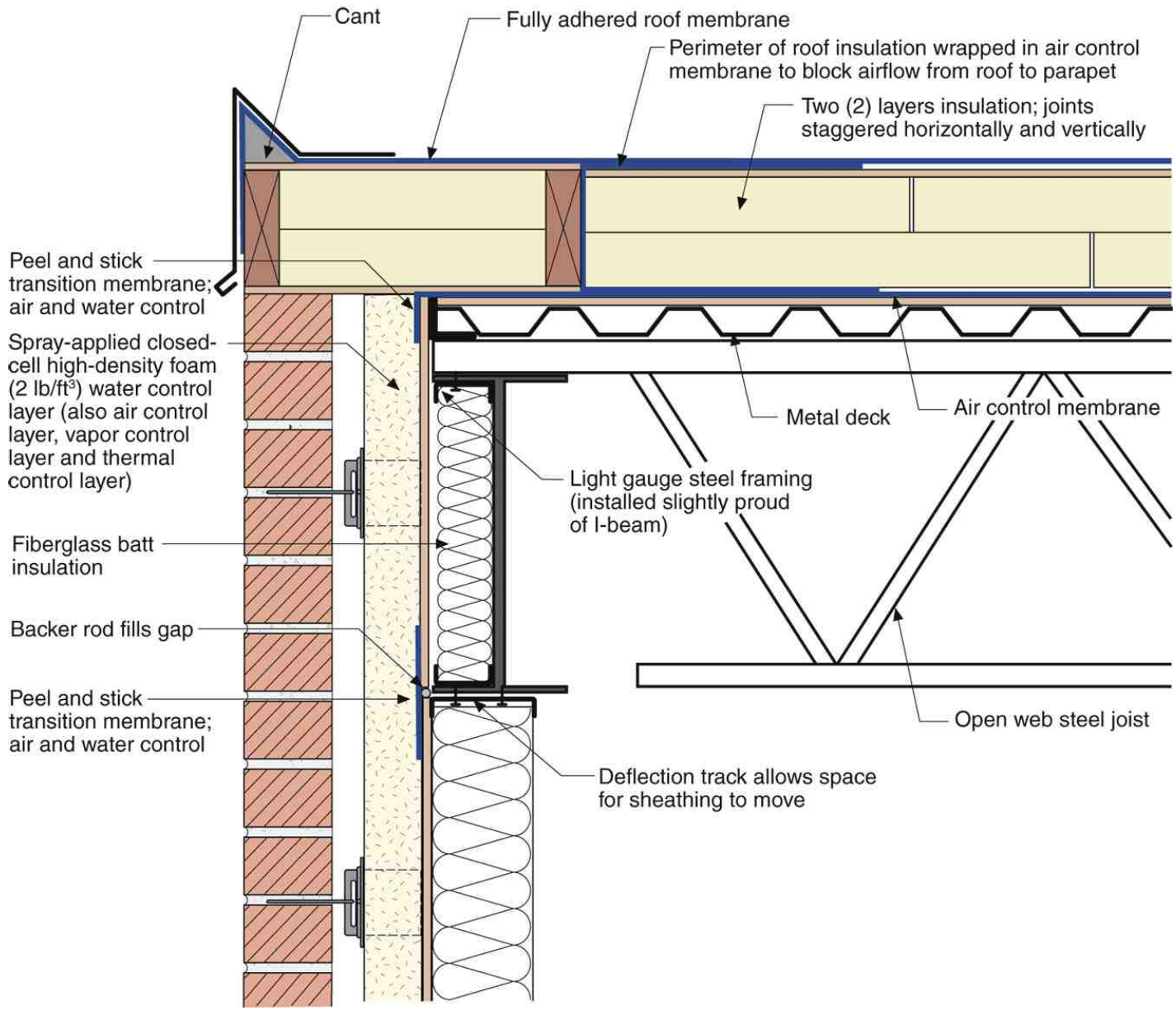




































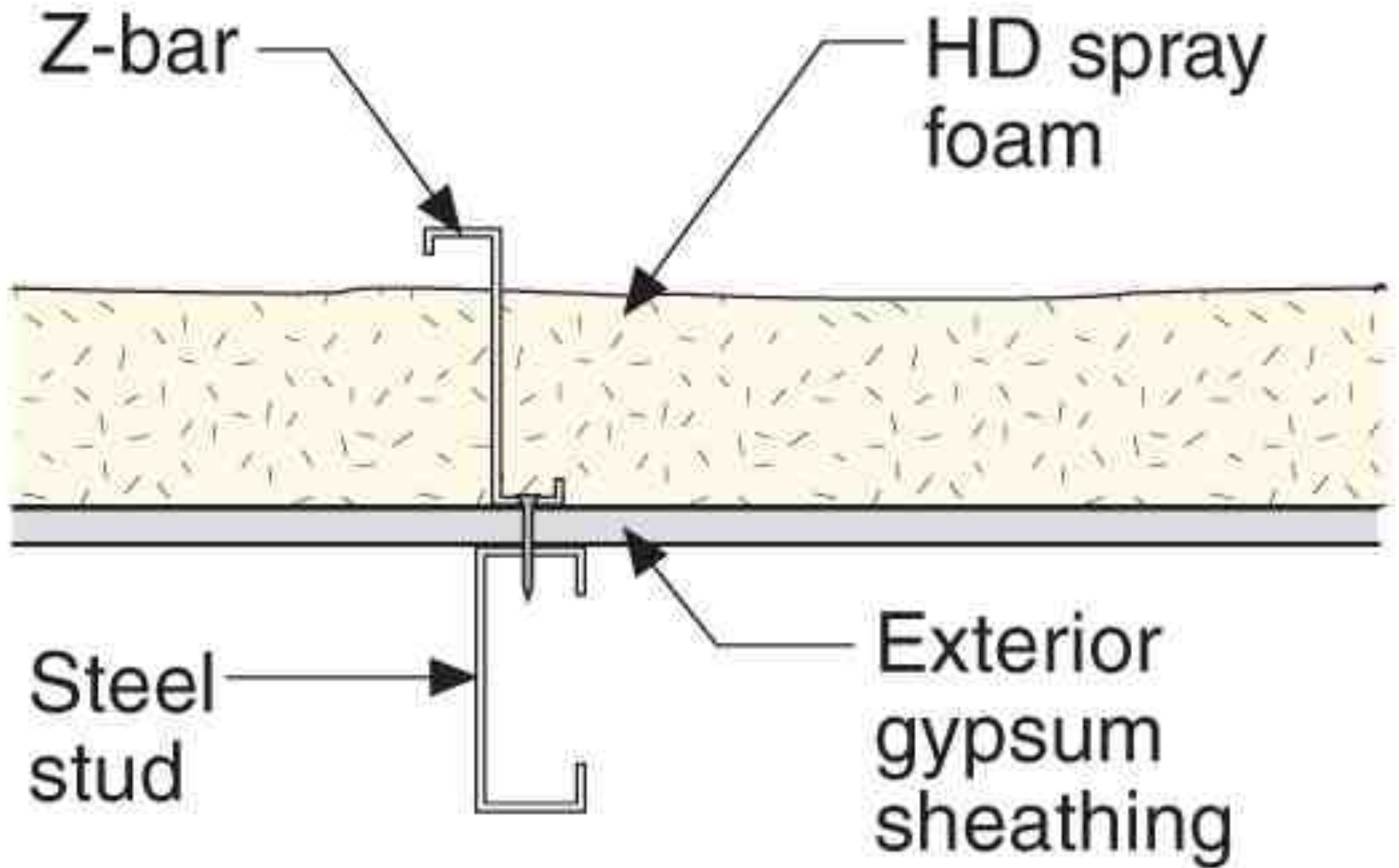


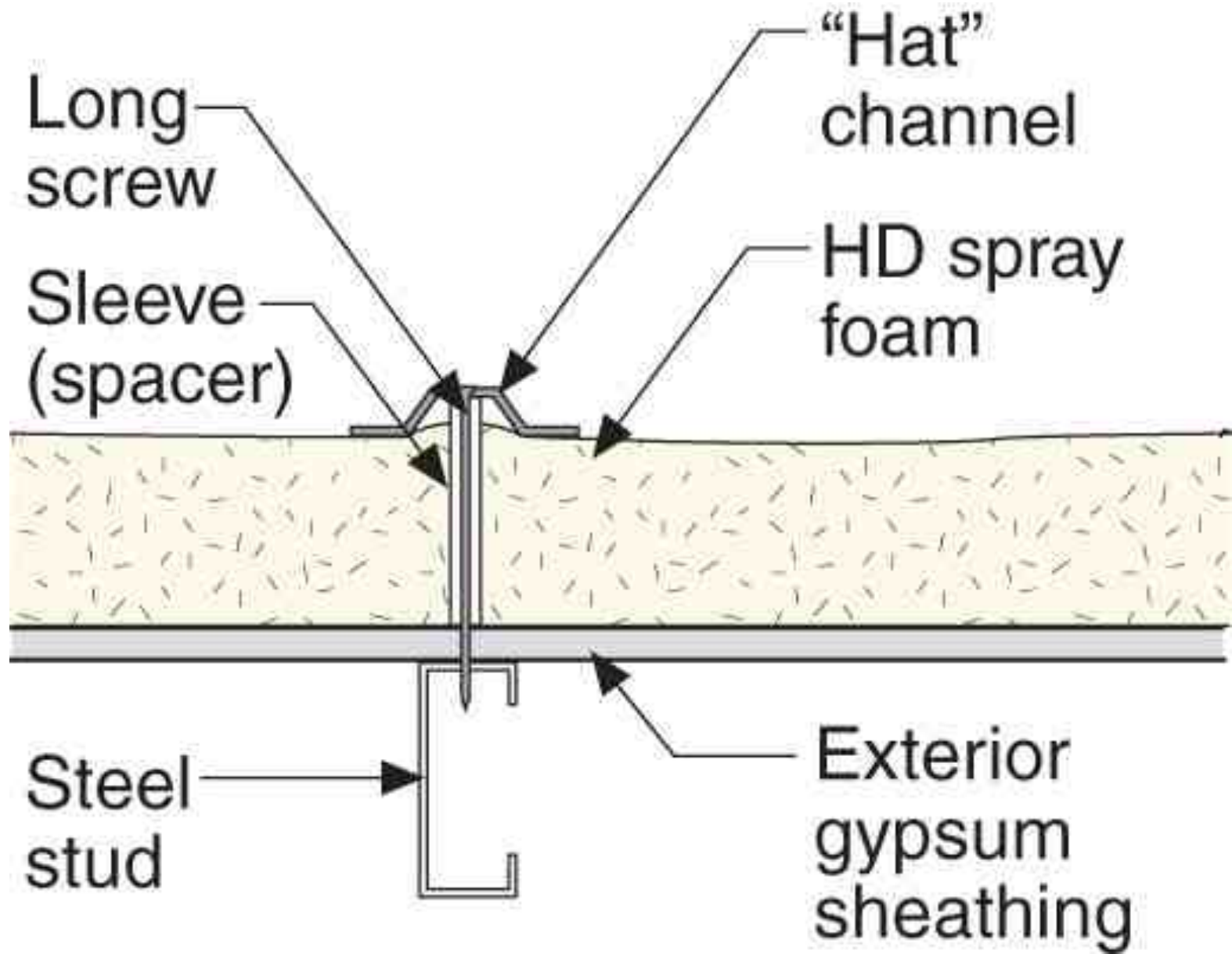


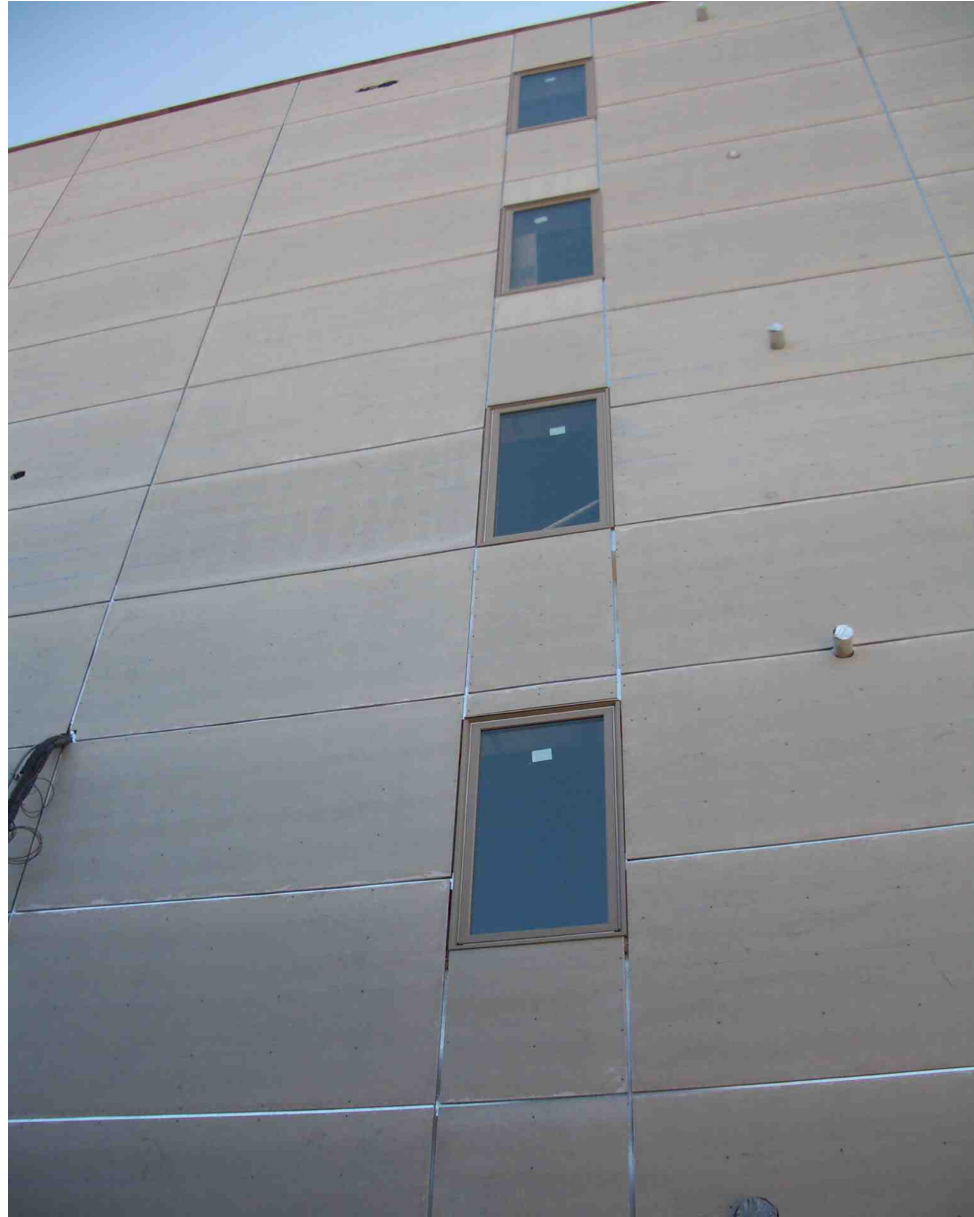






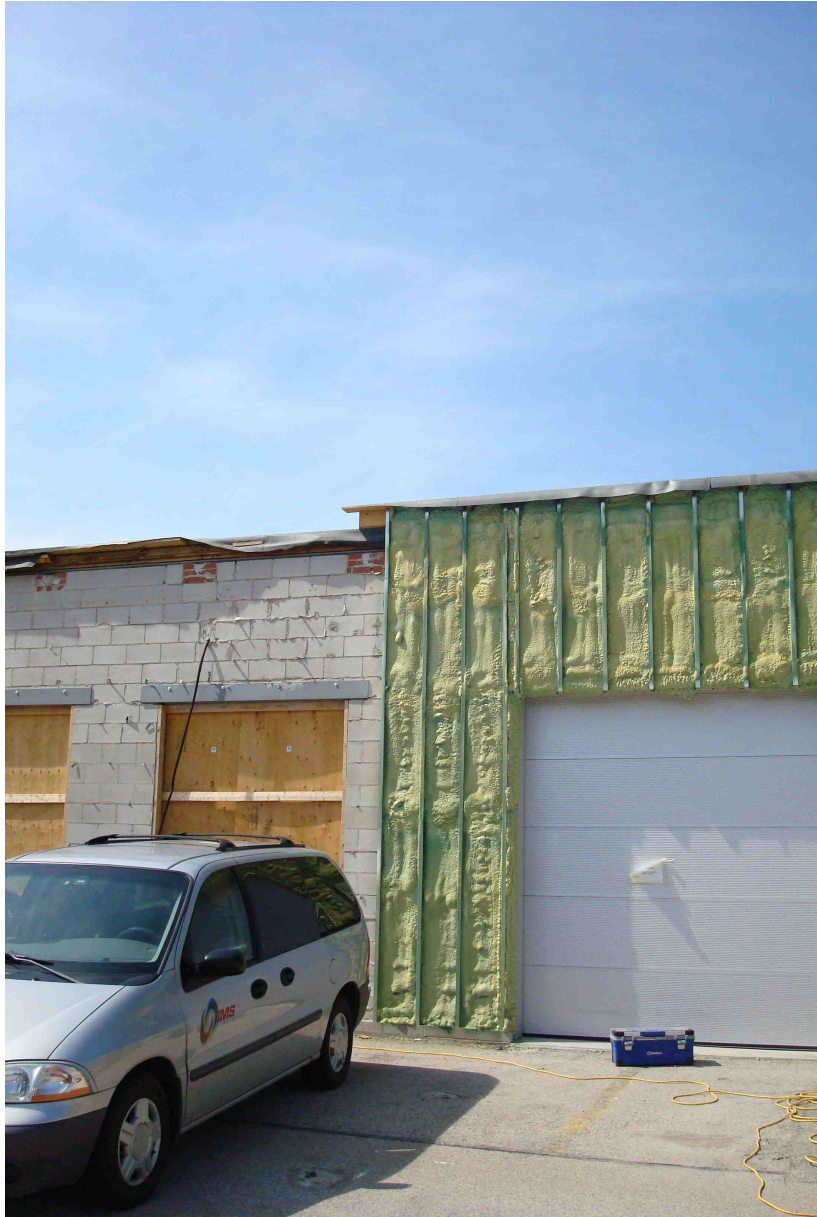






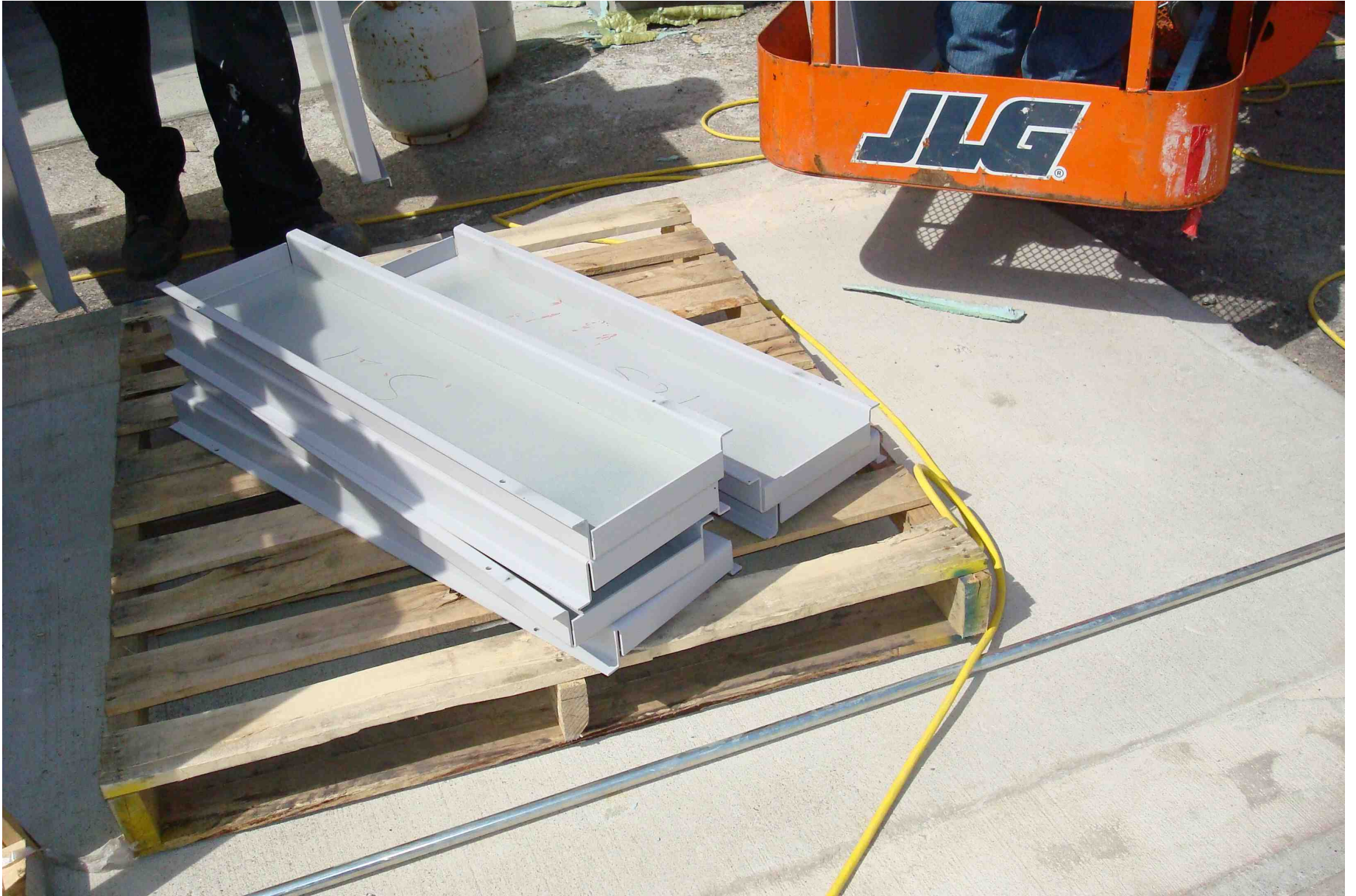








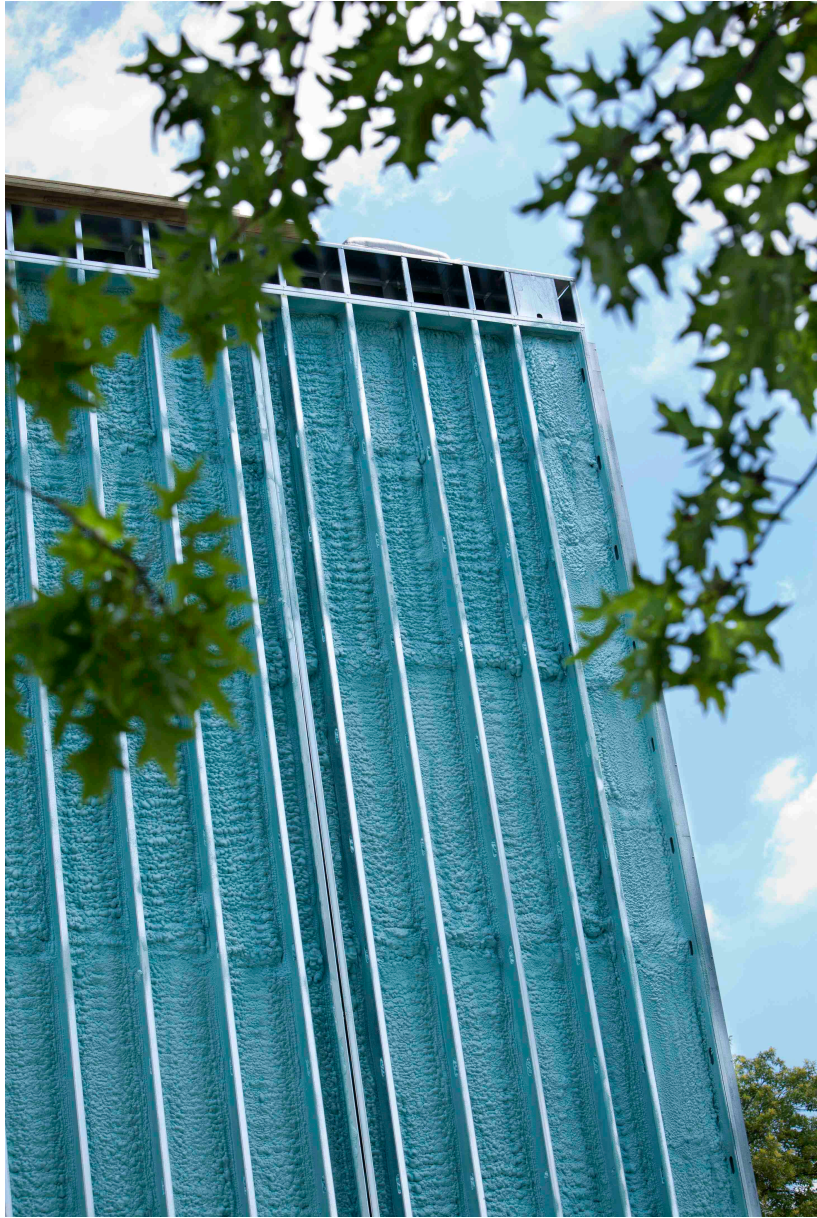




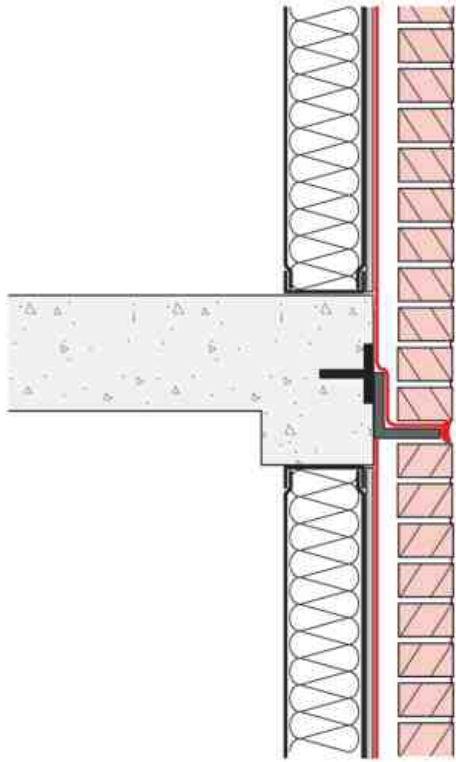




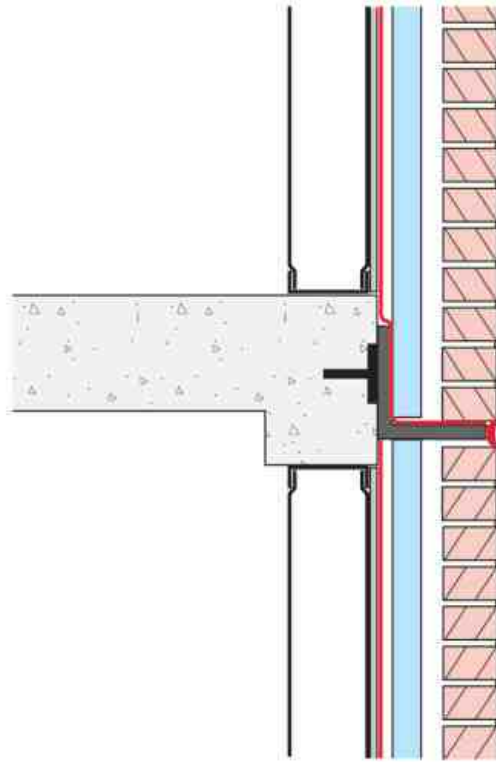




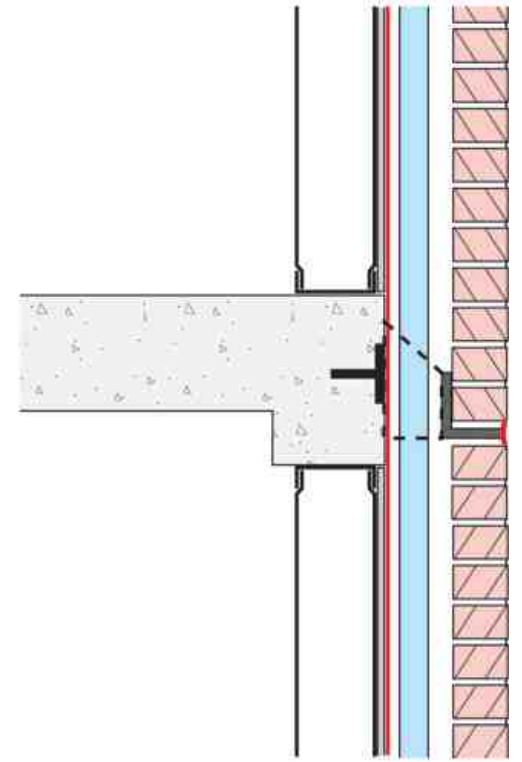




**“The Ugly”**



**“The Bad”**

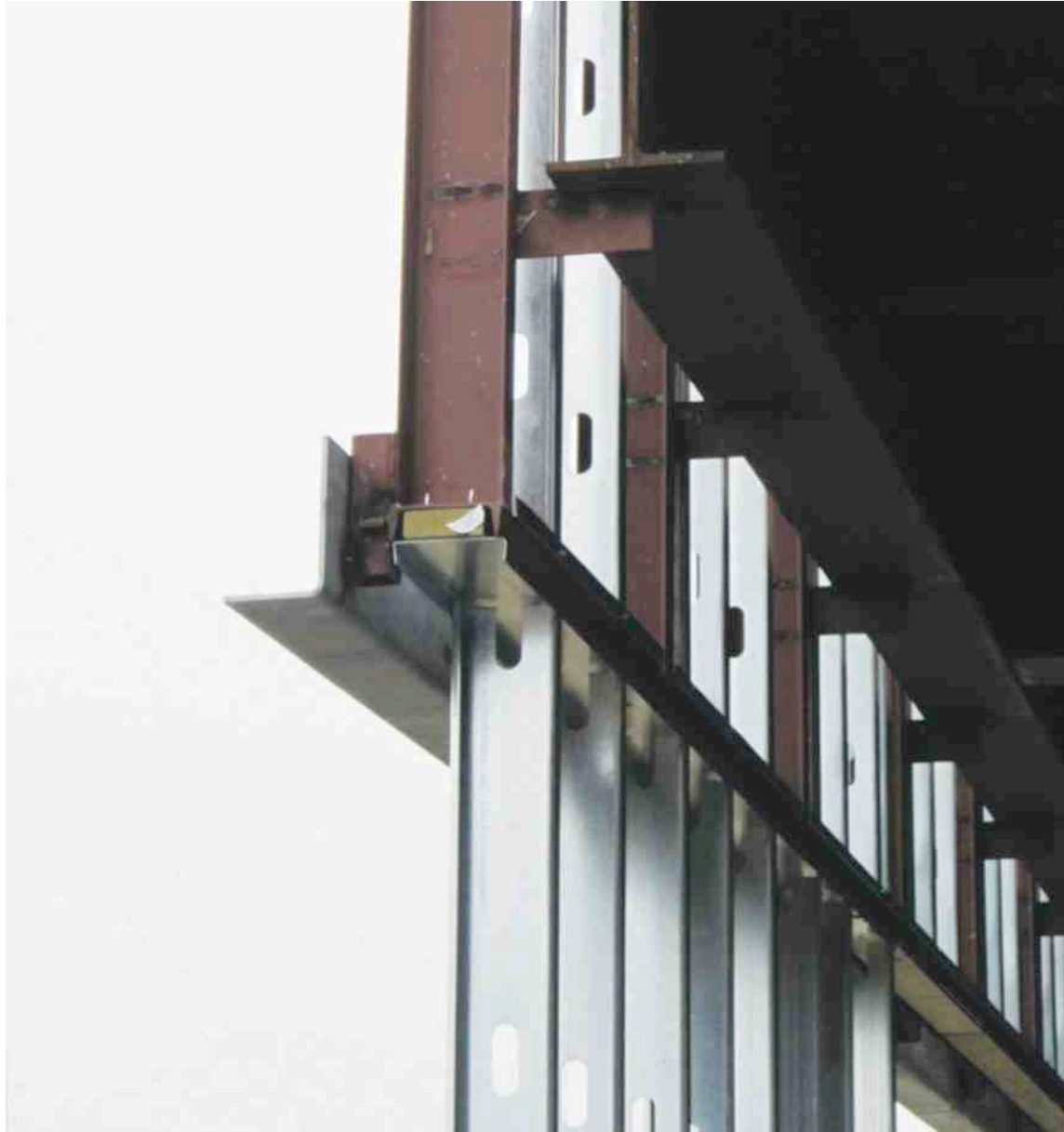


**“The Good”**













# Beware Thermal Flanking

- Beware heat flow around window frame

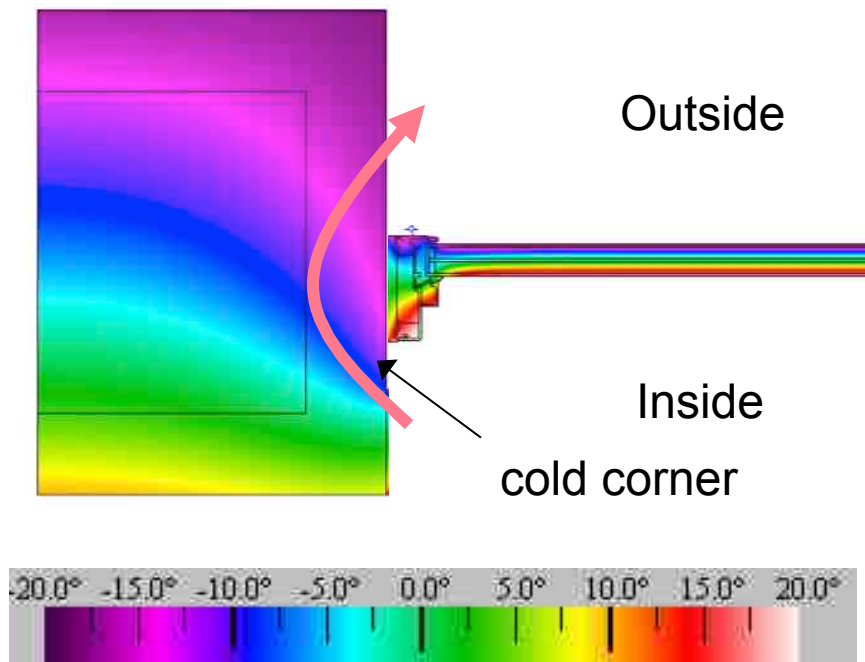


Figure 1: Thermal Flanking

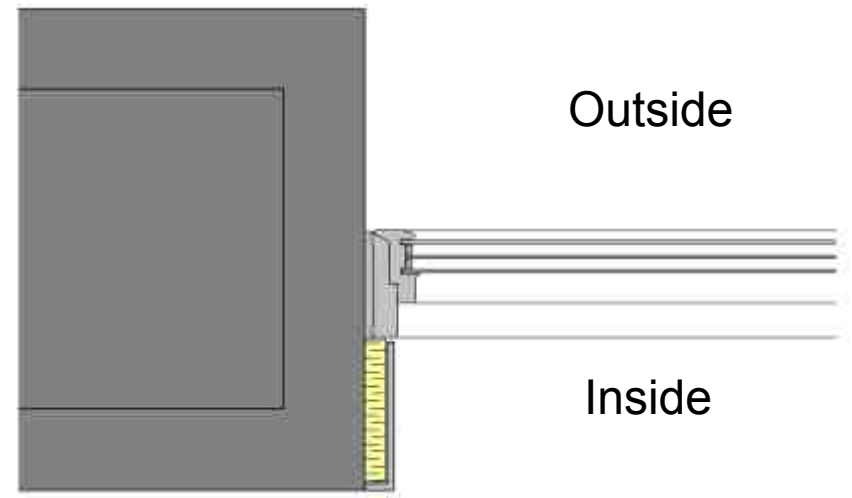
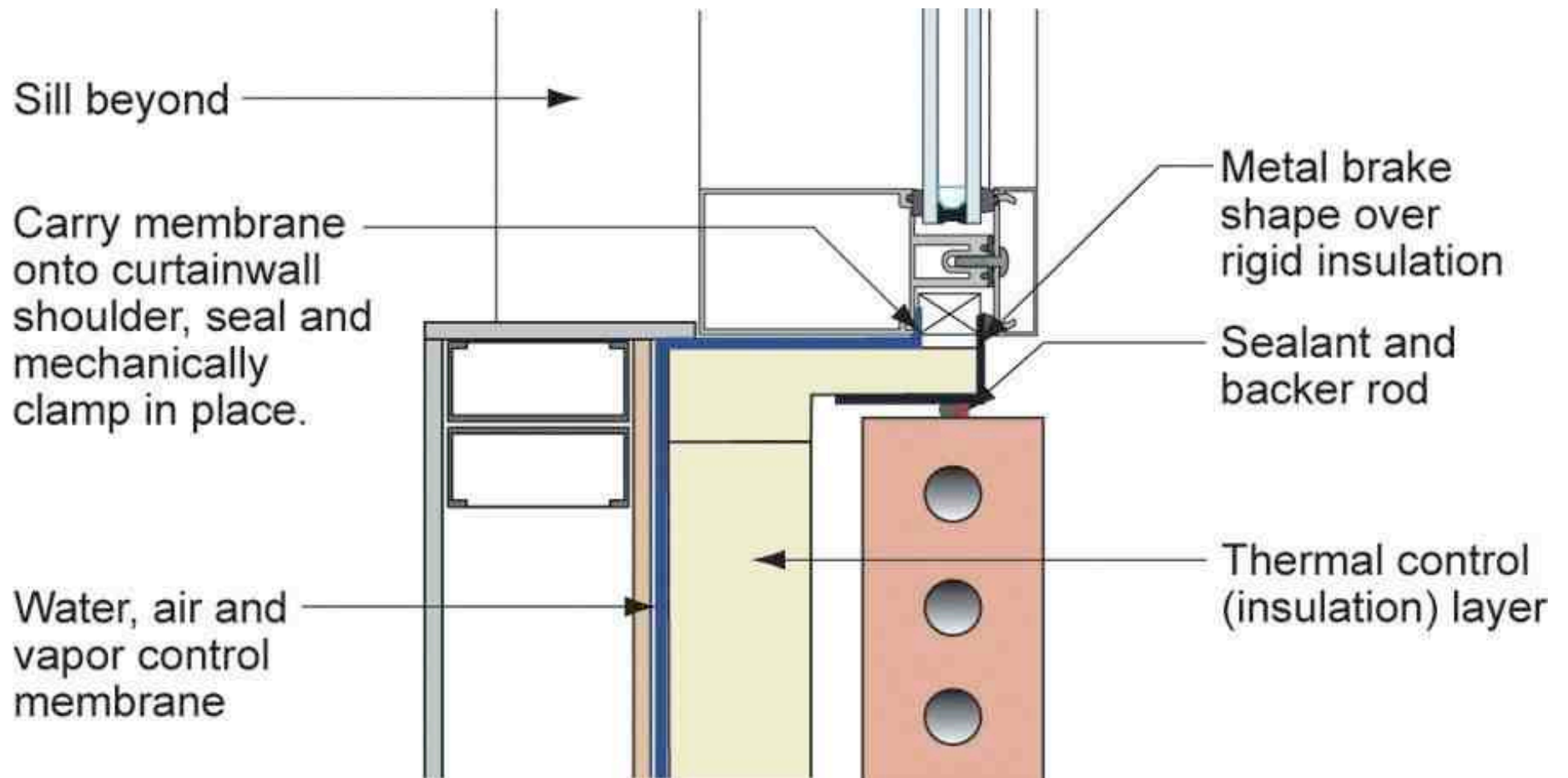
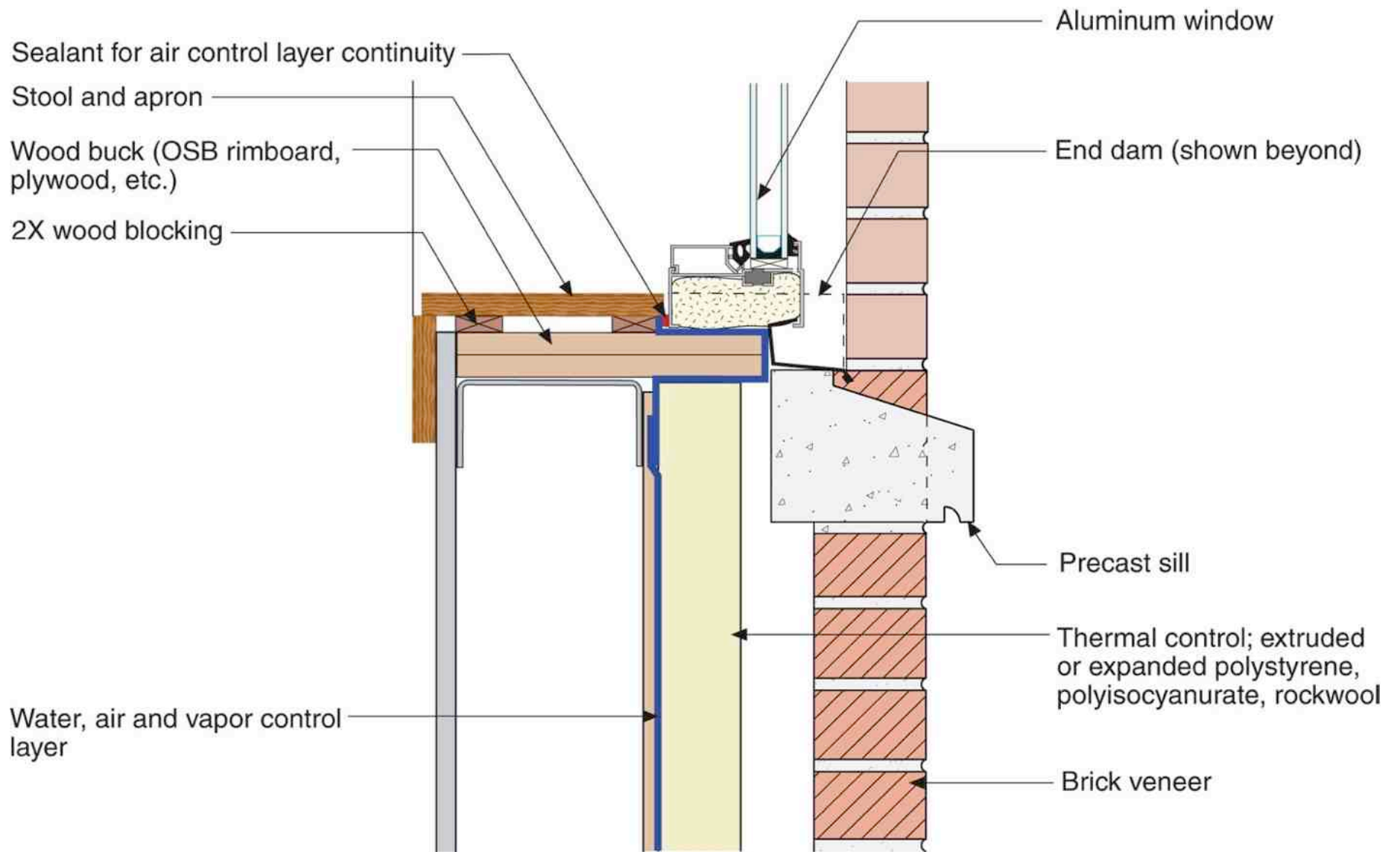


Figure 2: Flanking Reduced























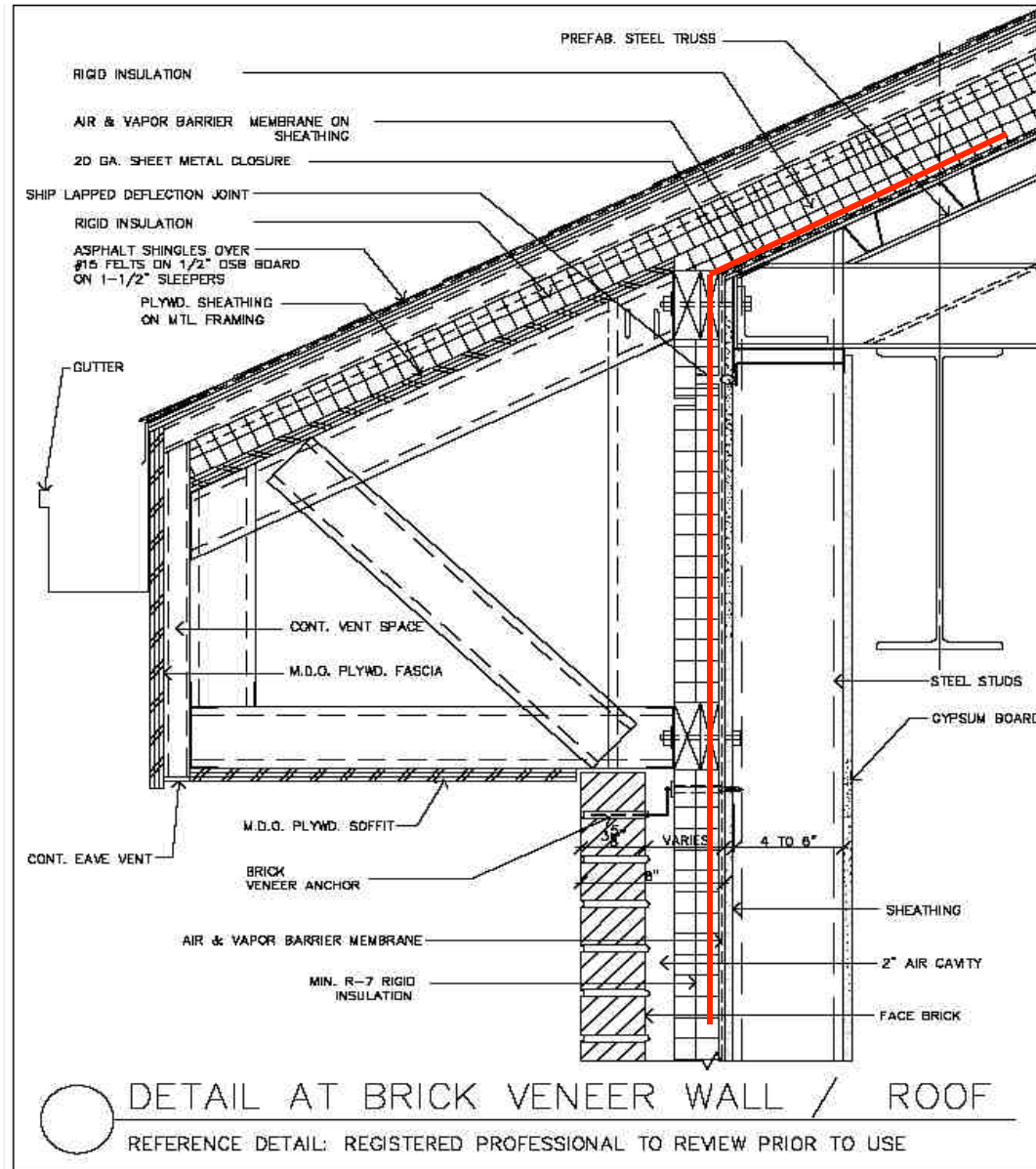




From the Product Bag Check for  
Warnings:  
This product is compressed. It may  
expand from air pressure. Do not  
use if the bag is damaged or if the  
product is not in its original  
package. Do not use if the product  
is not in its original container.  
Always use proper safety practices.

2790 W. 25th St., Salt Lake City, UT 84119  
(801) 477-4000  
4020 W. 25th St., Denver, CO 80202  
(303) 752-1800  
4300 E. 9th Ave., Aurora, CO 80014  
(303) 291-4100  
1725 E. 9th Ave., Springfield, MA 01102  
(413) 781-1348  
2500 Chestnut Creek, Suite 101, (978) 279-1400  
1801 South Avenue, Jackson, (904) 718-0110

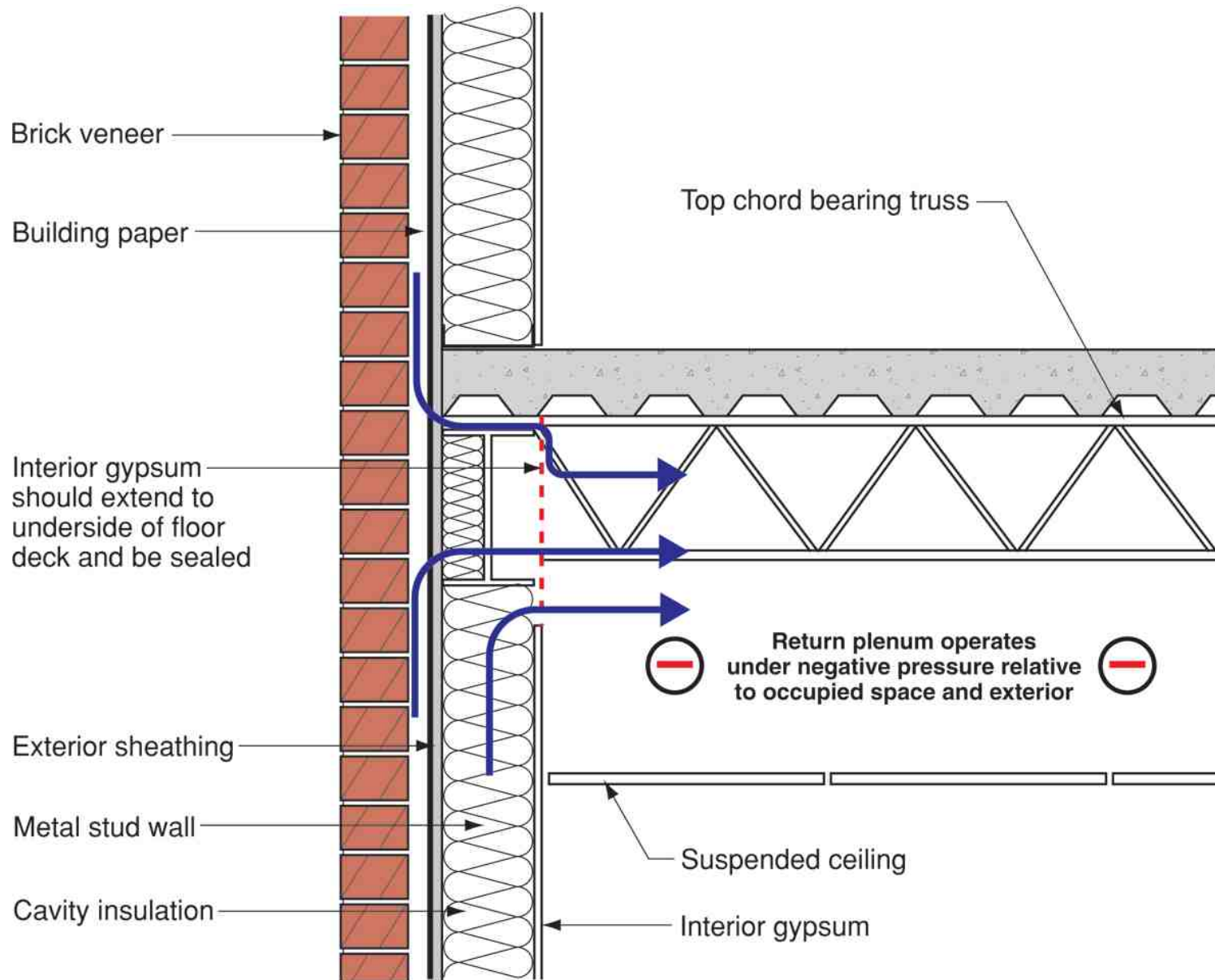




























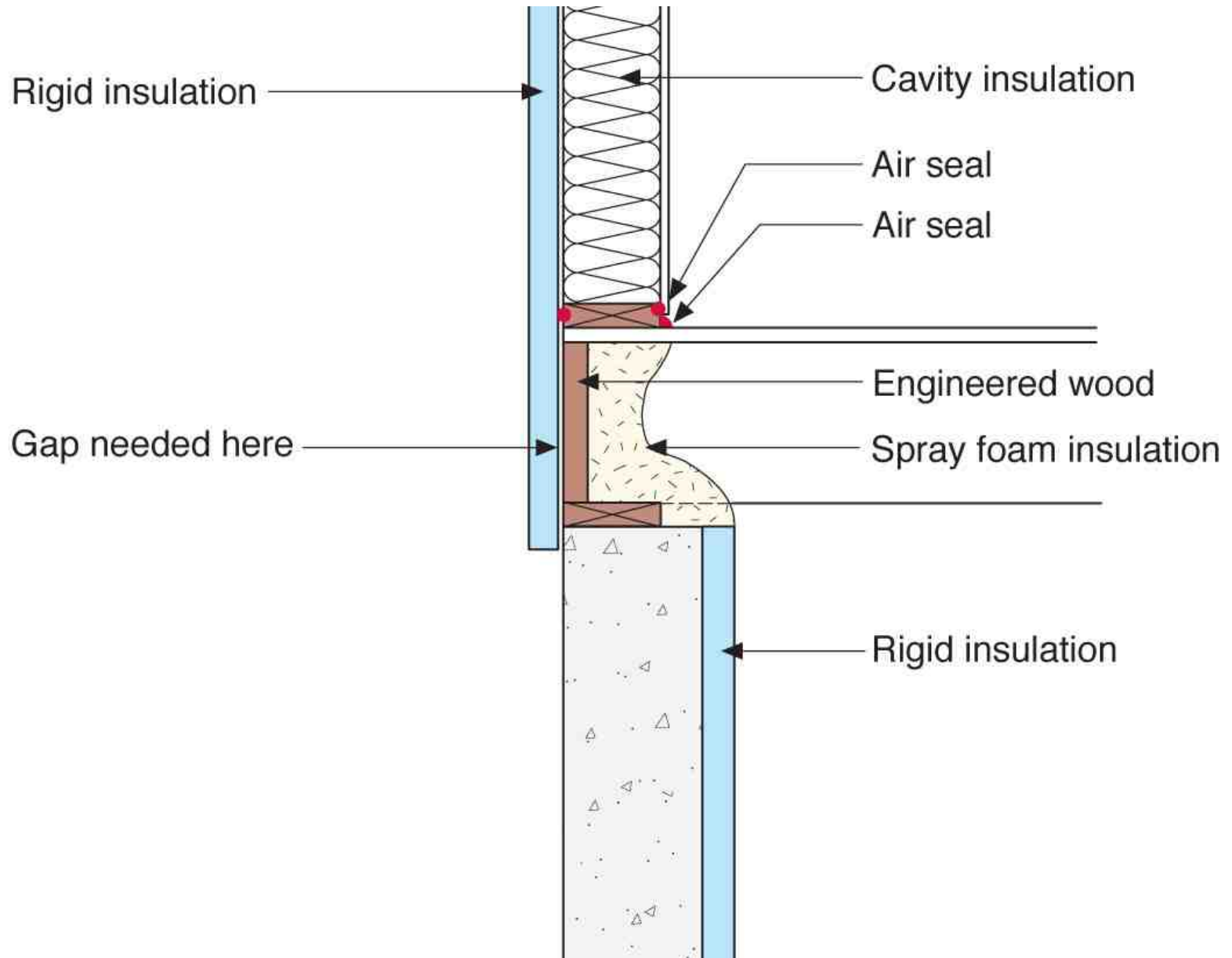




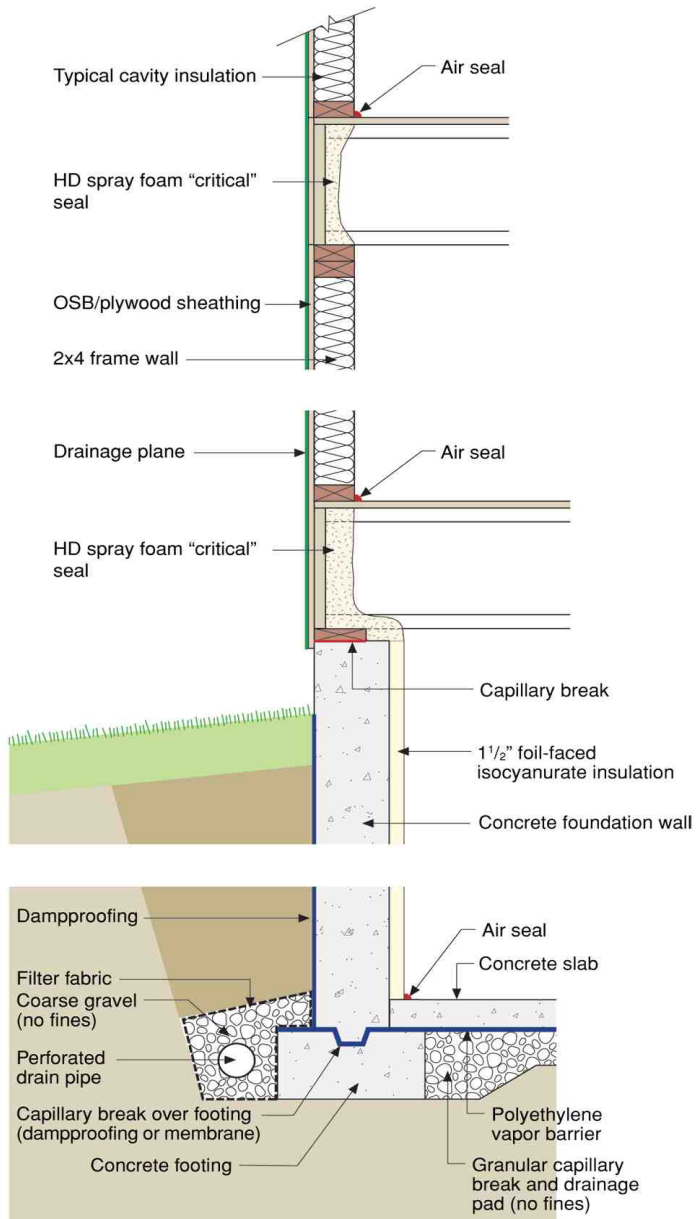


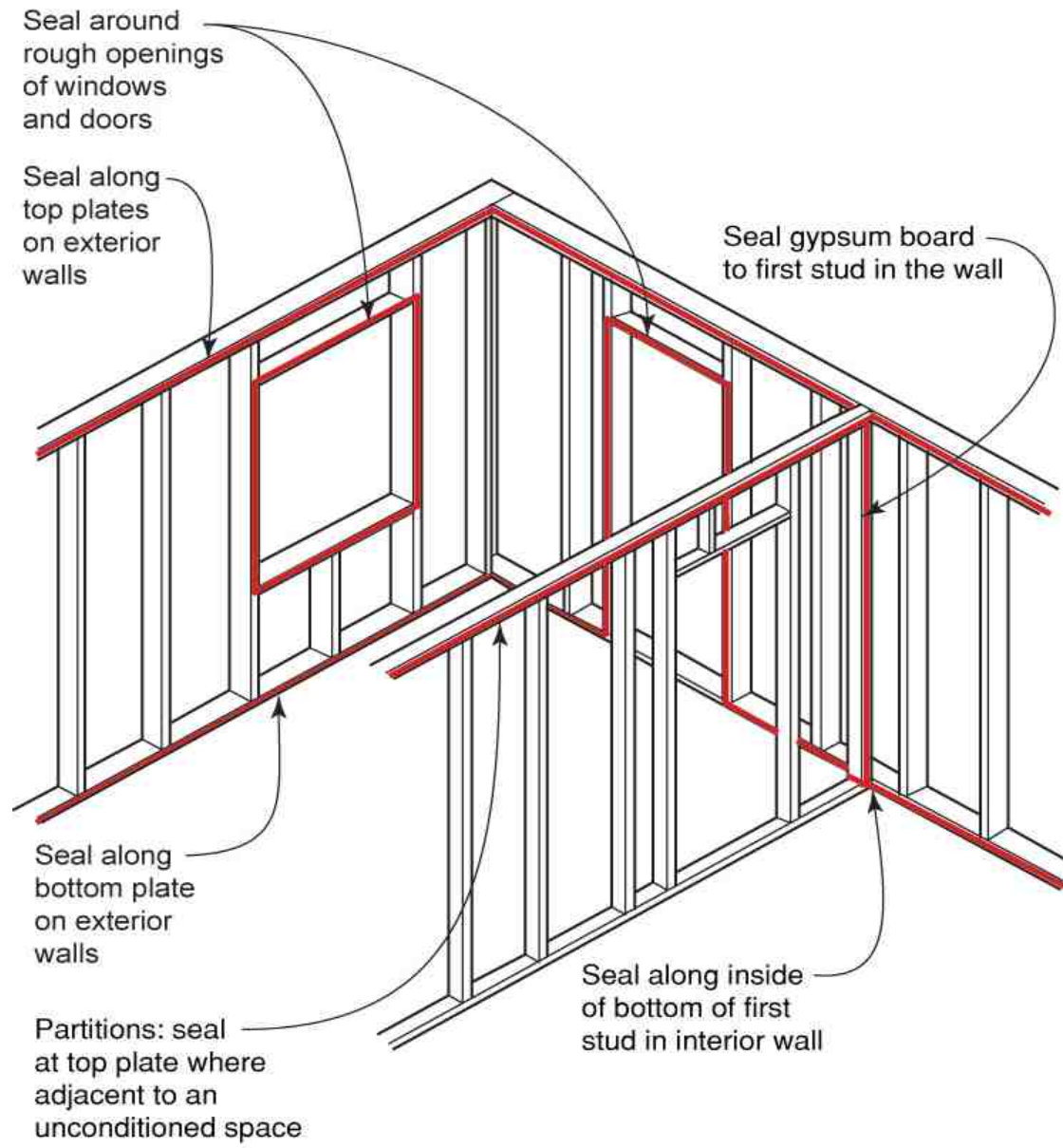












Seal around rough openings of windows and doors

Seal along top plates on exterior walls

Seal gypsum board to first stud in the wall

Seal along bottom plate on exterior walls

Partitions: seal at top plate where adjacent to an unconditioned space

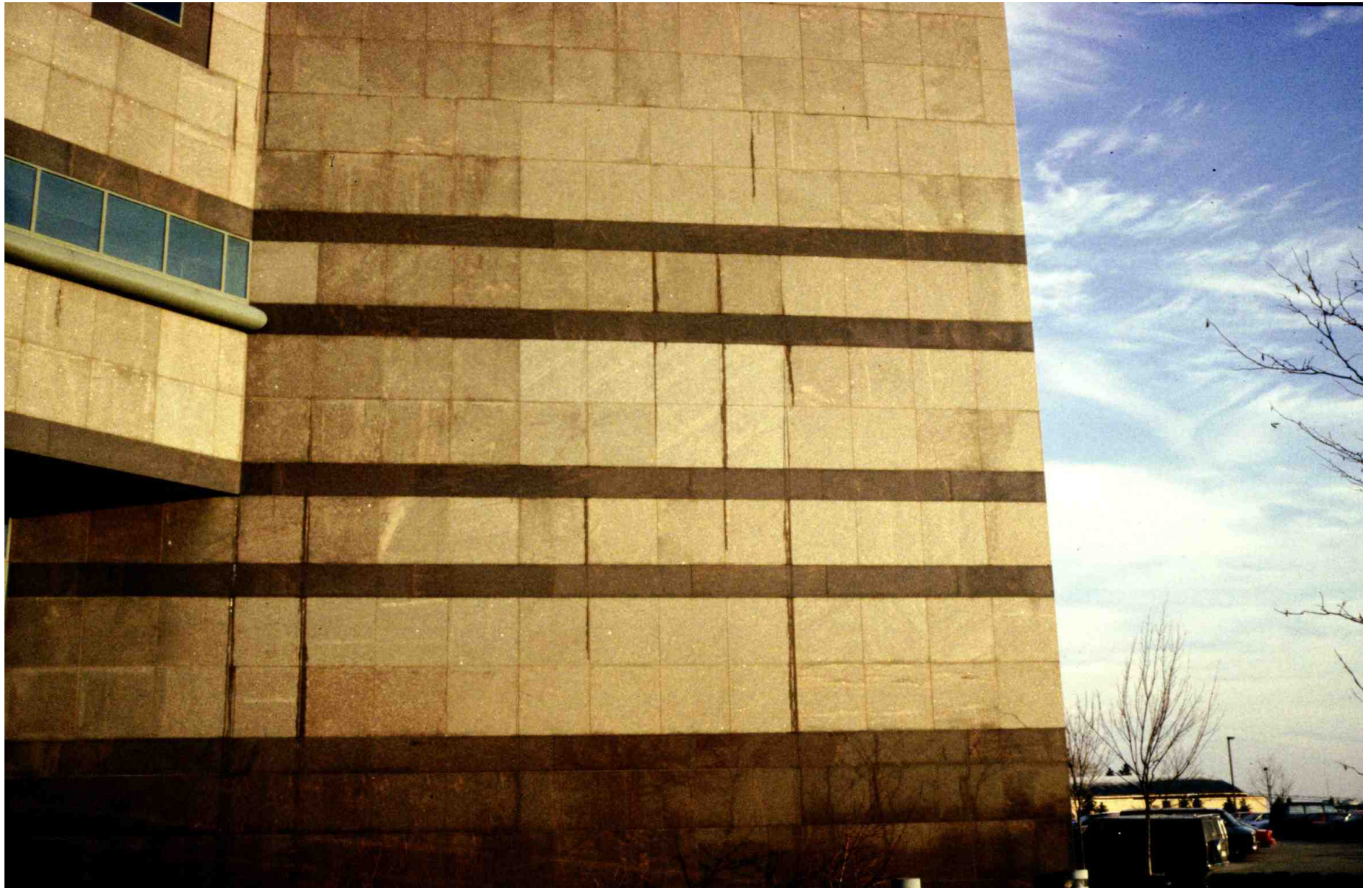
Seal along inside of bottom of first stud in interior wall

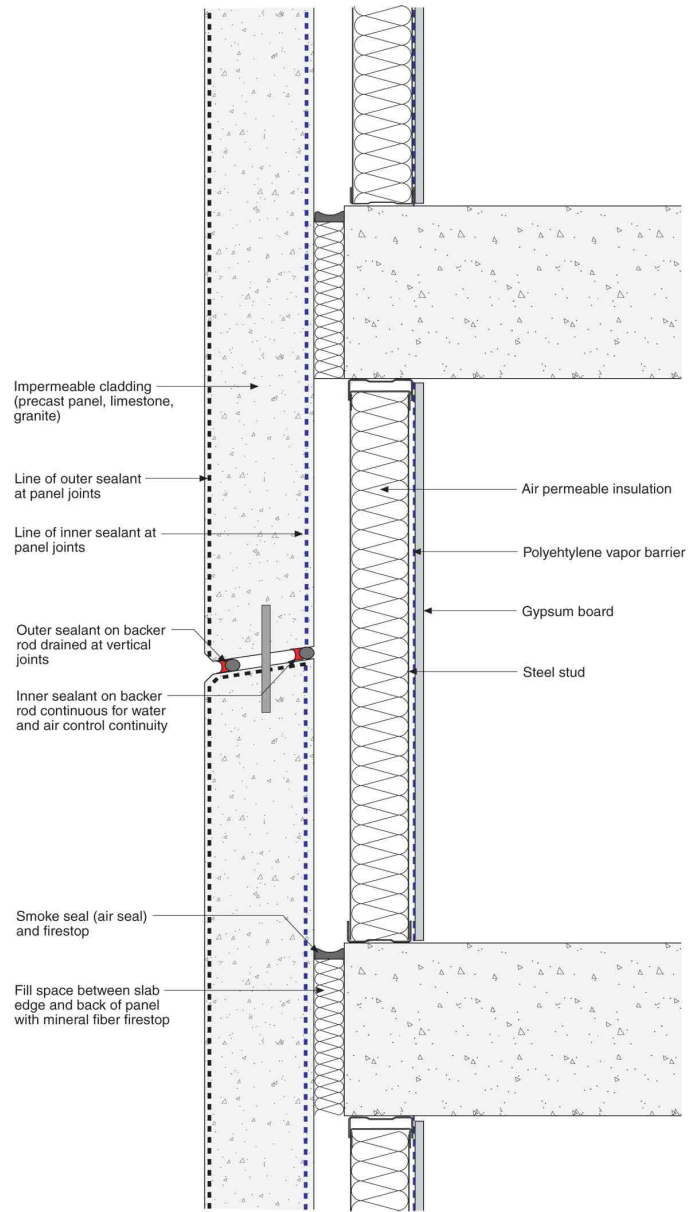


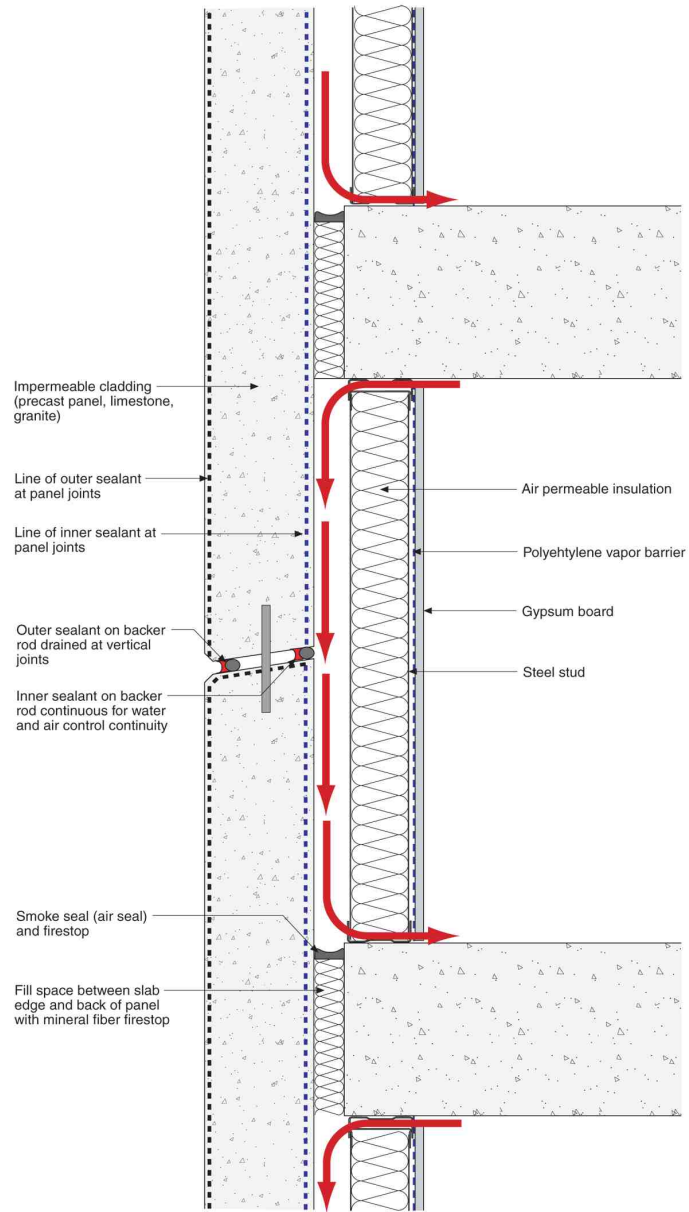


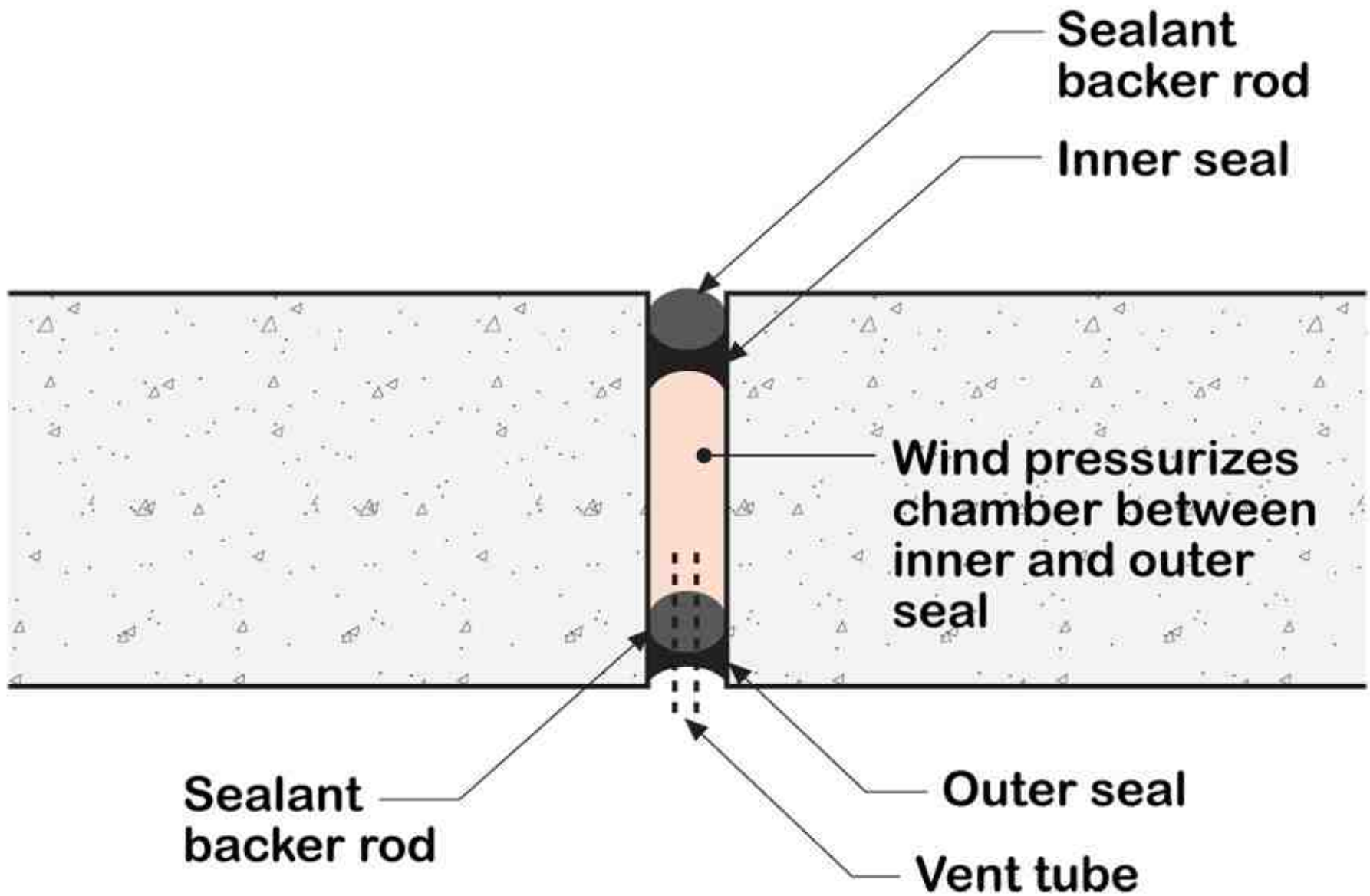




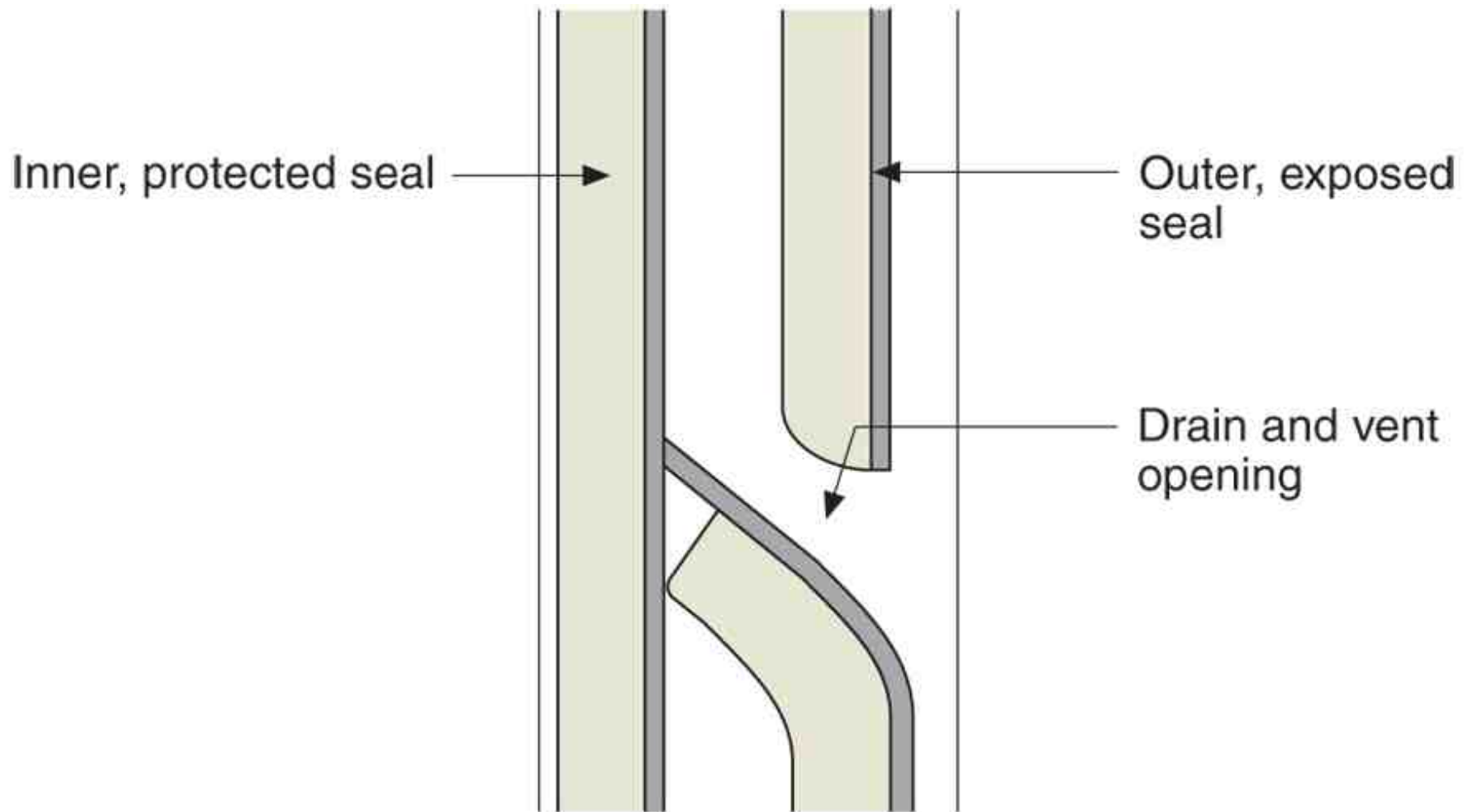


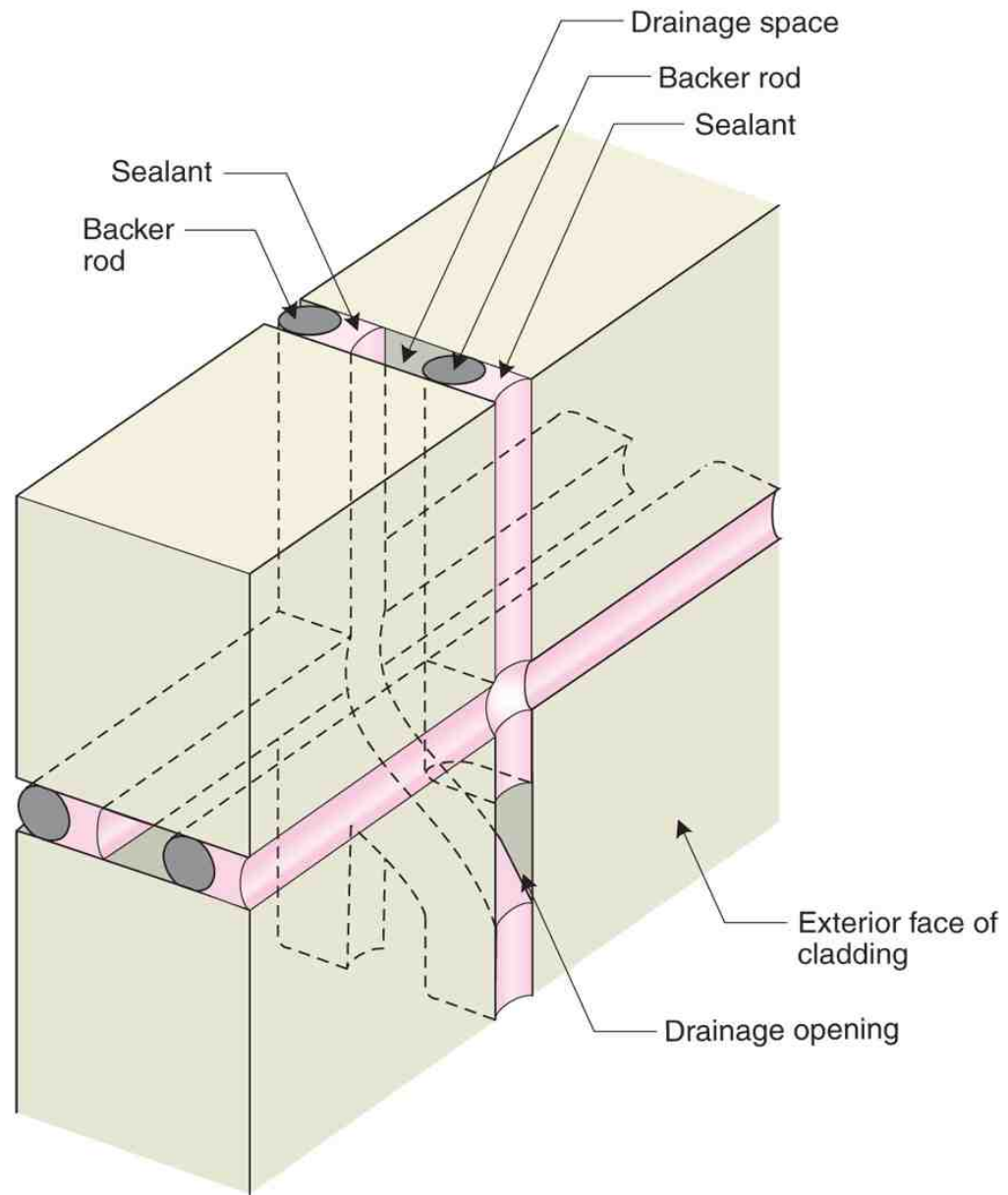


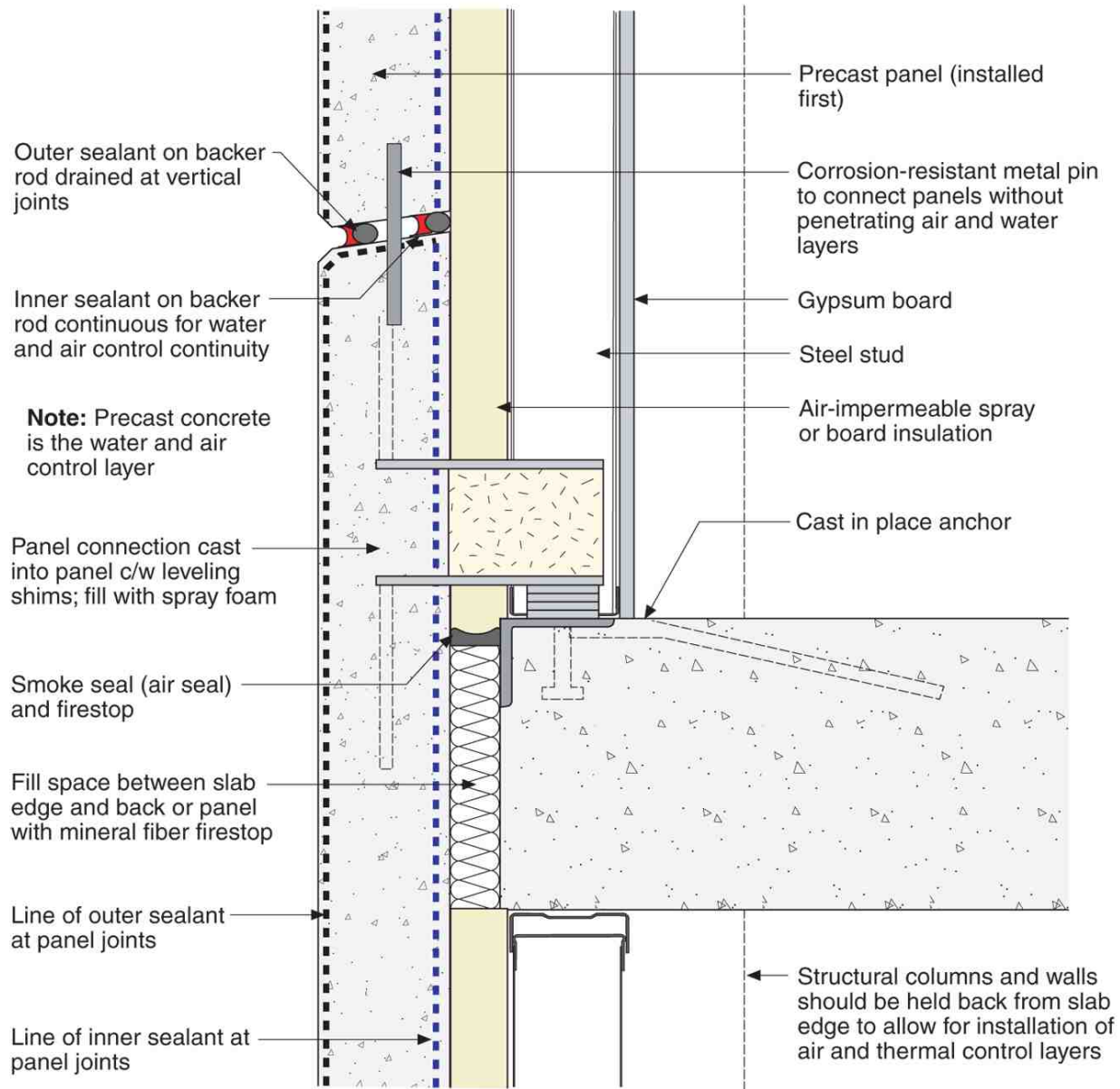


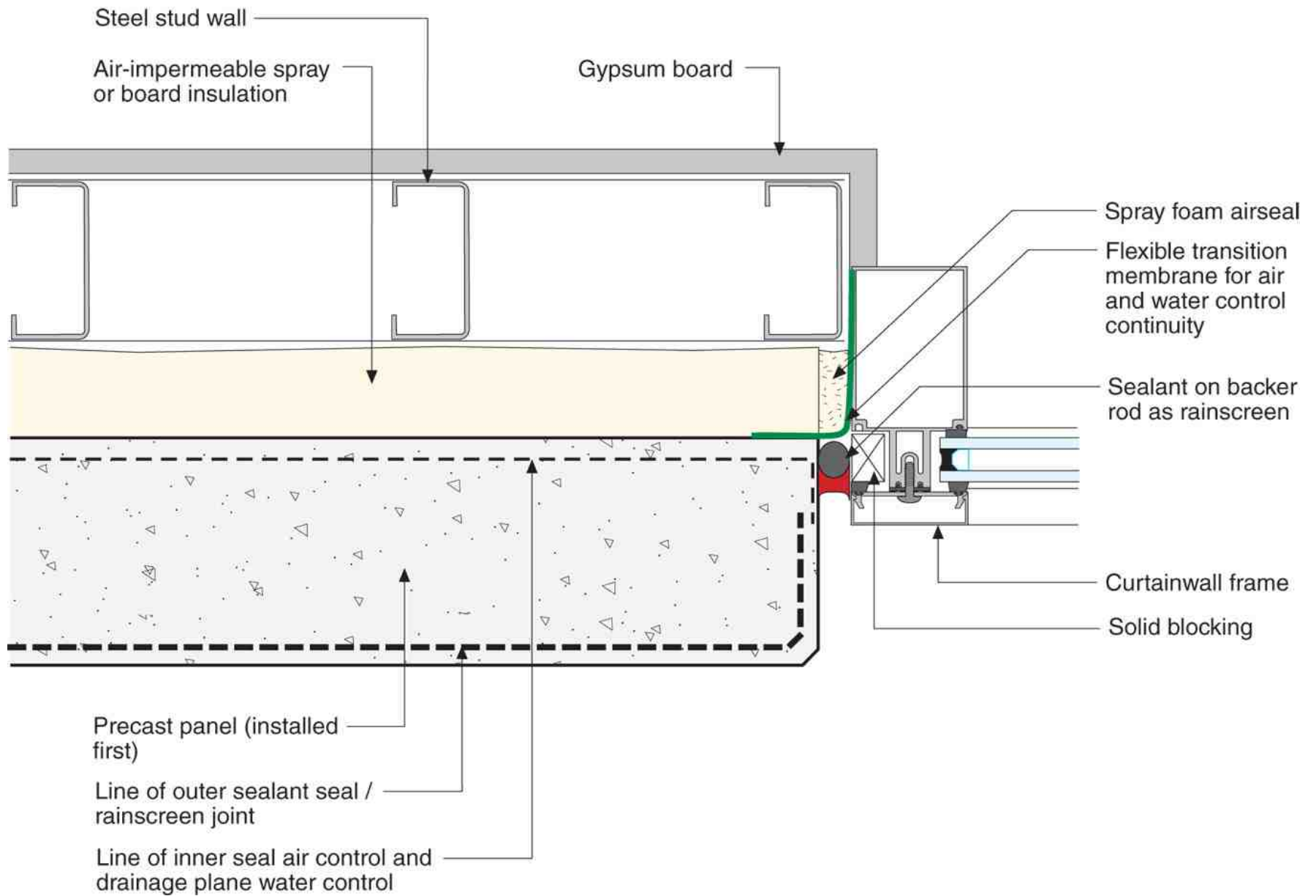






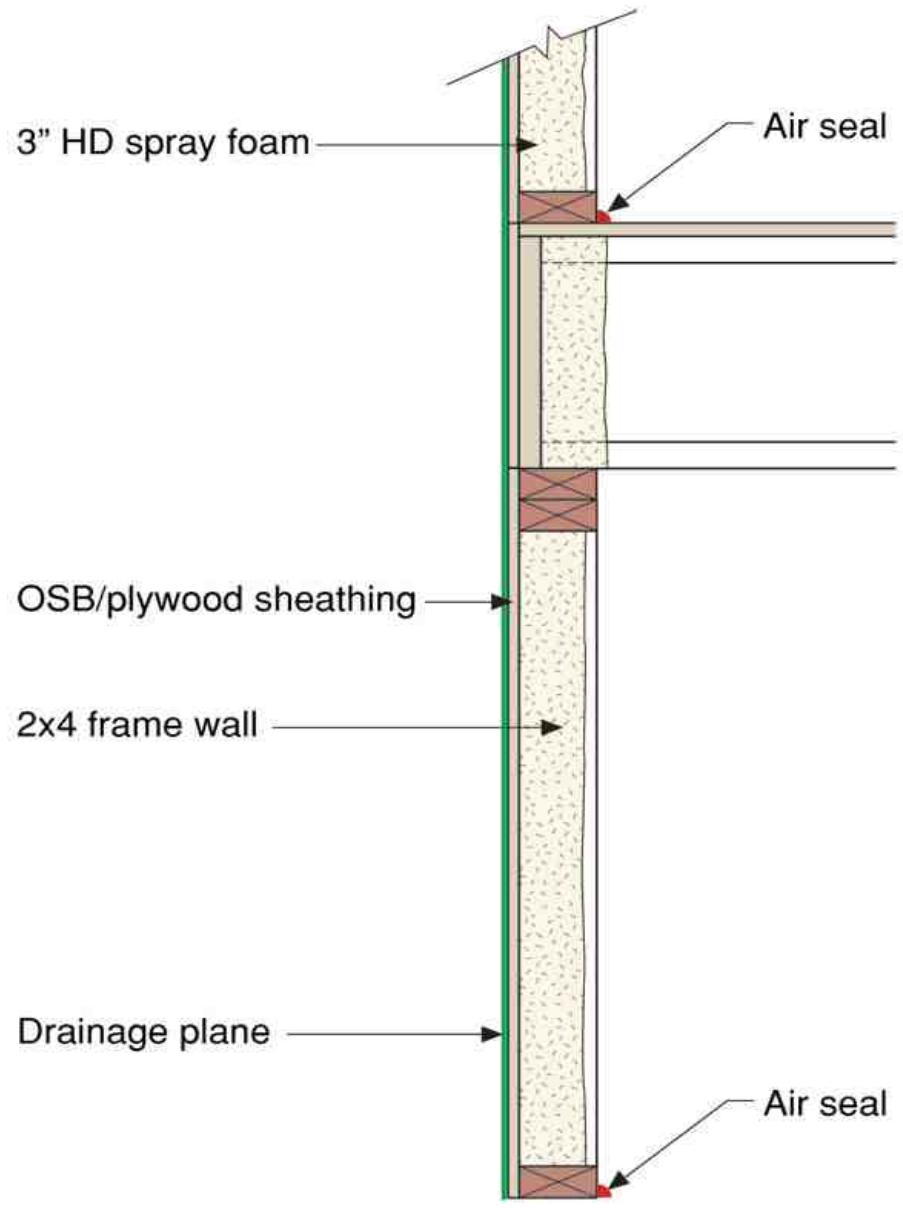


















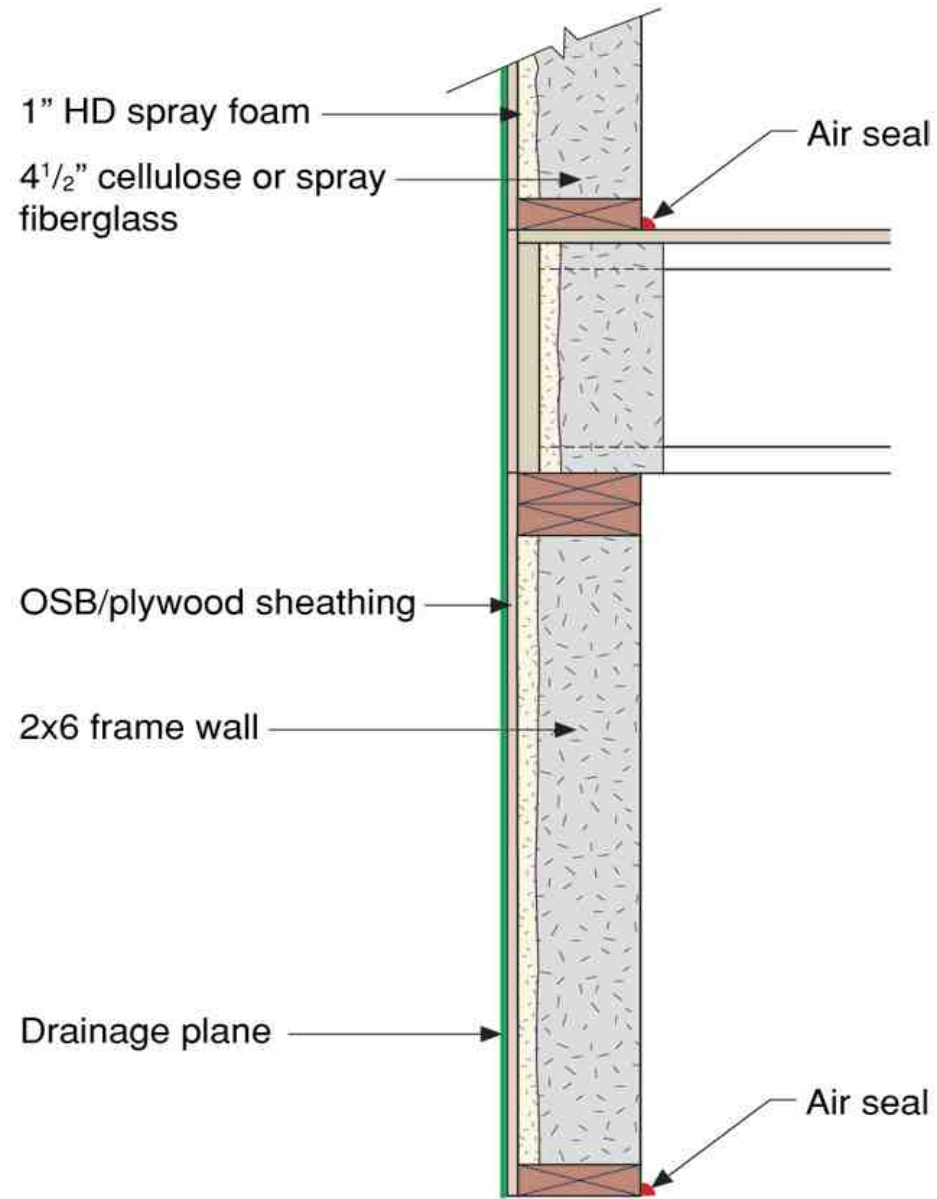




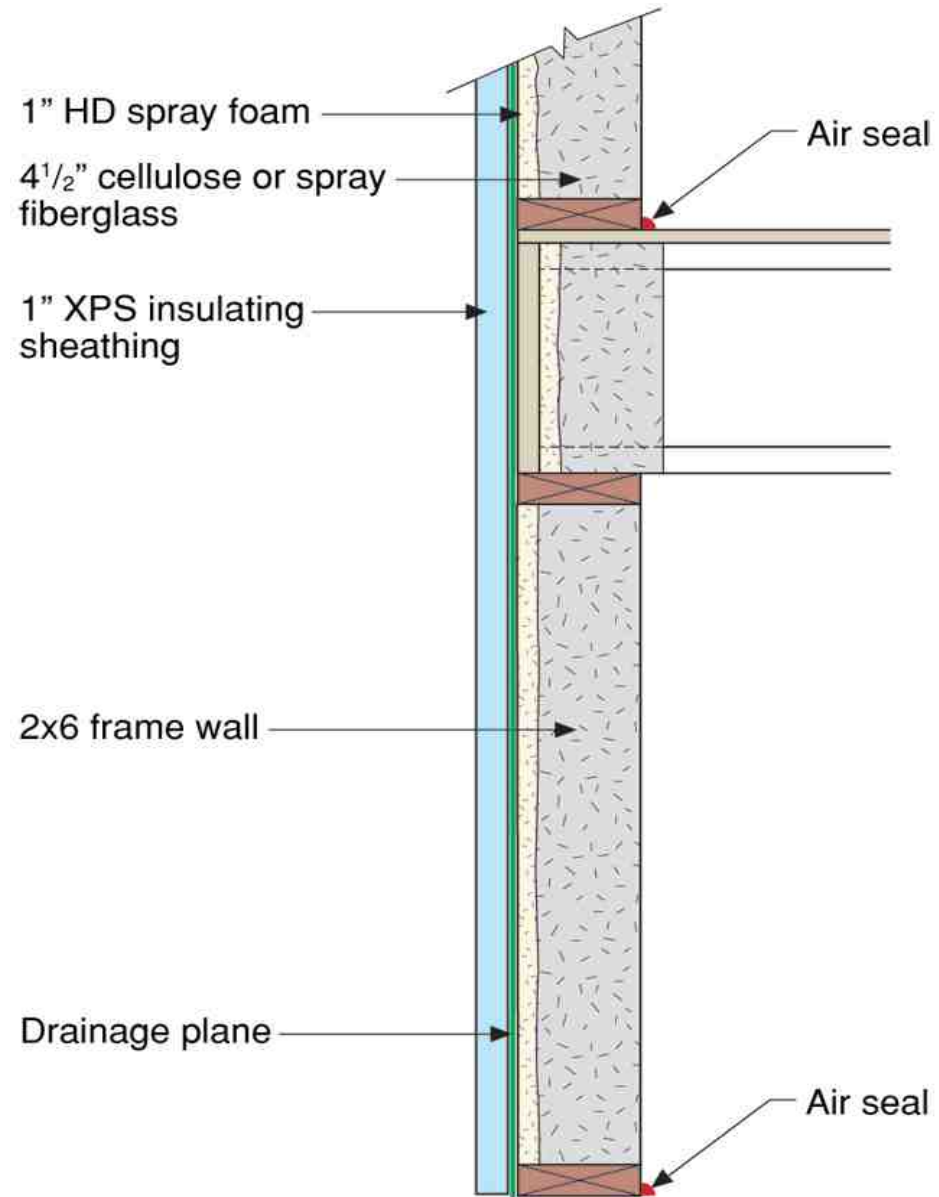


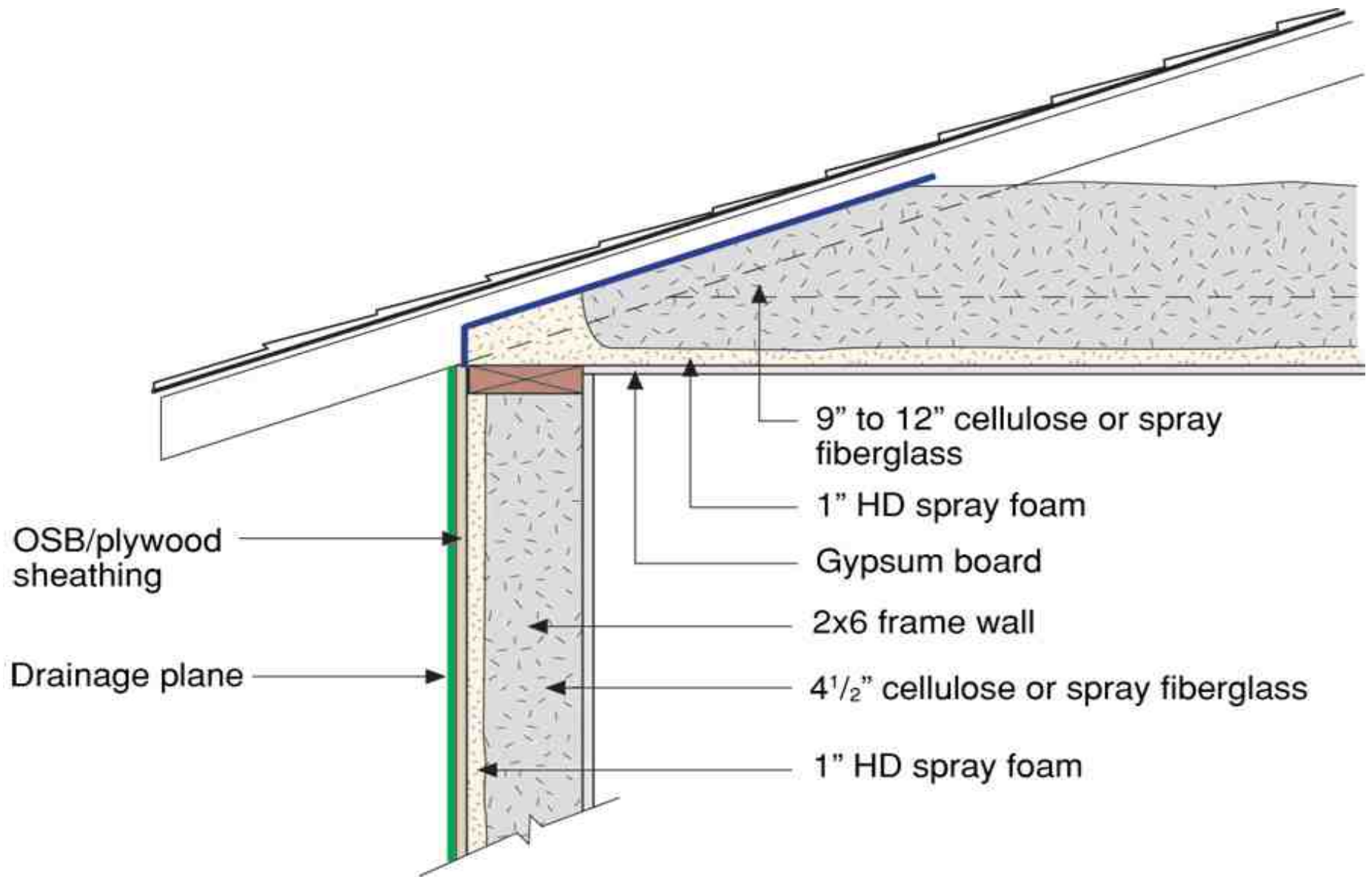


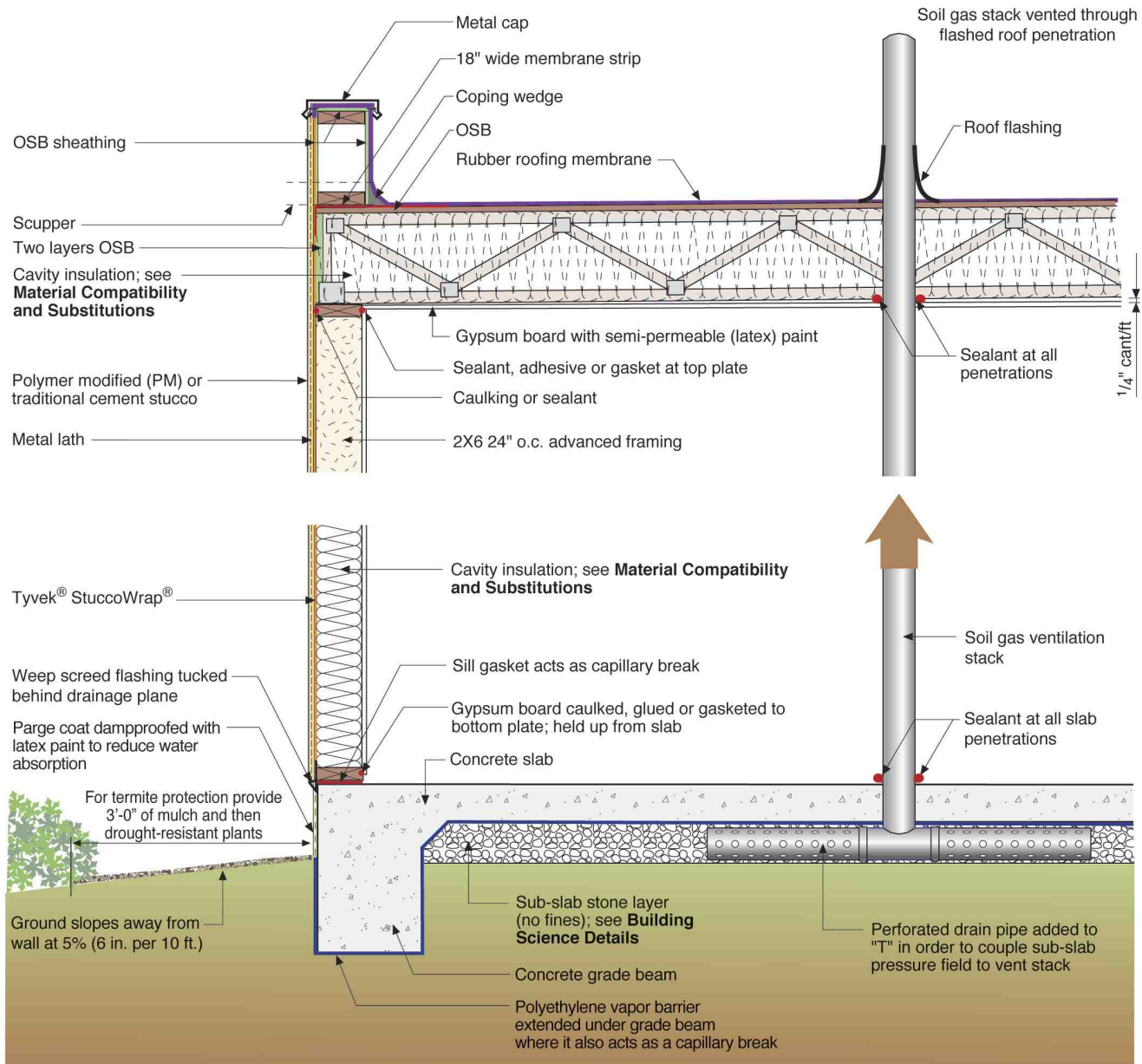


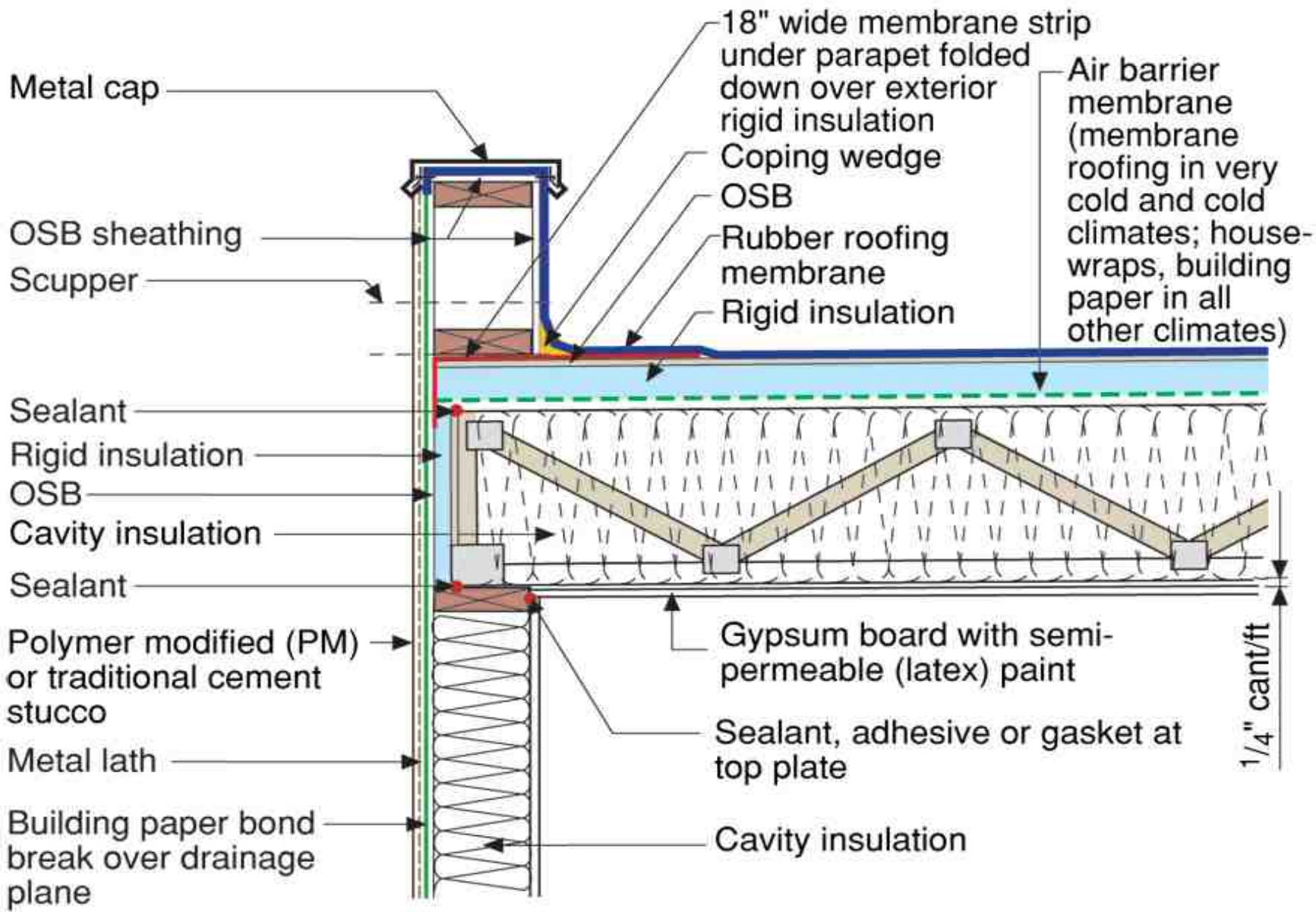




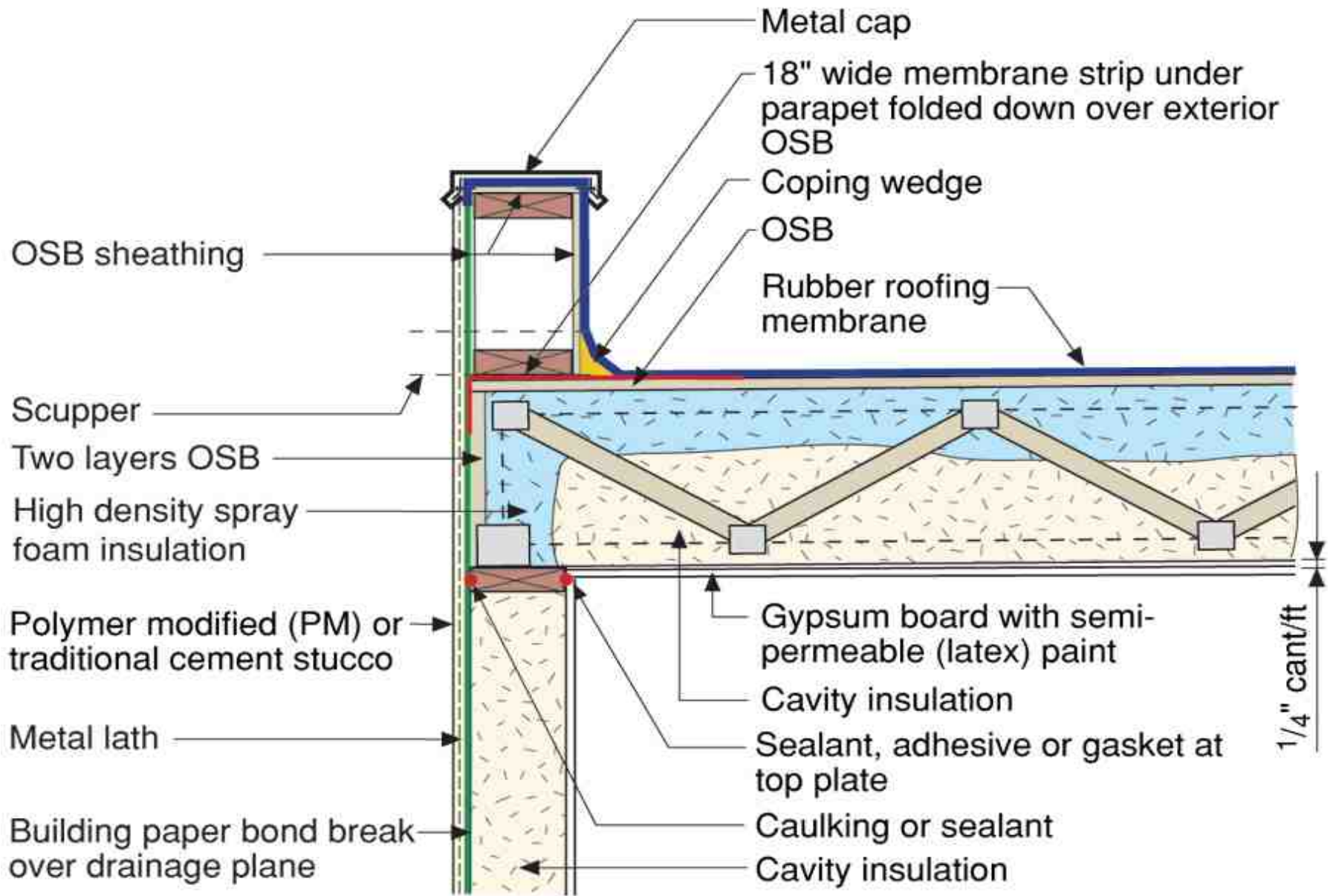




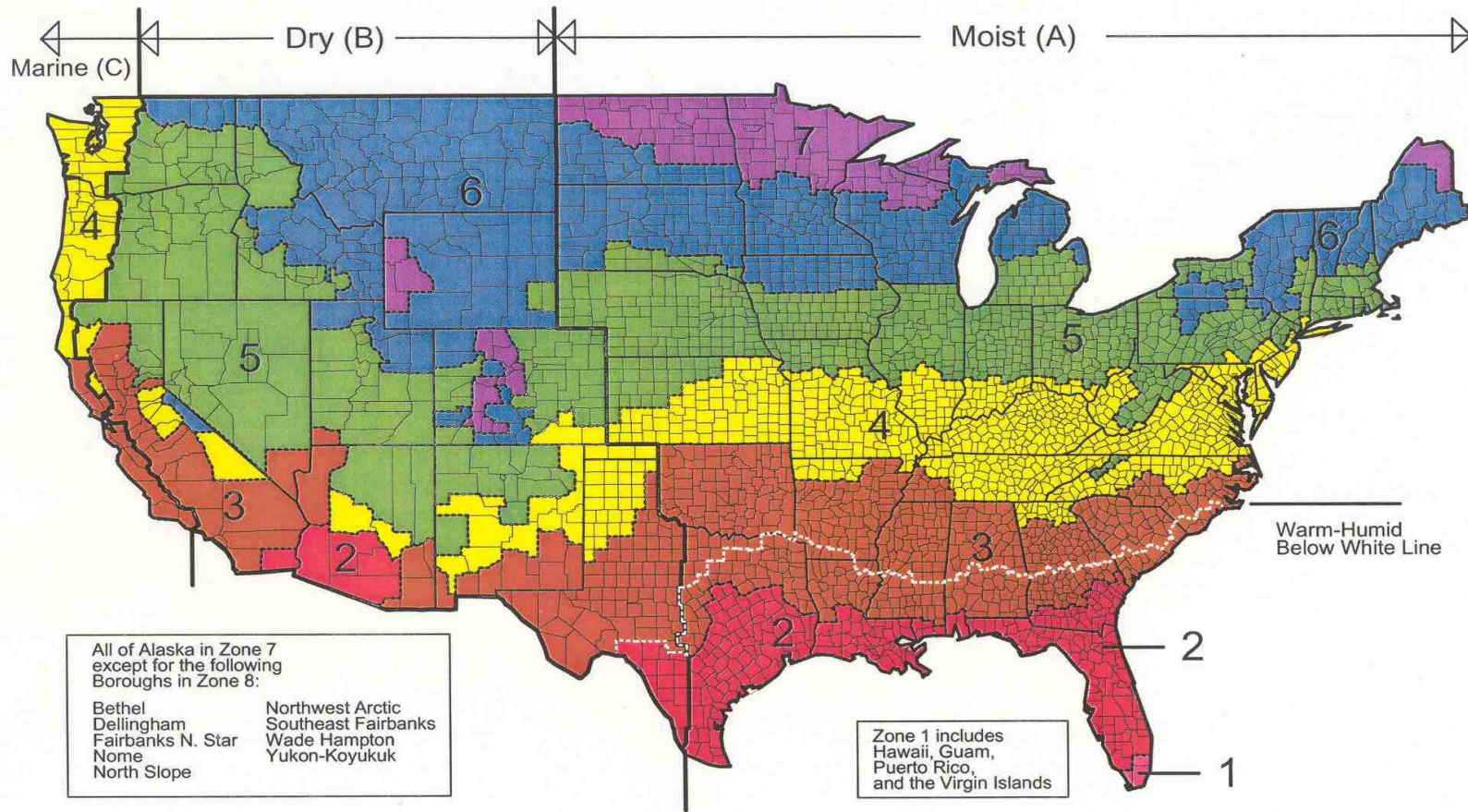








# Map of DOE's Proposed Climate Zones



March 24, 2003

Low density spray foam insulation

Asphalt shingles

Roofing paper

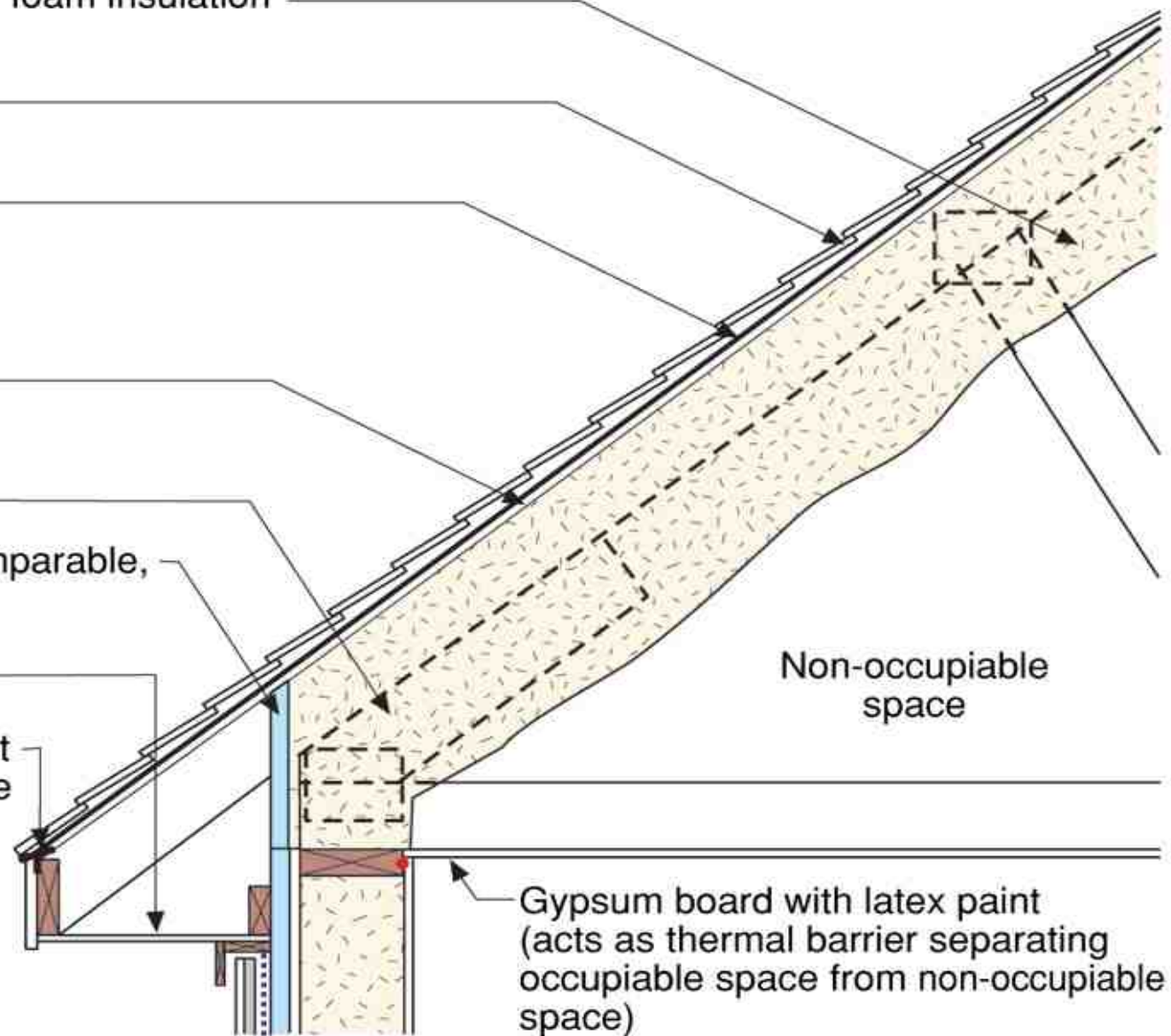
Roof sheathing

Raised heel truss

Rigid foam, or comparable,  
as backdam

Soffit

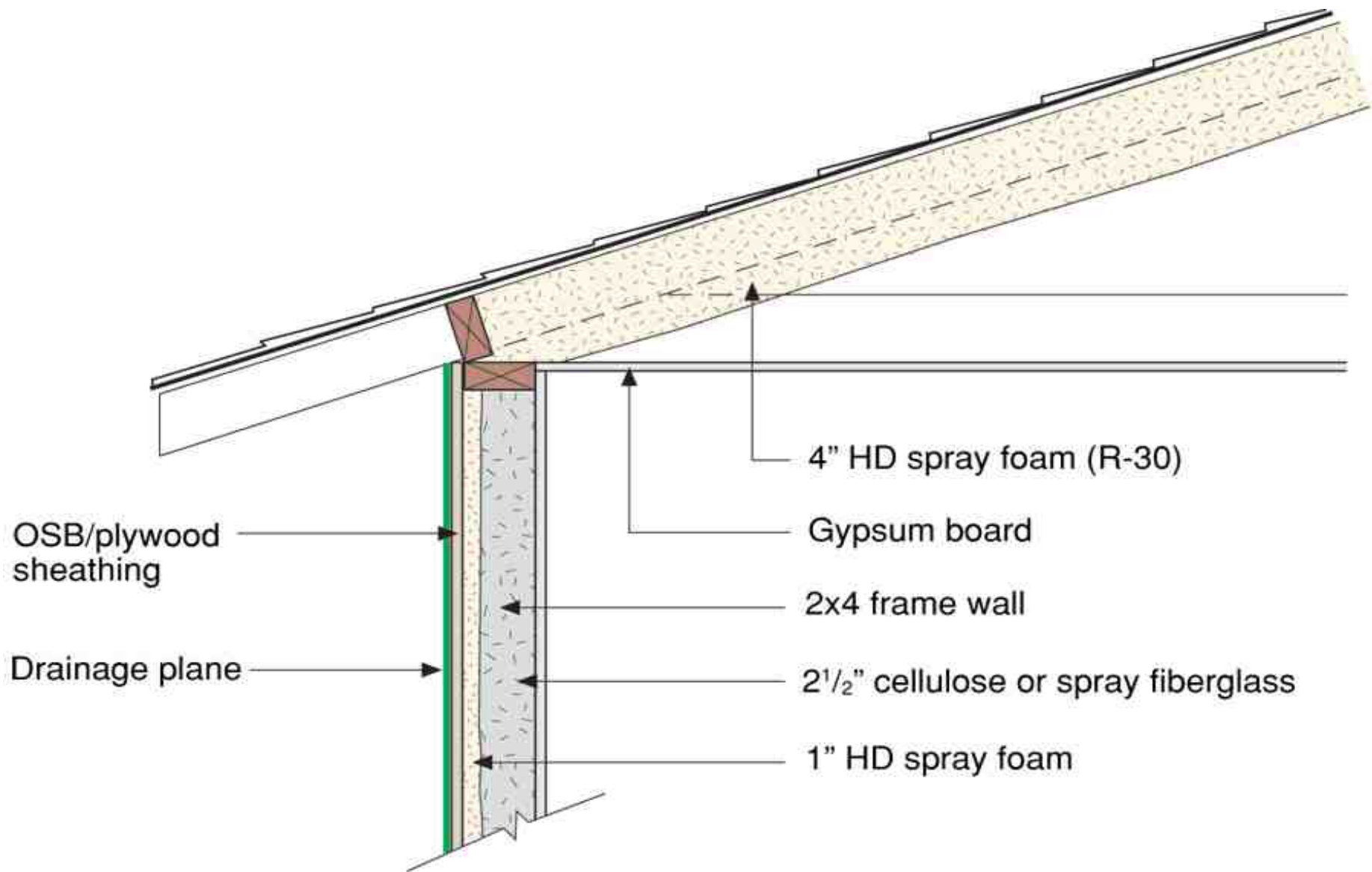
Roof underlayment  
sealed to drip edge



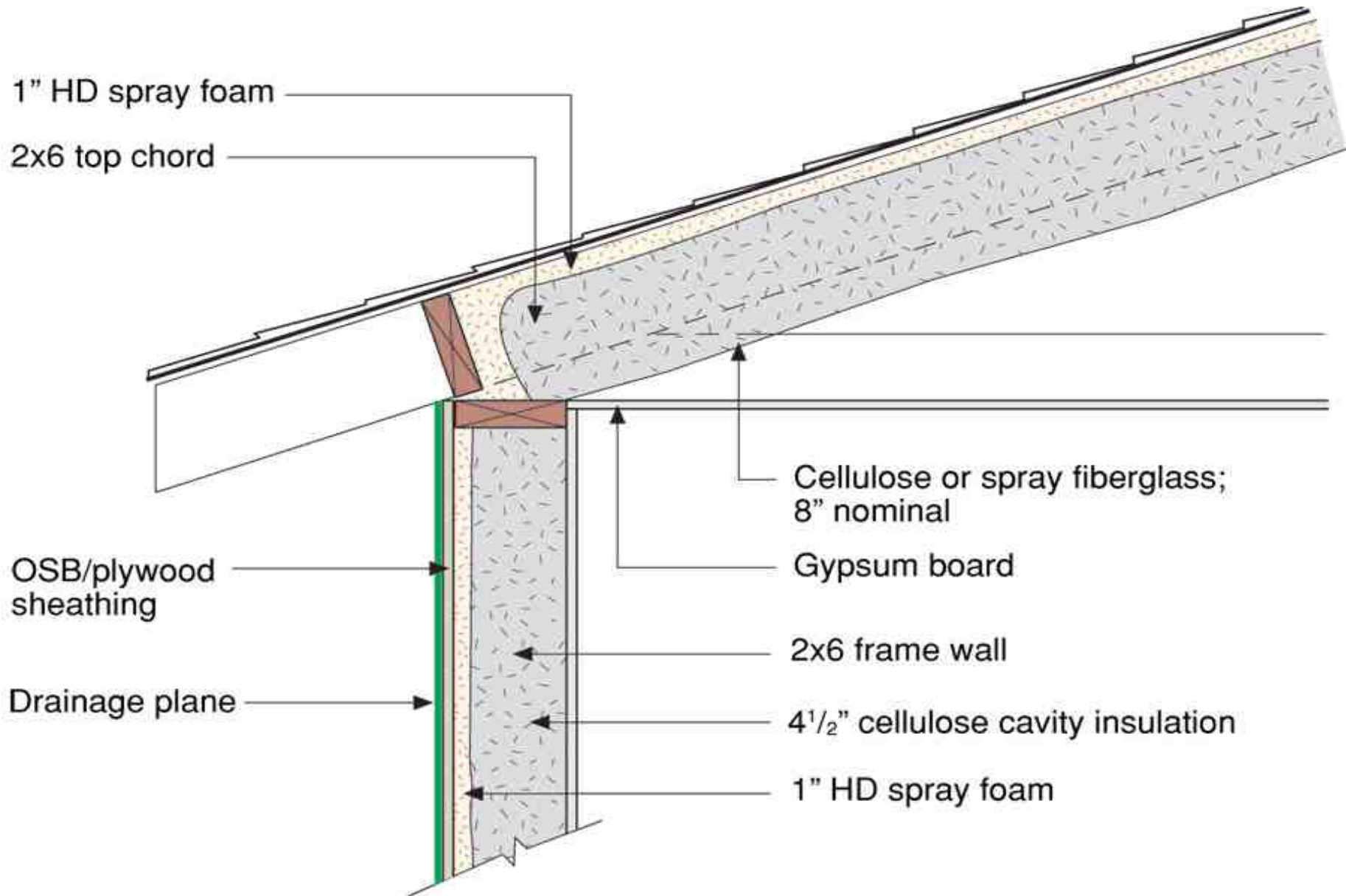
Non-occupiable  
space

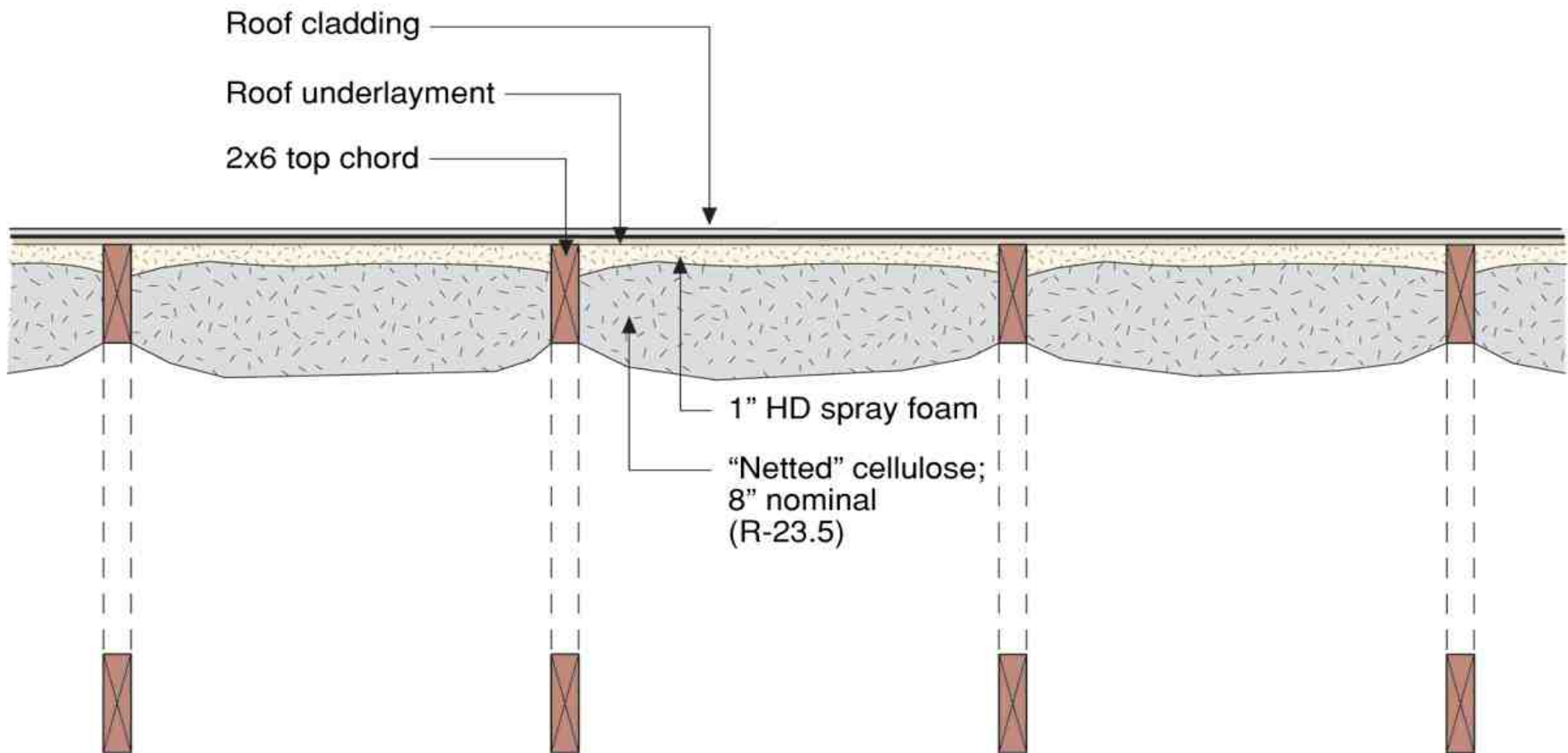
Gypsum board with latex paint  
(acts as thermal barrier separating  
occupiable space from non-occupiable  
space)

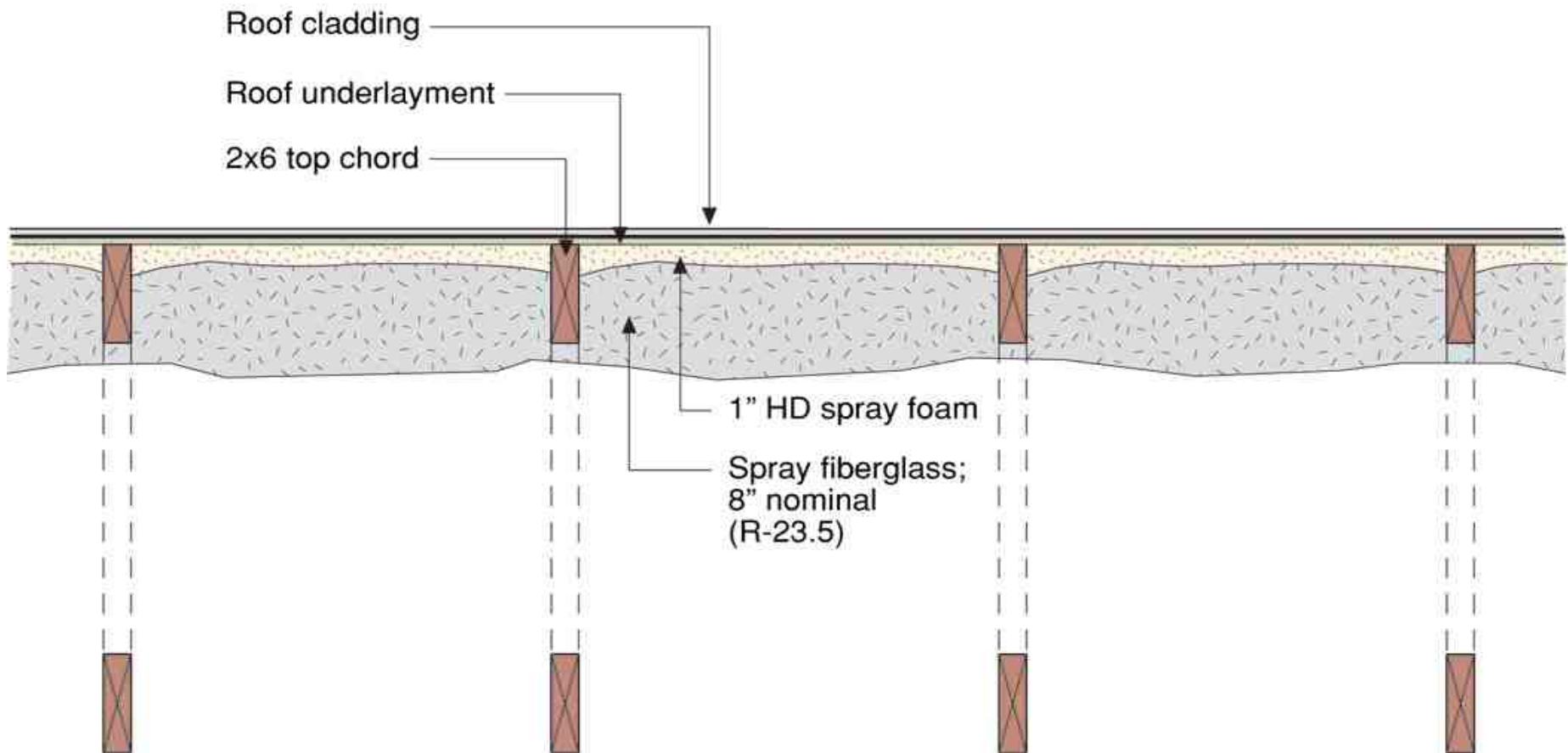


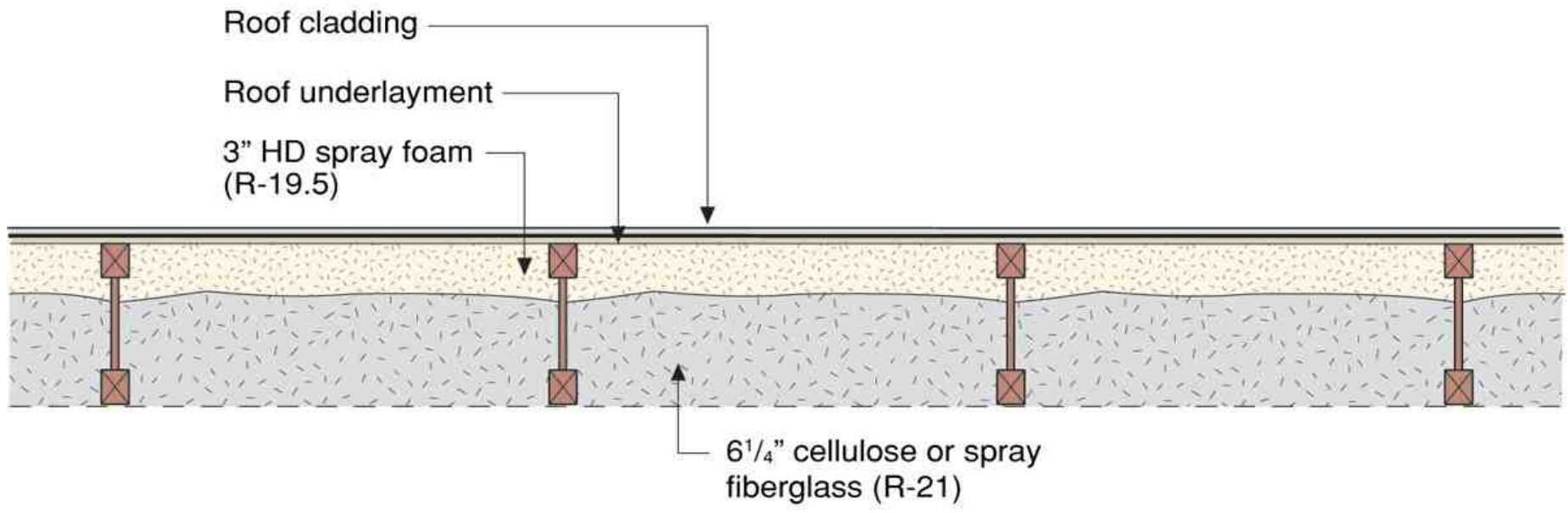










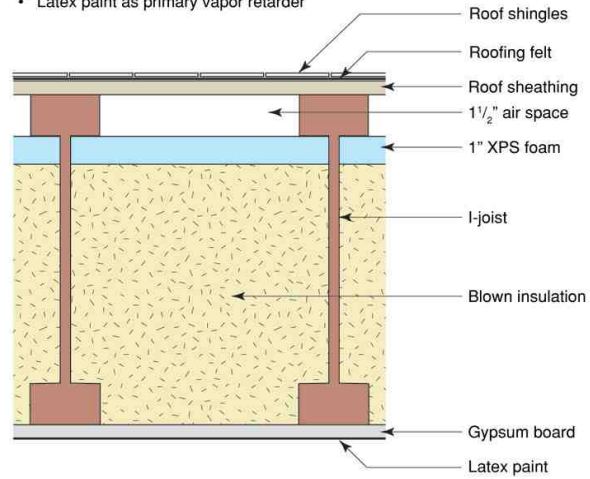




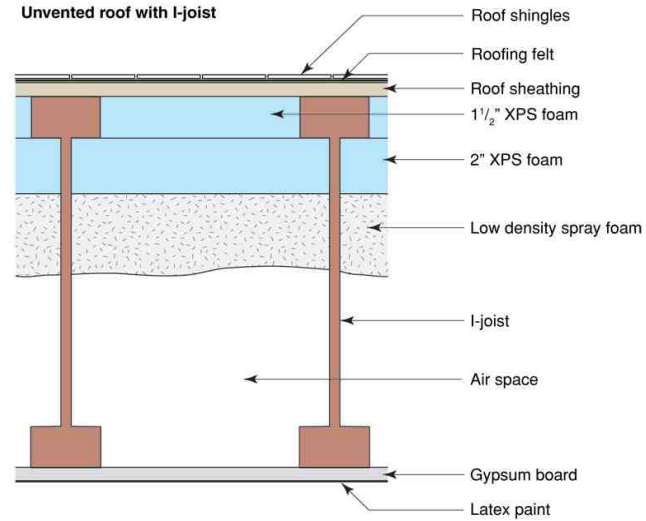
### Vented roof with I-joint

#### Notes:

- 1 1/2" vented air space connected to soffit and ridge vents
- Gypsum board as air barrier
- Use care at recessed fixtures
- Latex paint as primary vapor retarder



### Unvented roof with I-joint























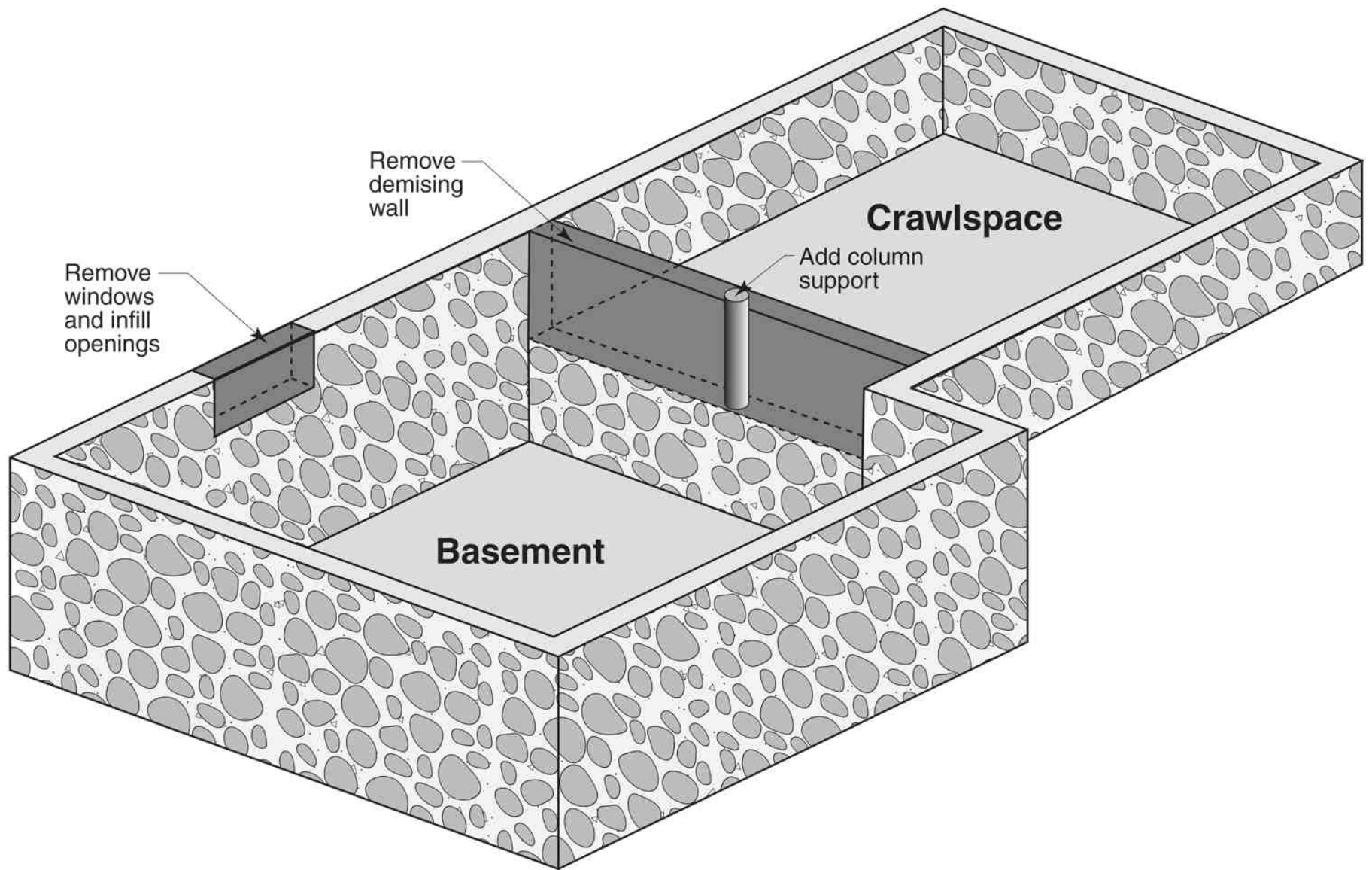






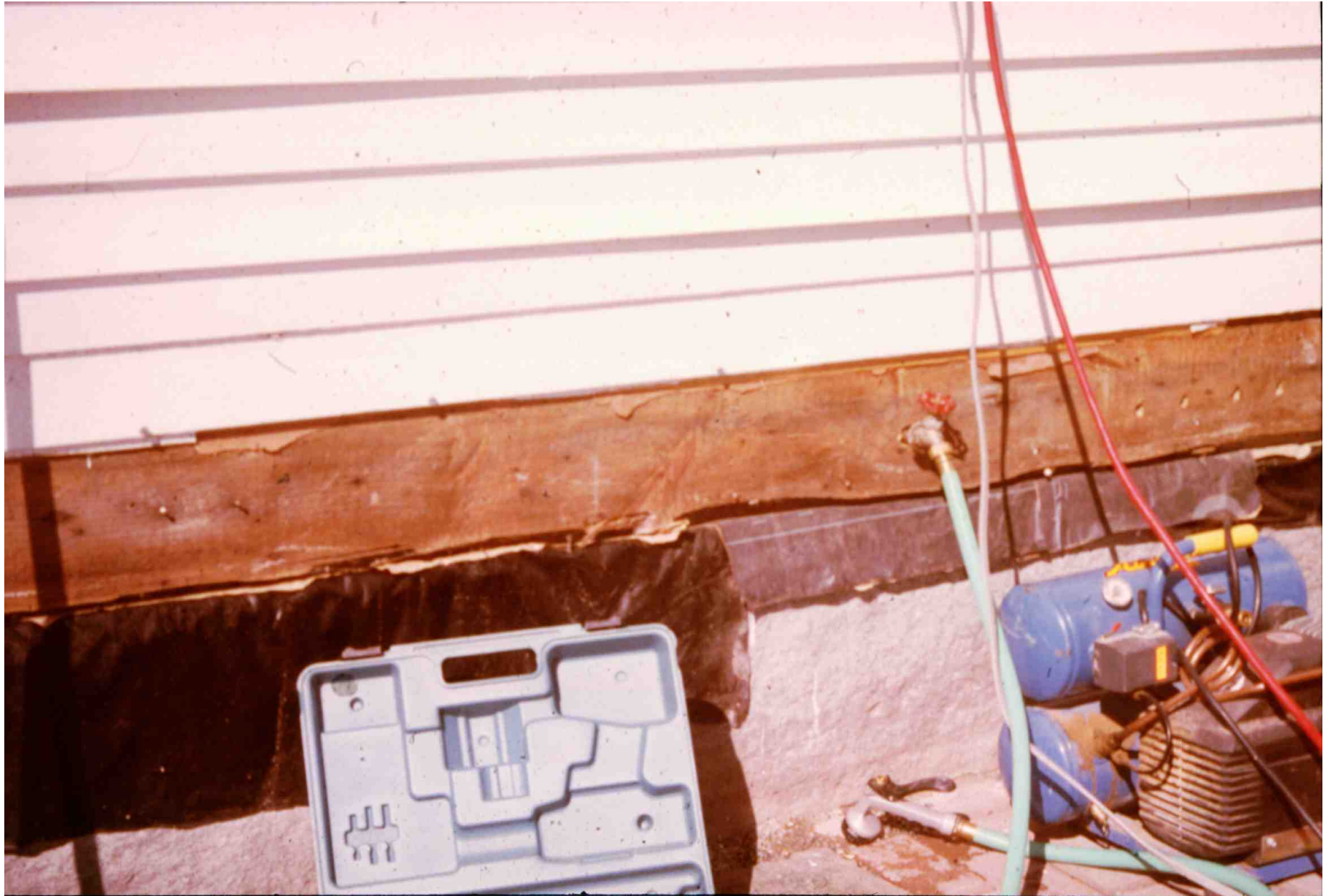






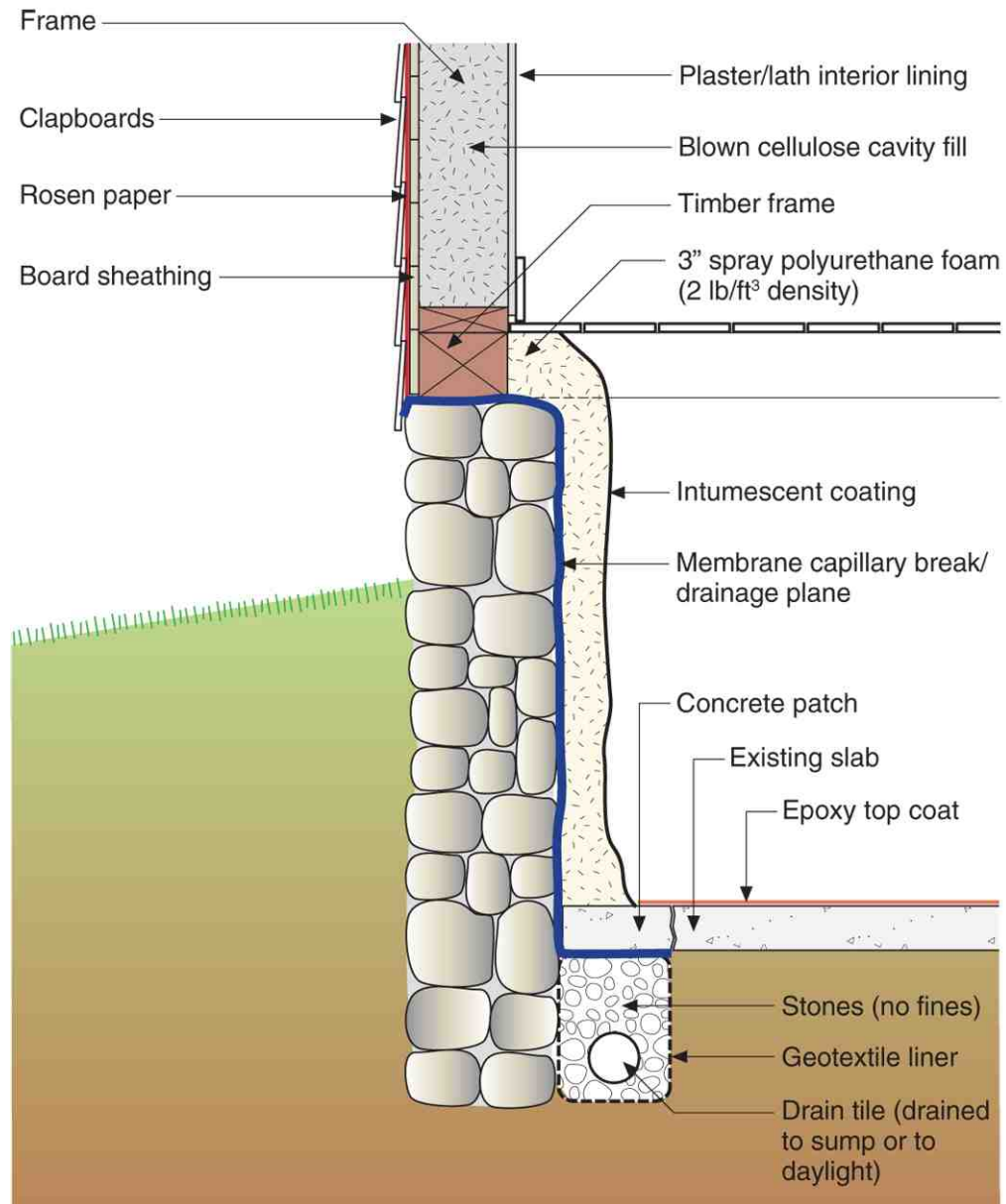












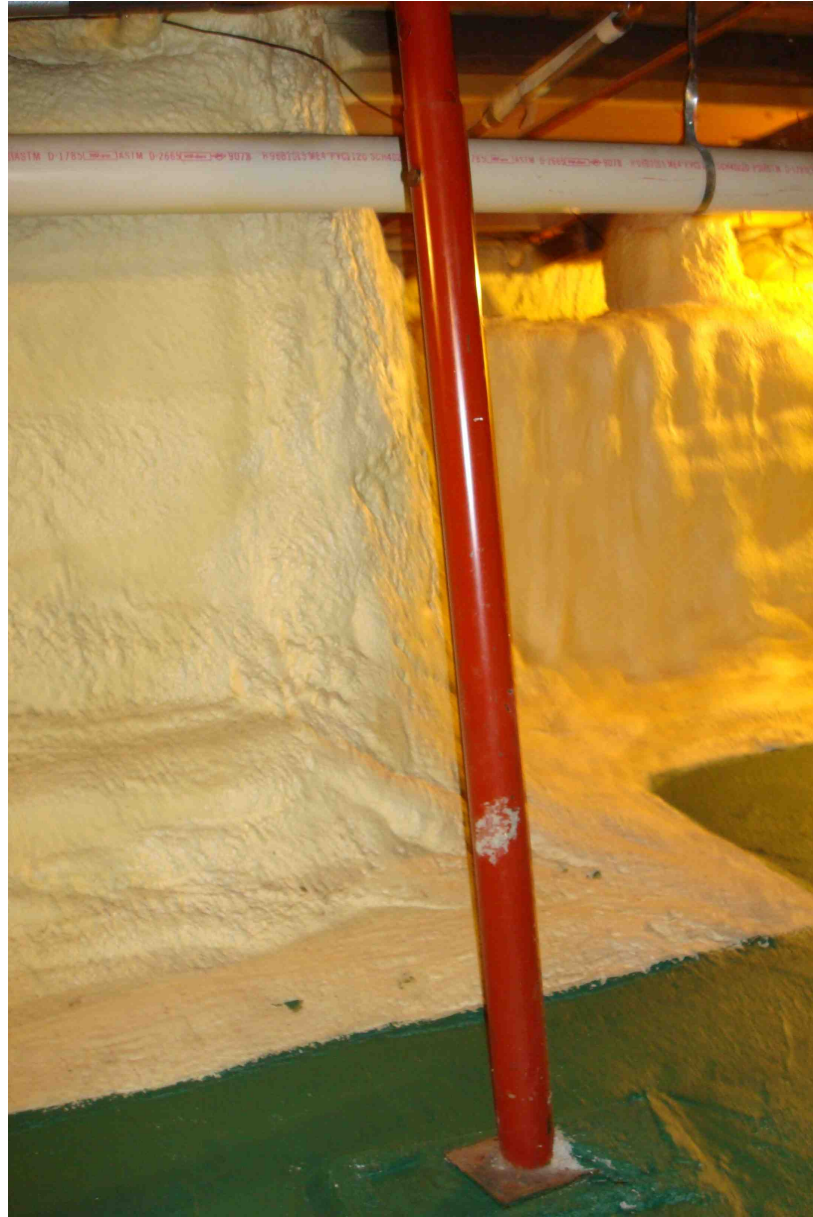






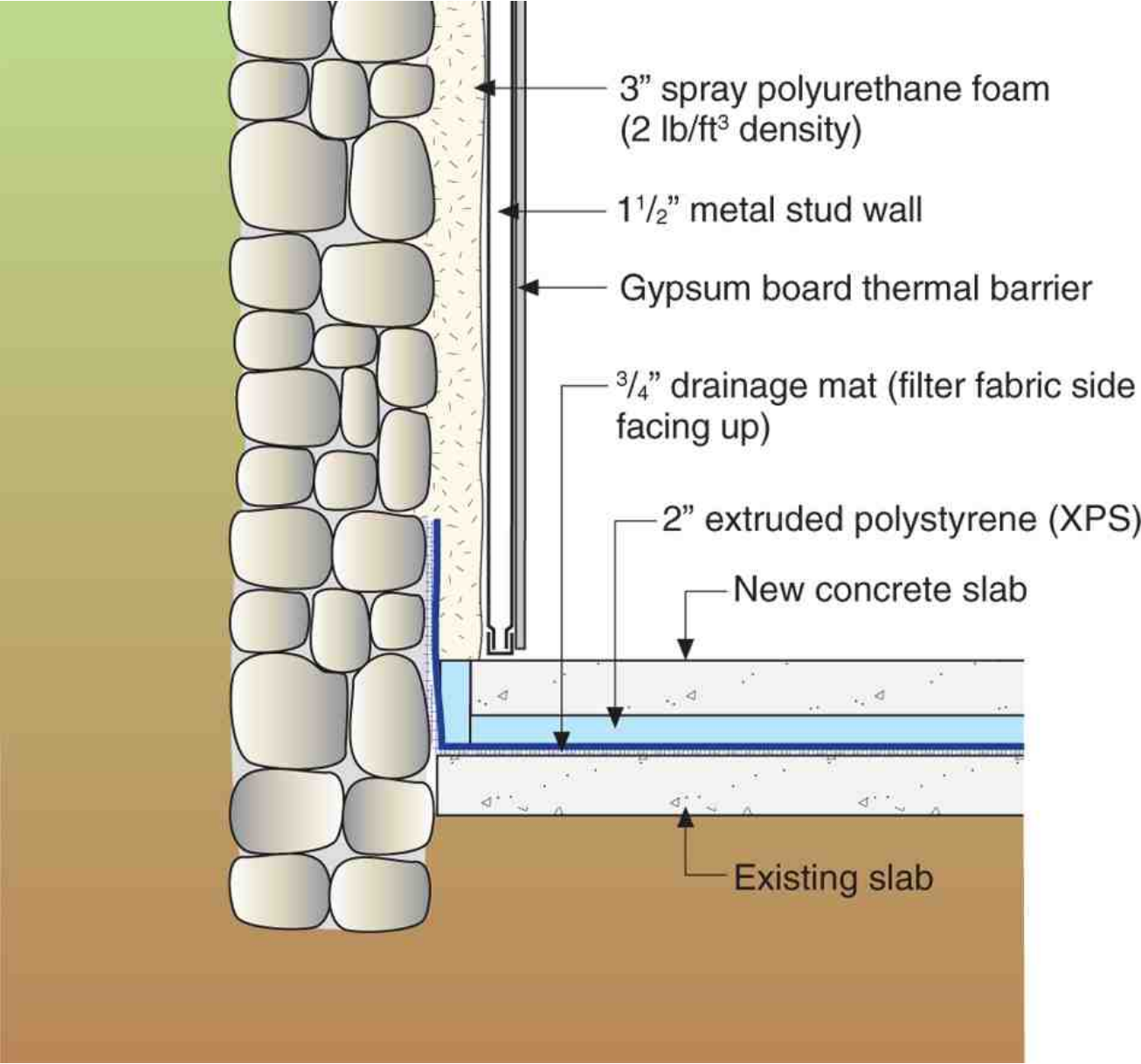
















































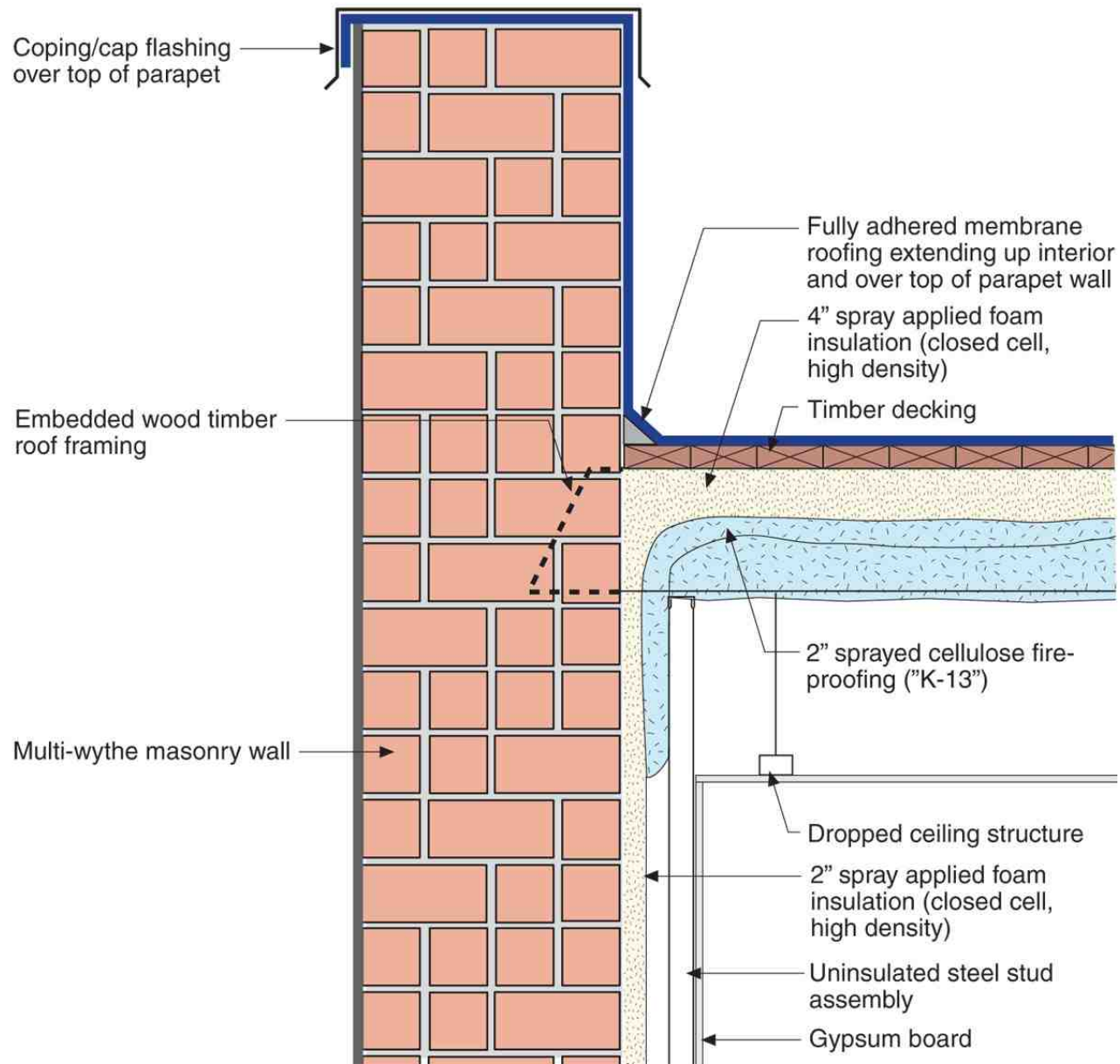




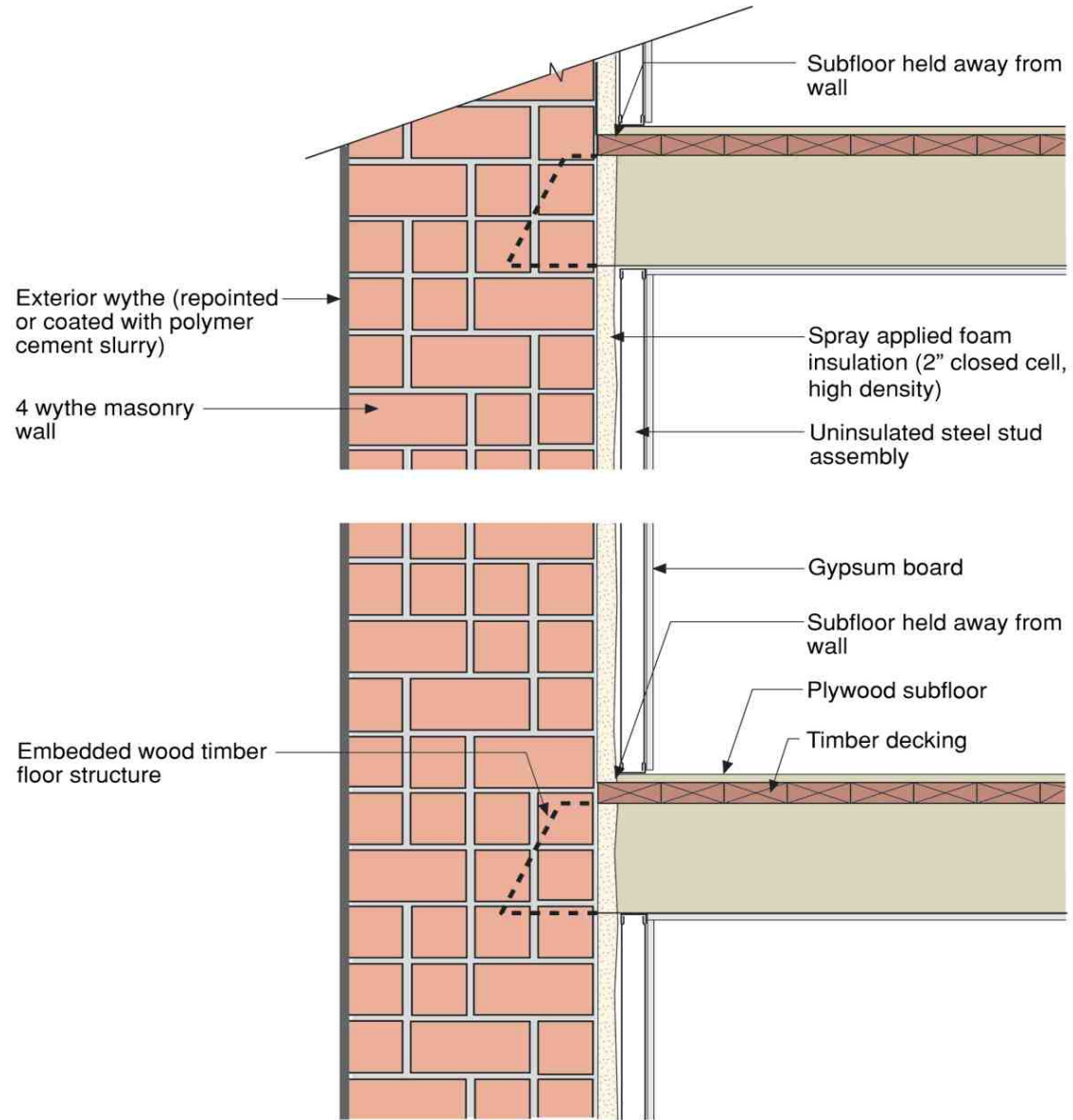


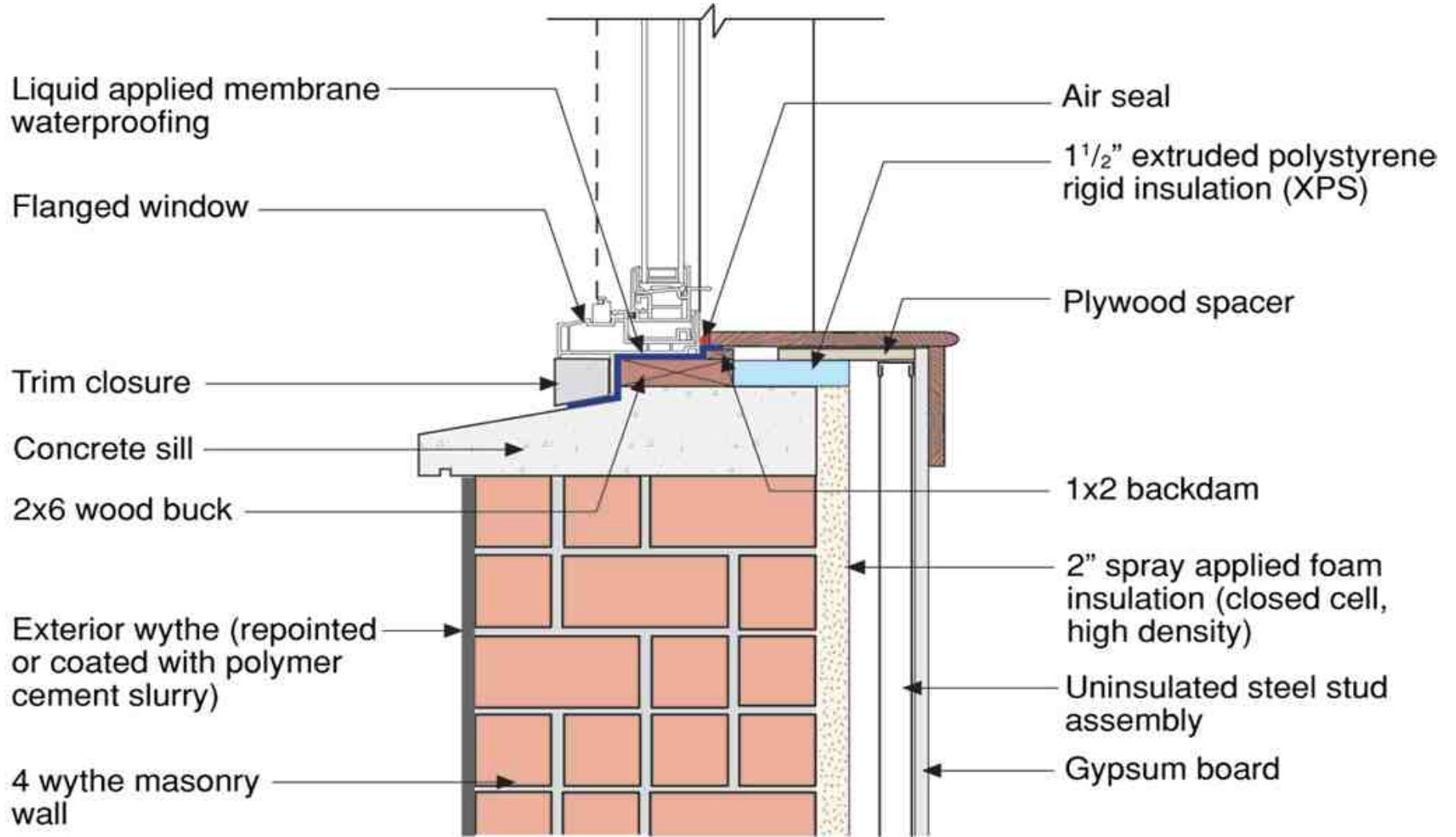








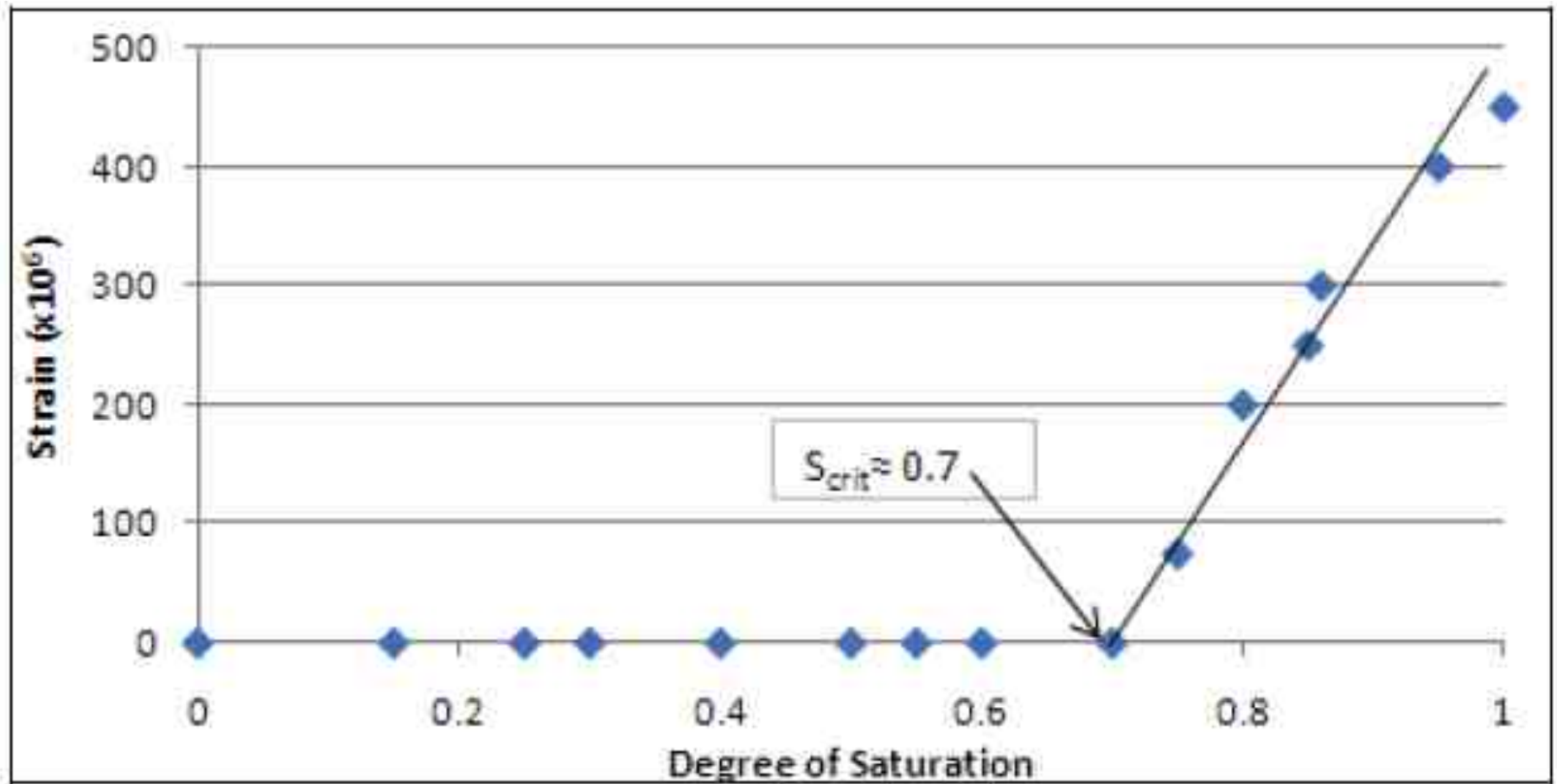






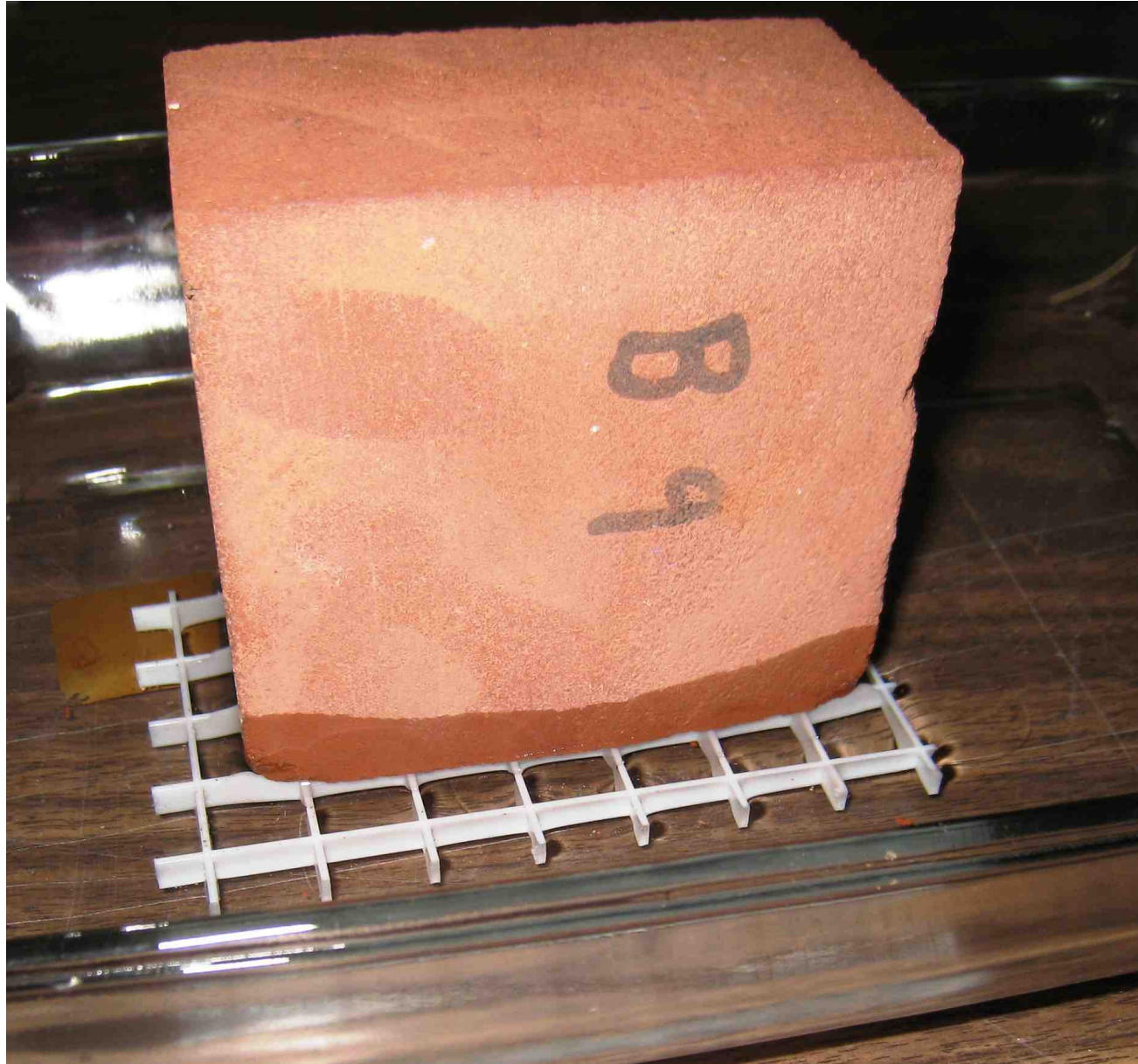


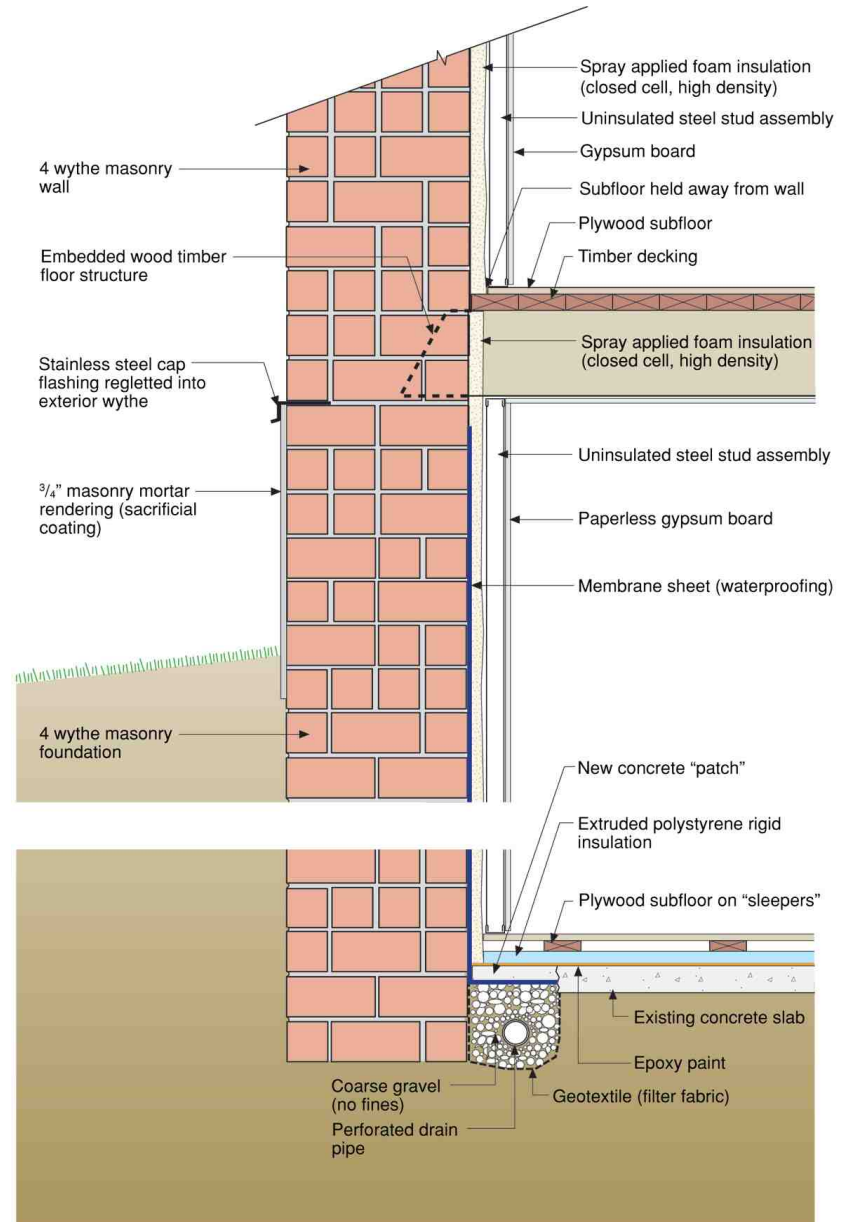


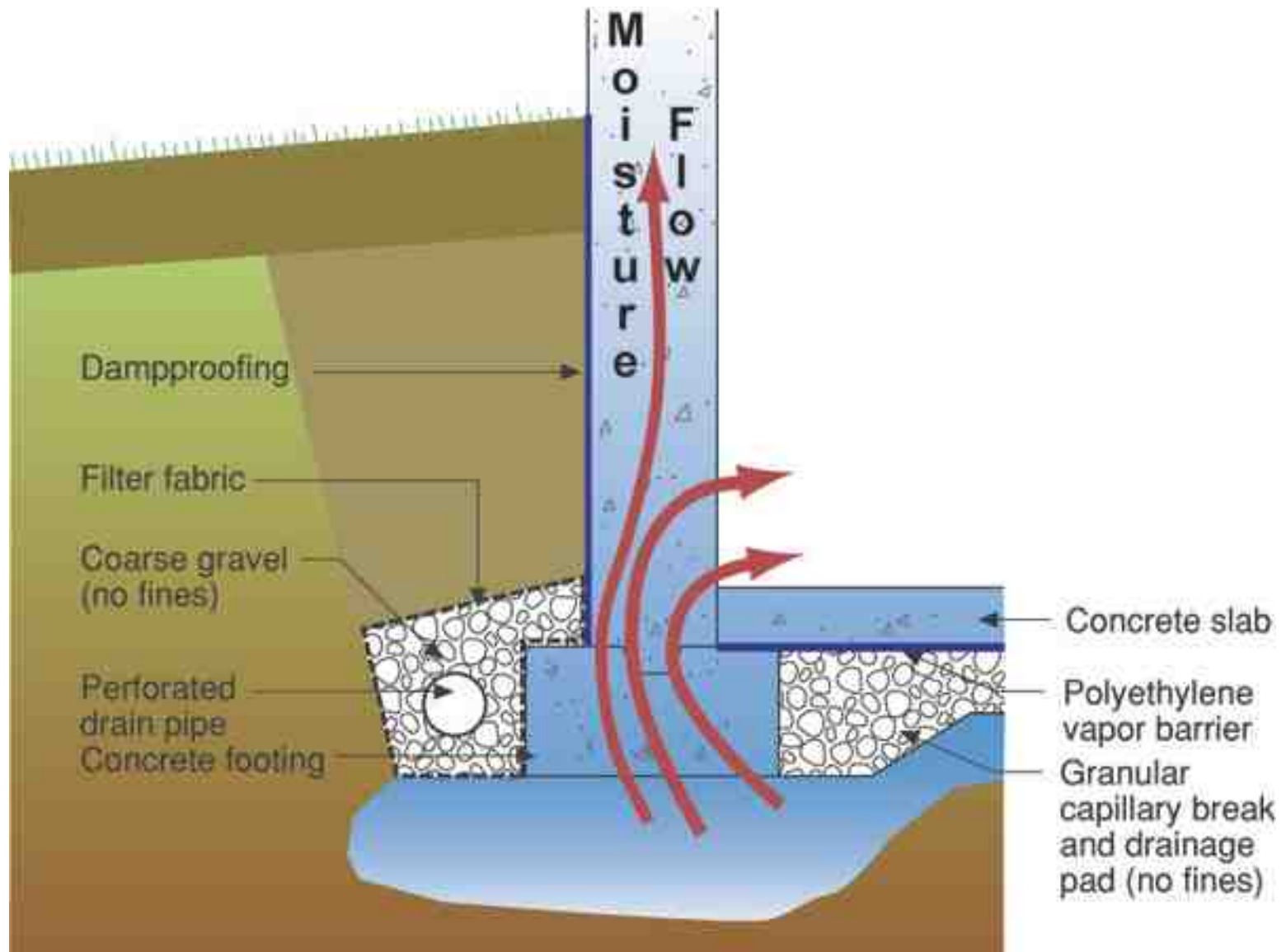




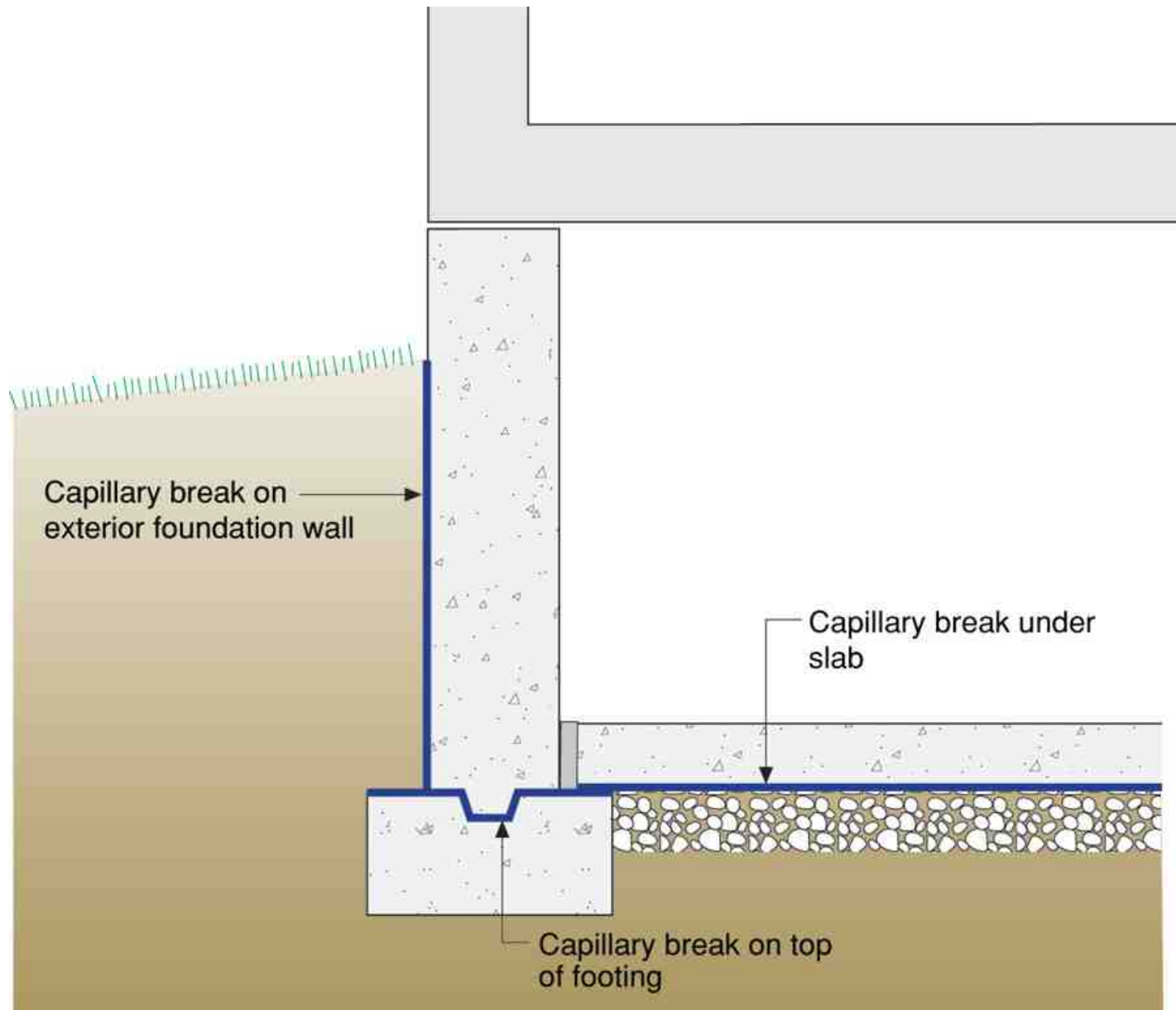






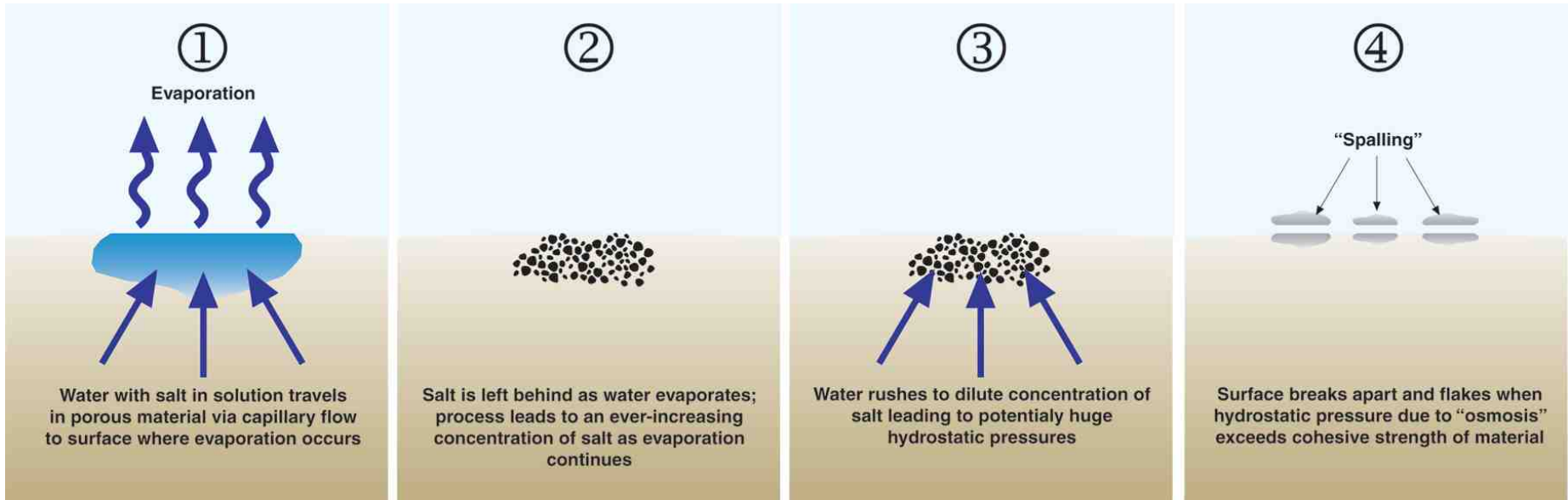






# Capillarity + Salt = Osmosis

- Mineral salts carried in solution by capillary water
- When water evaporates from a surface the salts left behind form crystals in process called efflorescence
- When water evaporated beneath a surface the salts crystallize within the pore structure of the material in called sub-efflorescence
- The salt crystallization causes expansive forces that can exceed the cohesive strength of the material leading to spalling





# Diffusion + Capillarity + Osmosis = Problem

- Diffusion Vapor Pressure 3 to 5 psi
- Capillary Pressure 300 to 500 psi
- Osmosis Pressure 3,000 to 5,000 psi







