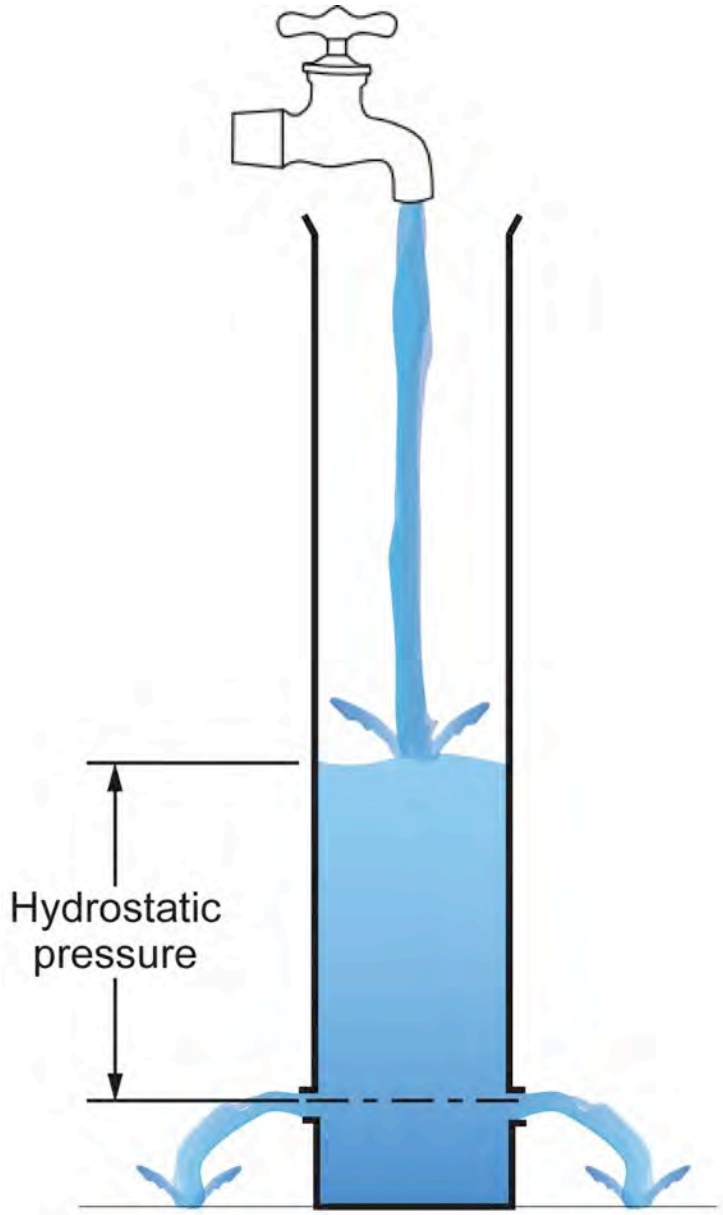
Joseph Lstiburek, Ph.D., P.Eng, ASHRAE Fellow

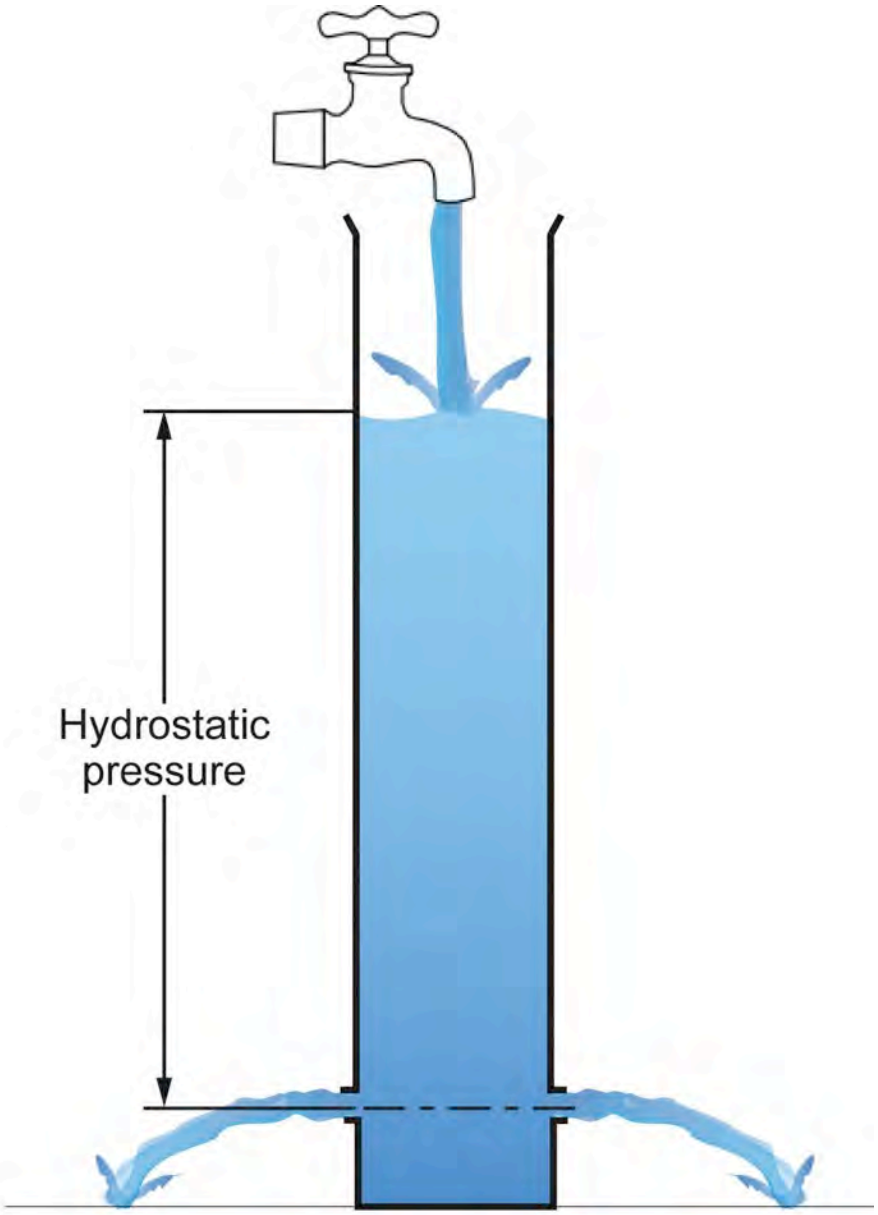
Building Science

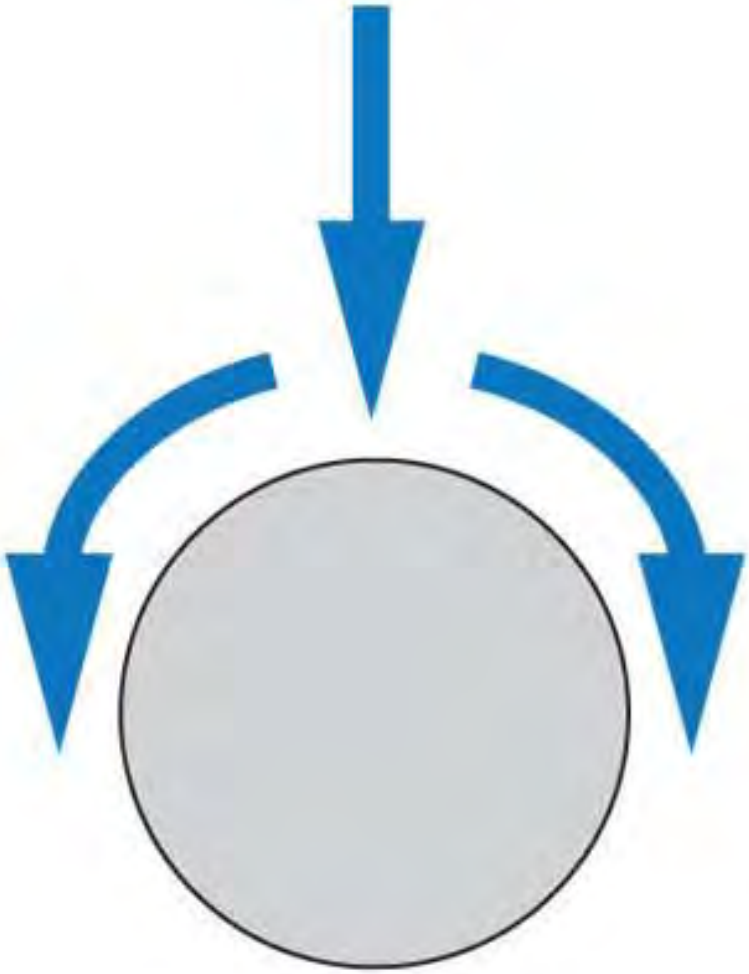
Adventures In Building Science

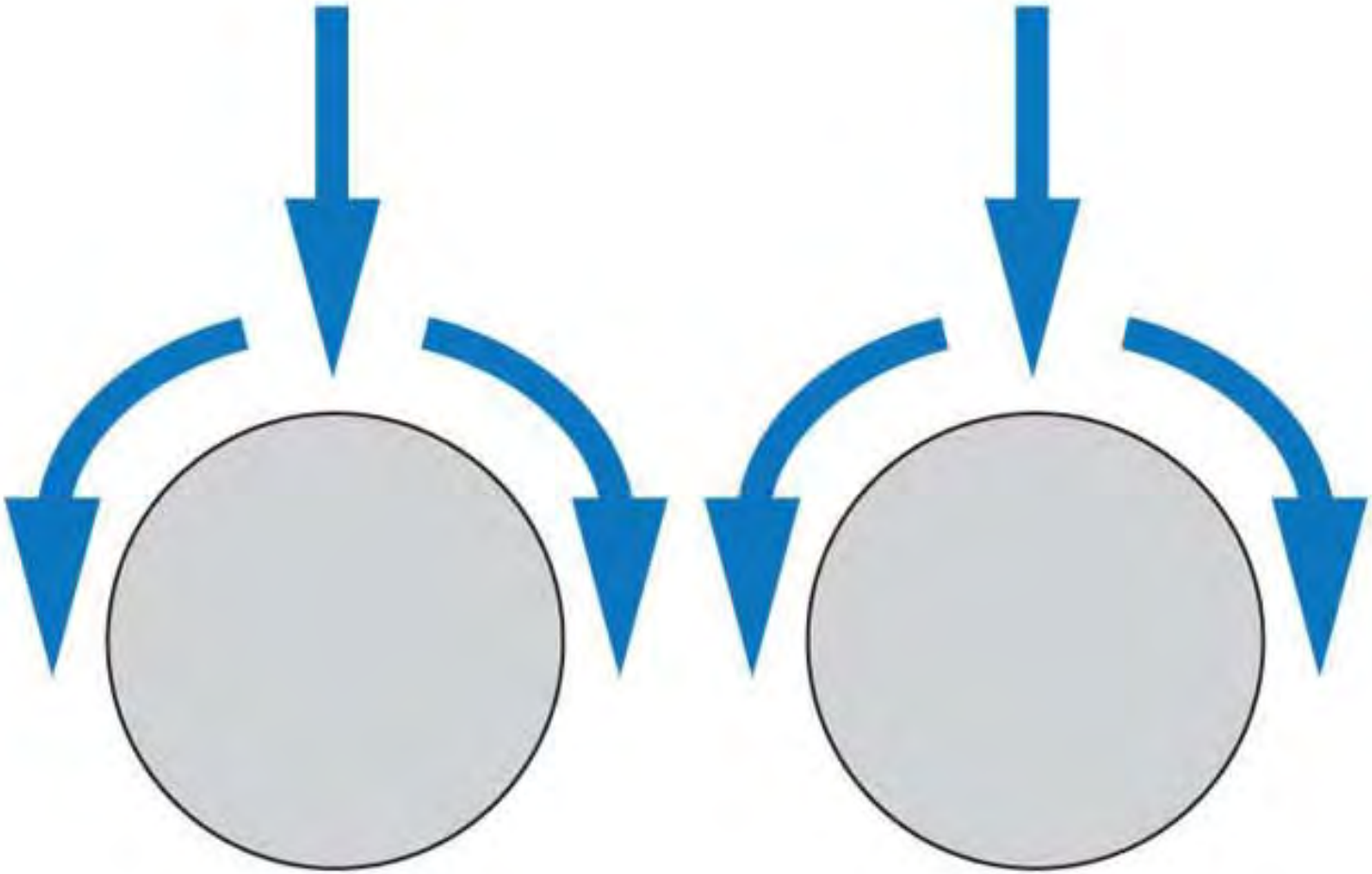
www.buildingscience.com

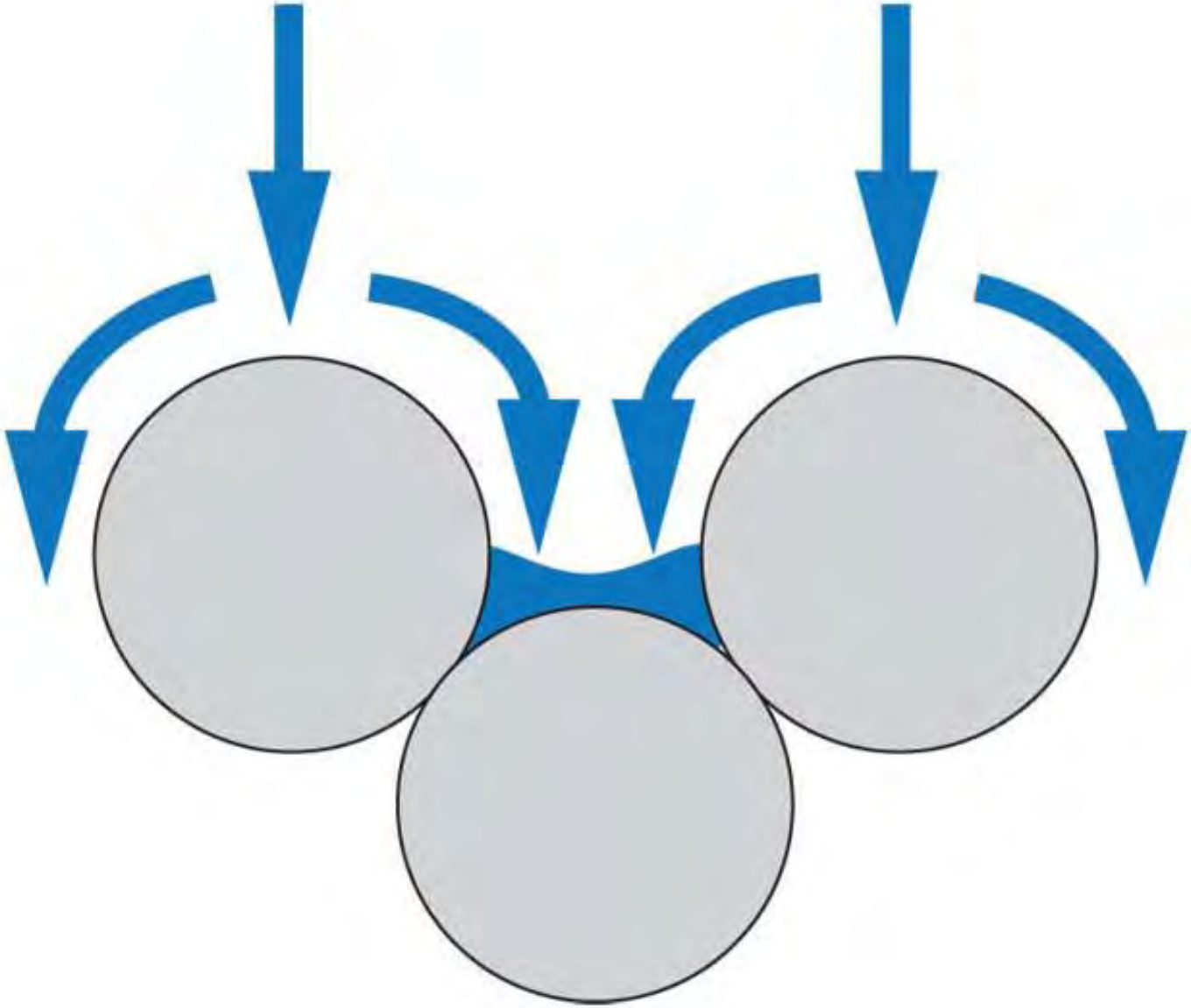
Rain

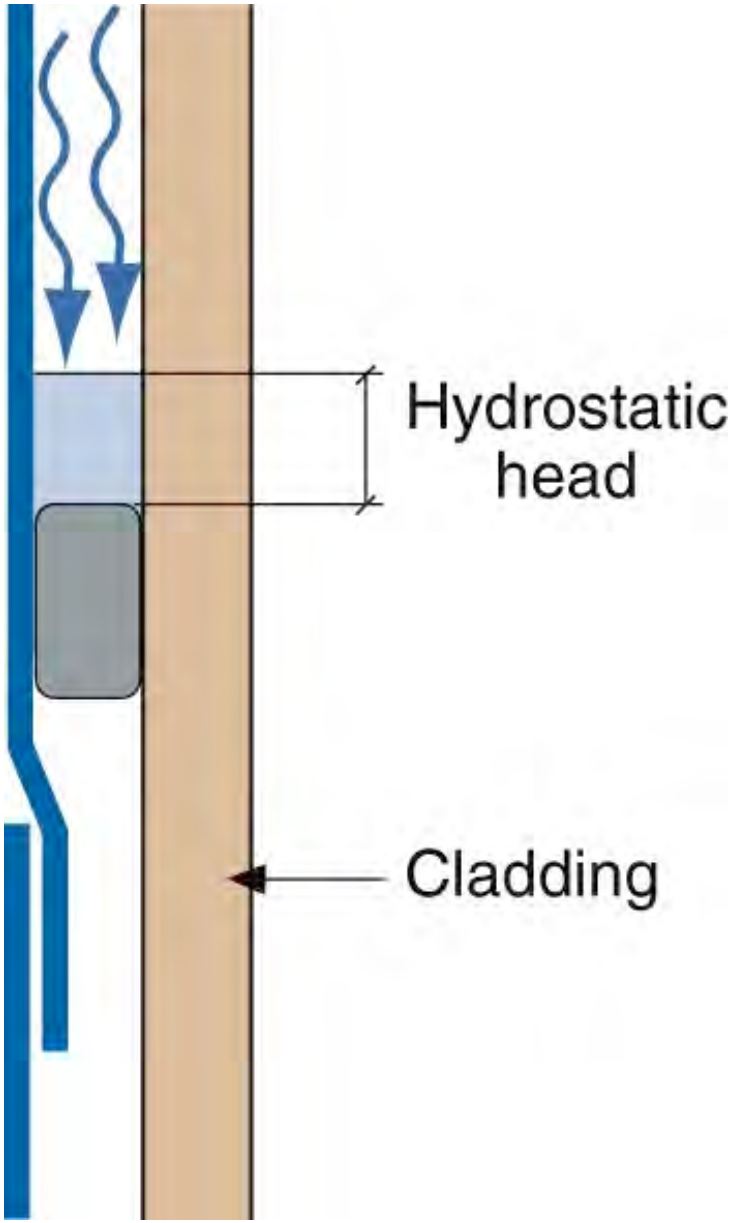

Hydrostatic
pressure

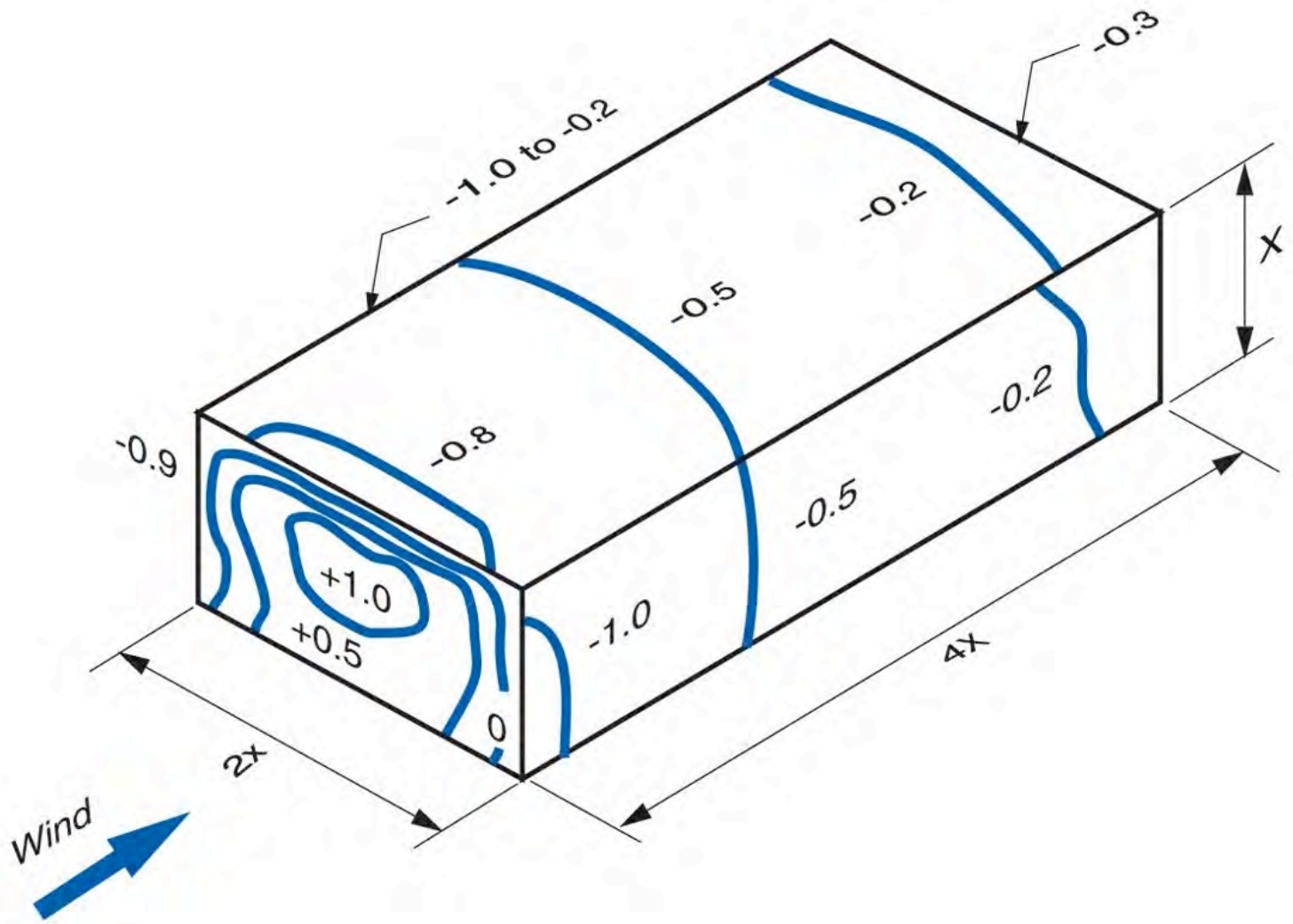

Hydrostatic
pressure



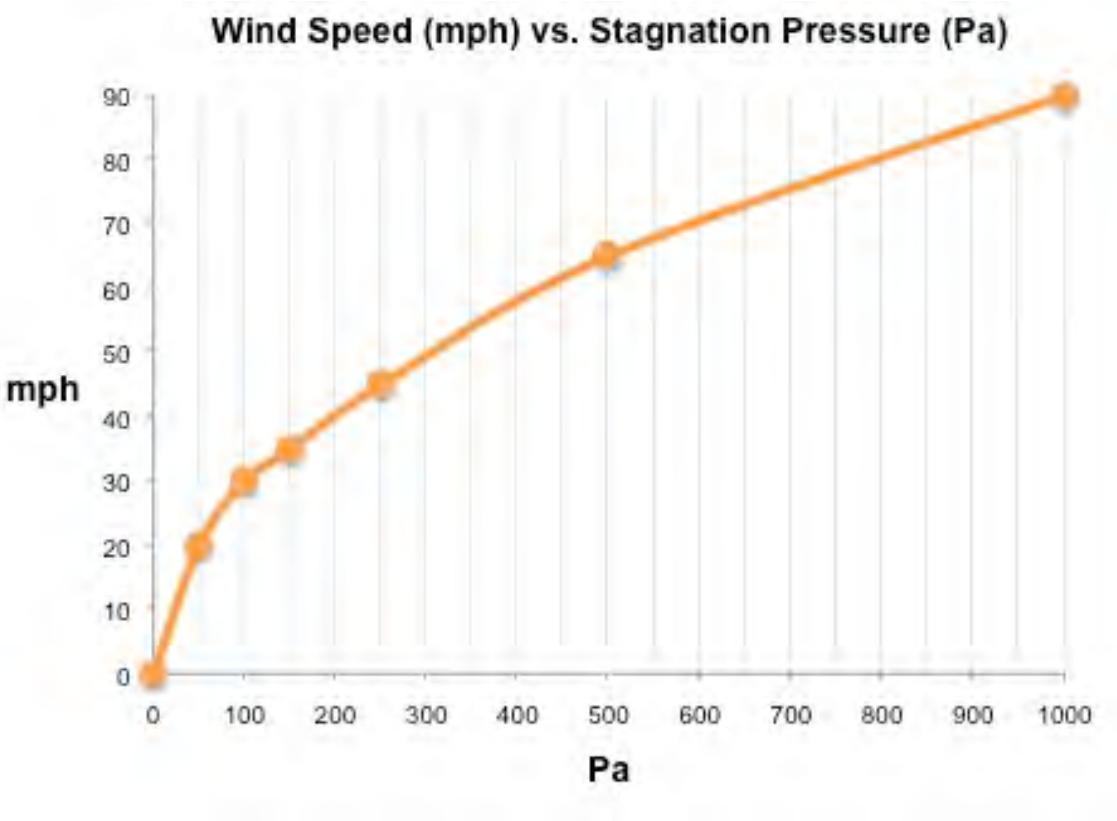





Hydrostatic
head
Cladding

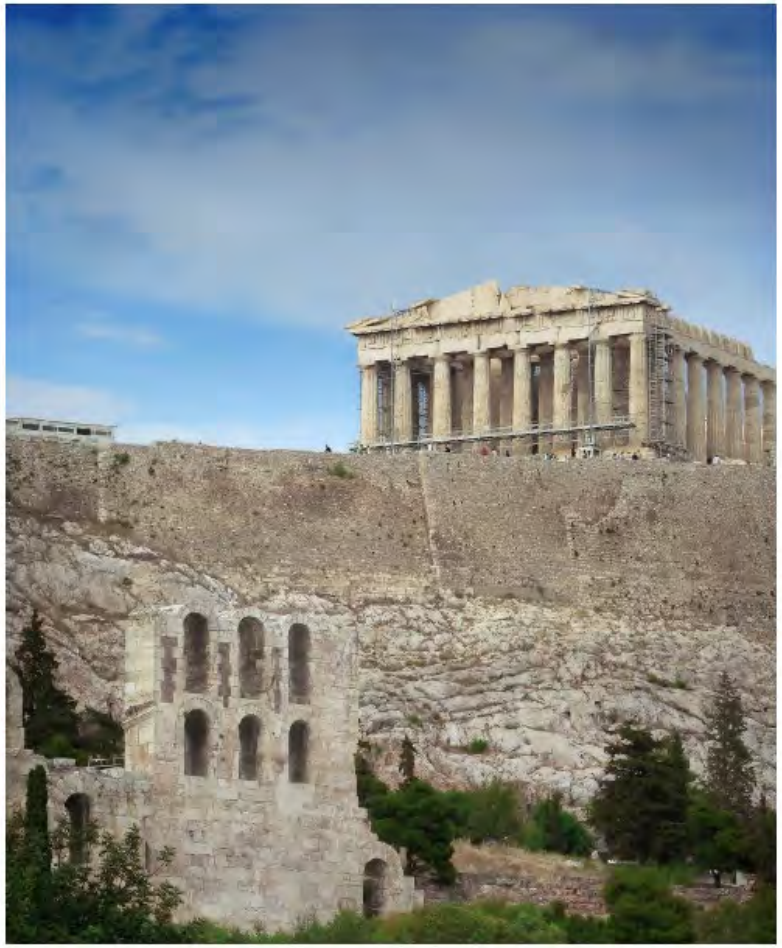

-0.3
-1.0 to -0.2
-0.2
-0.5
-0.2
-0.9
-0.8
-0.5
+1.0
+0.5
-1.0
0
X
2X
4X
Wind

Pascals		mph
50	Pa =	20 mph
100	Pa =	30 mph
150	Pa =	35 mph
250	Pa =	45 mph
500	Pa =	65 mph
1,000	Pa =	90 mph




panago
QUILTED TREASURES


panago
QUILTED TREASURES



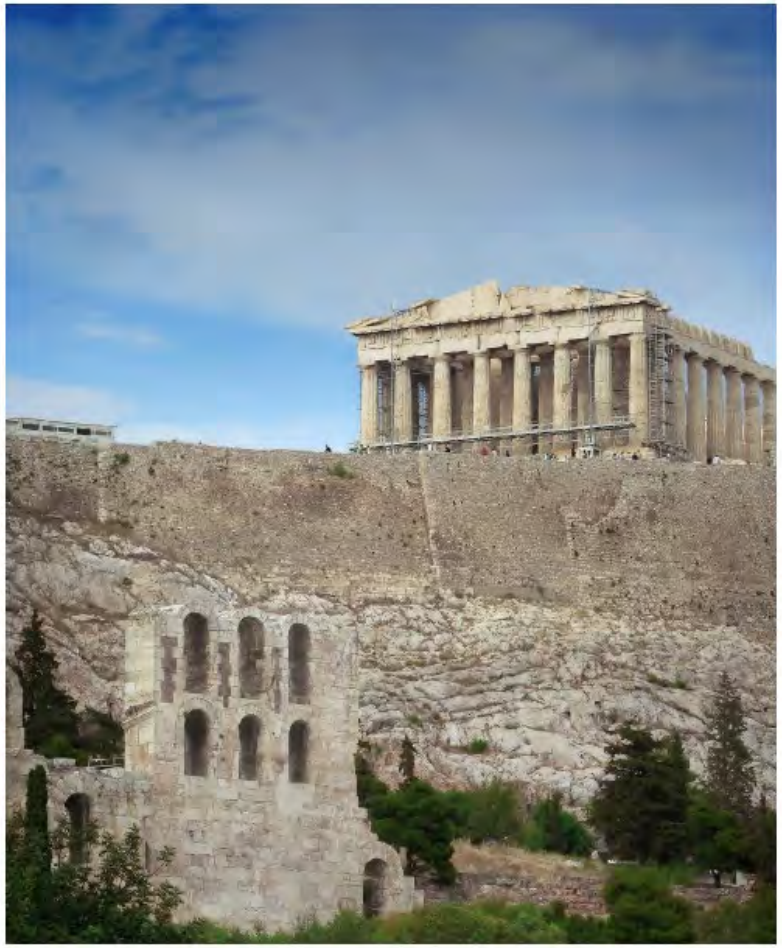

Tyvek
DrainWrap
DUPONT The miracles of science
Styrofoam


N-6
IV-7


W1
W3

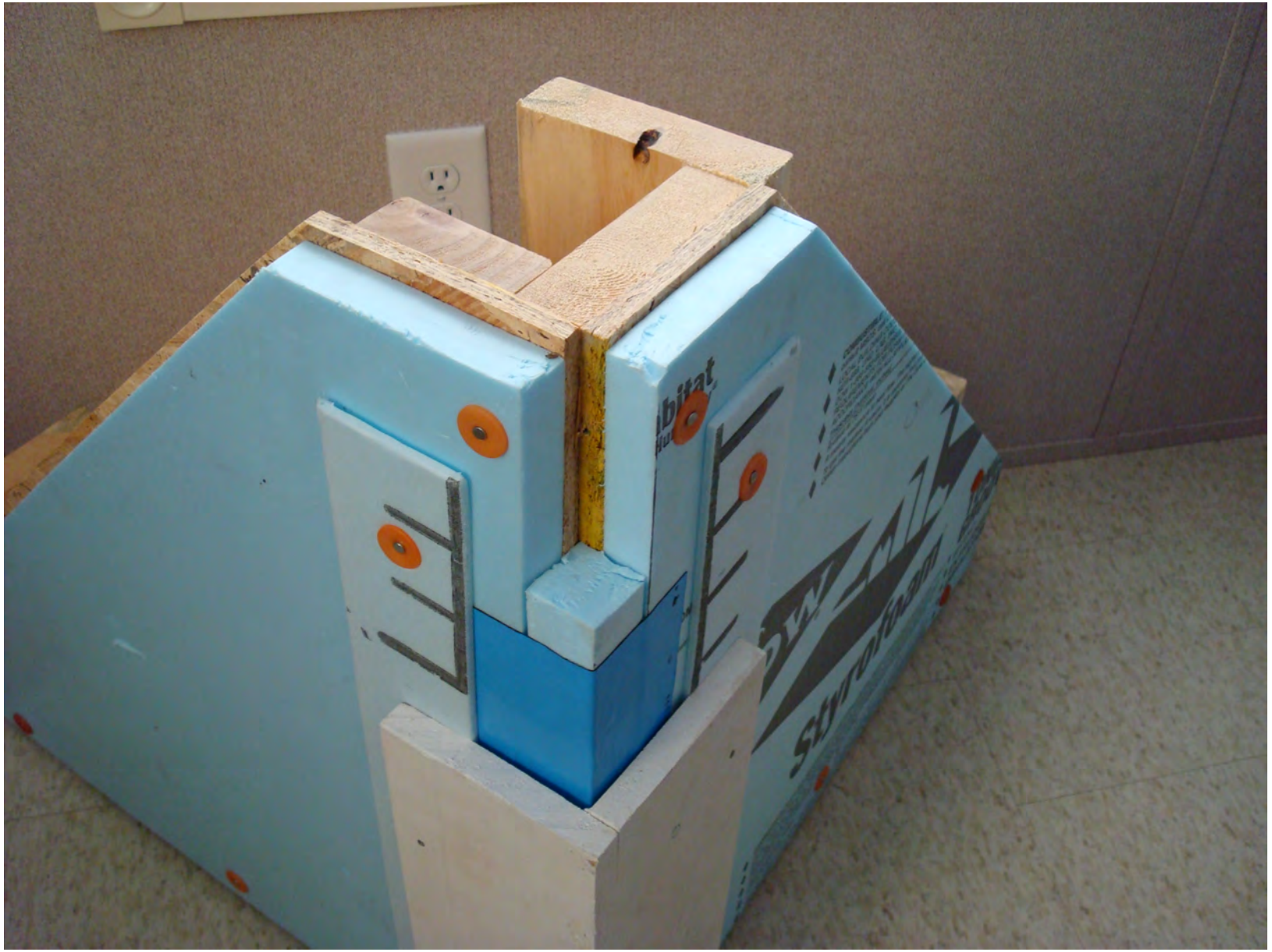

LOWER
N-2


panago
QUILTED TREASURES

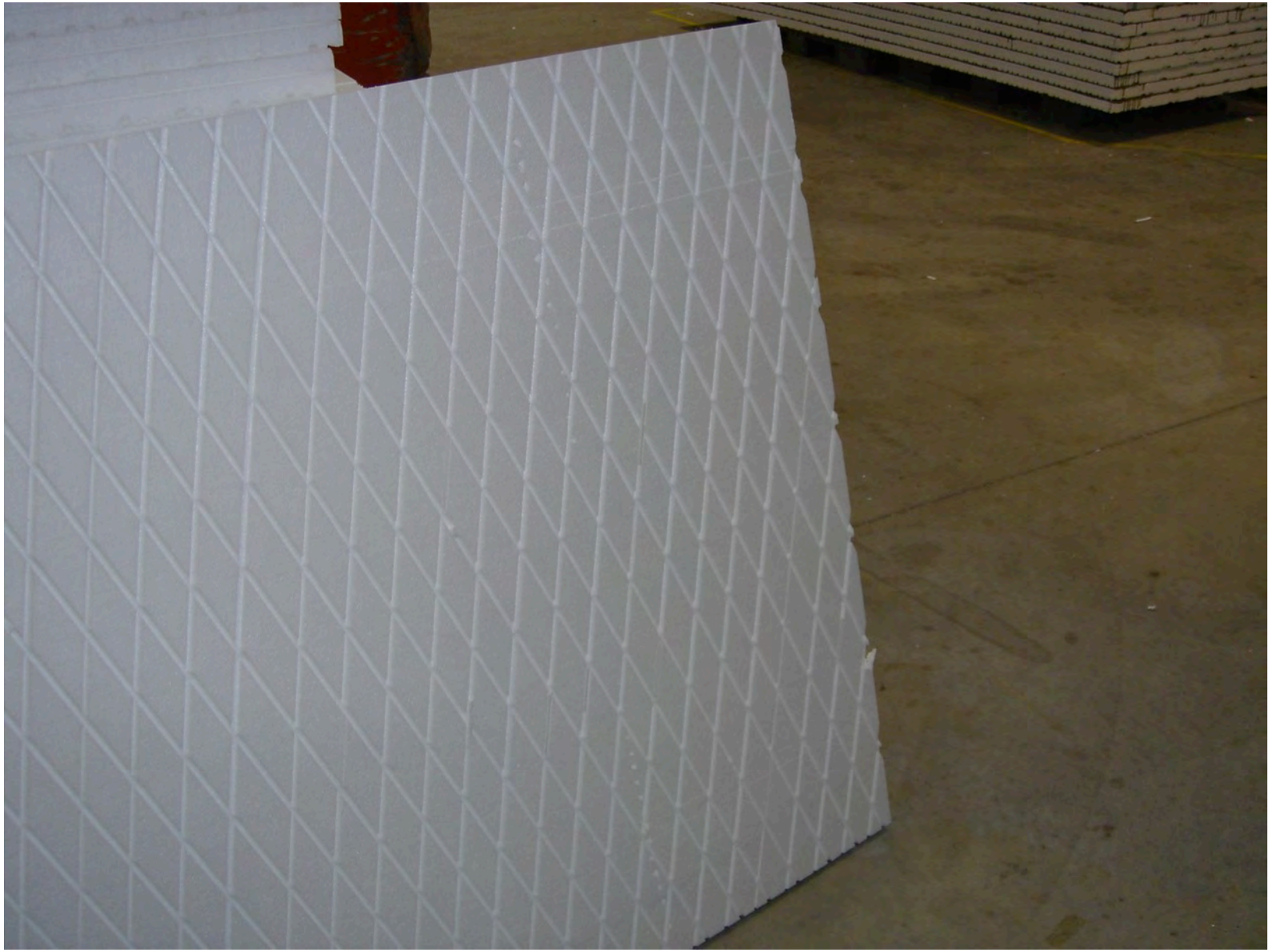



yvek
omeWrap
Tyvek
HomeWrap

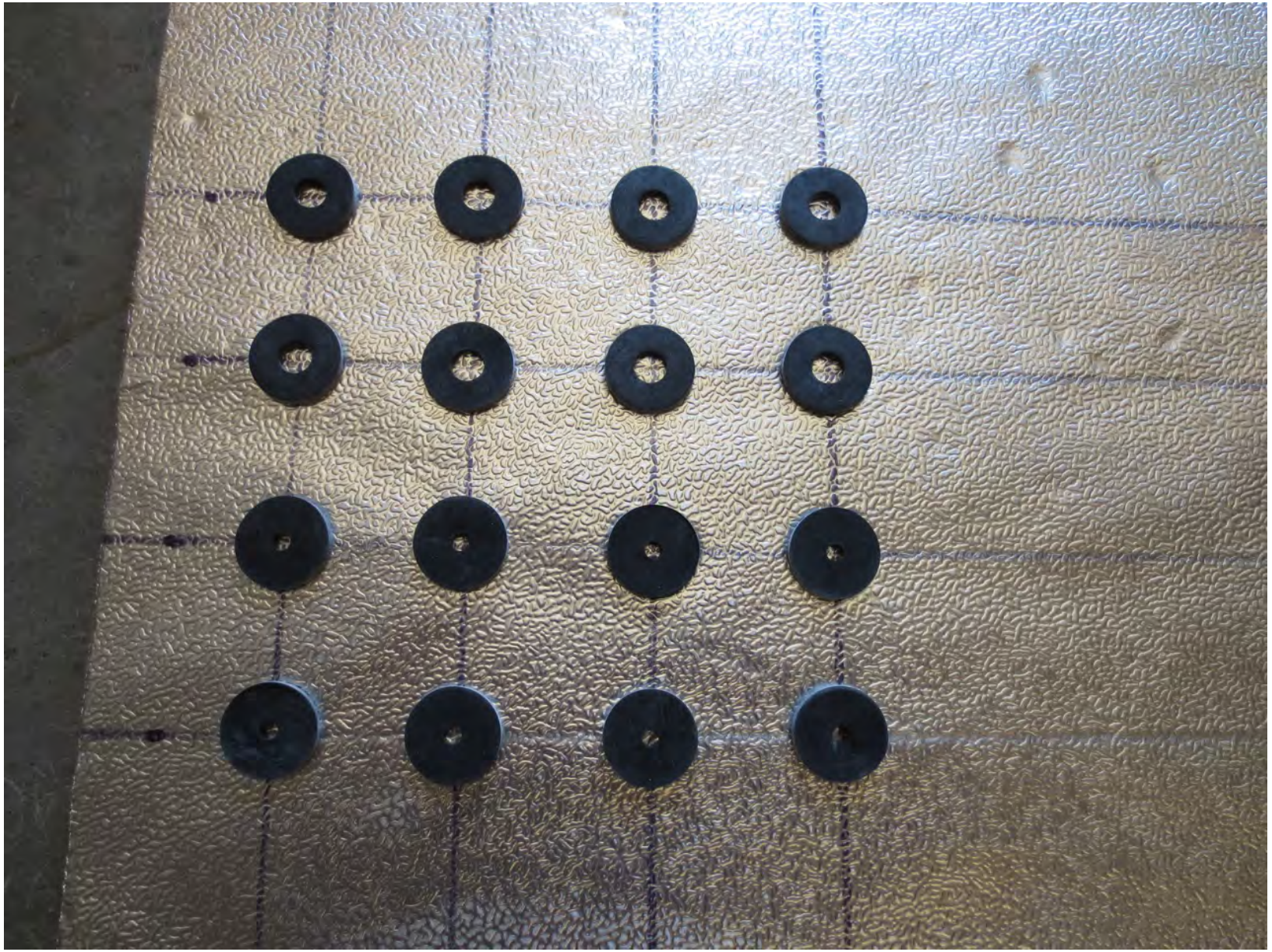

Call 1-800-44TYVEK
WWW.TYVEK.COM


Styrofoam

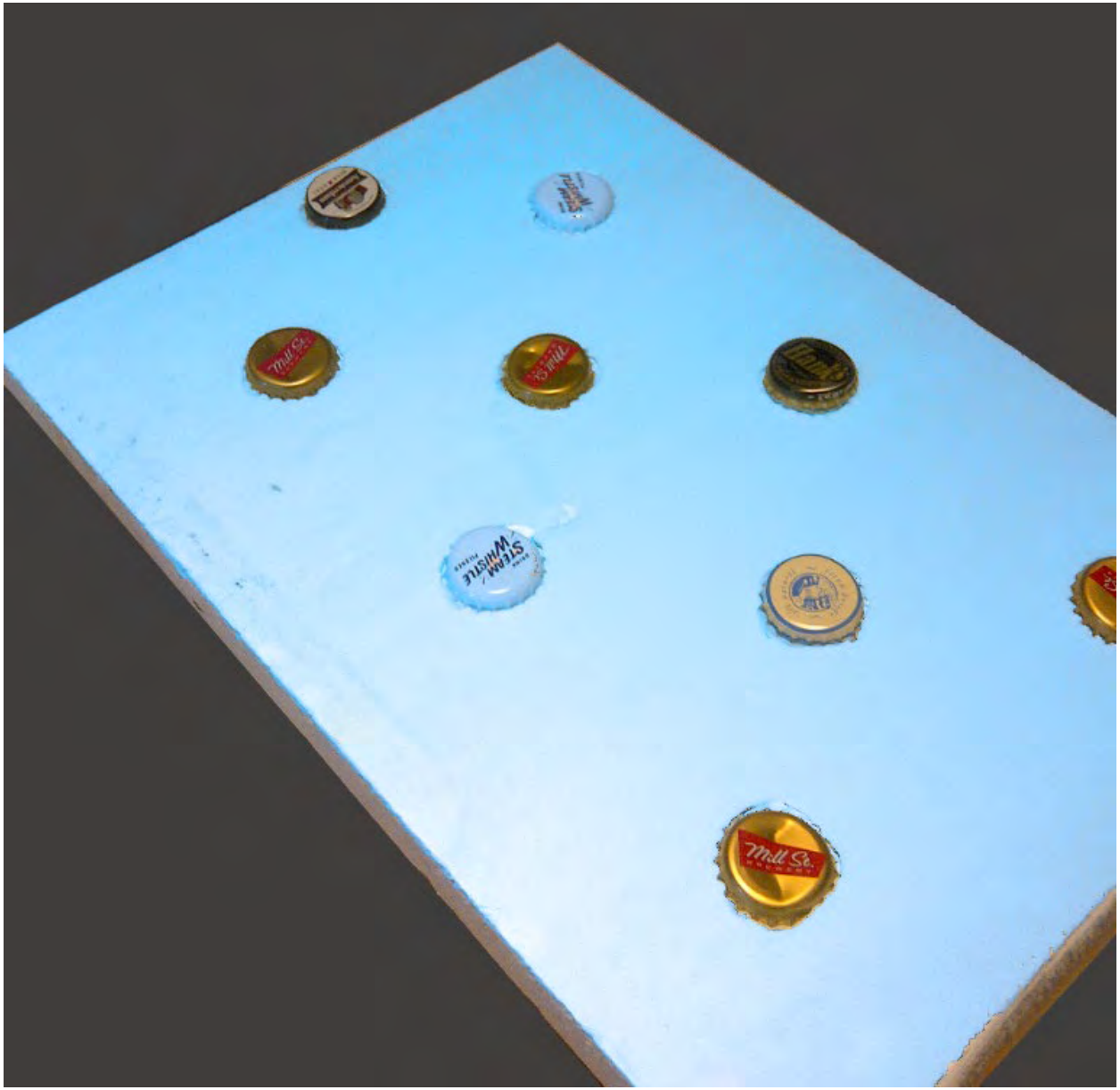

DuPont
Tyvek
Tape
DuPont
Tyvek
Tape



Rain Screen



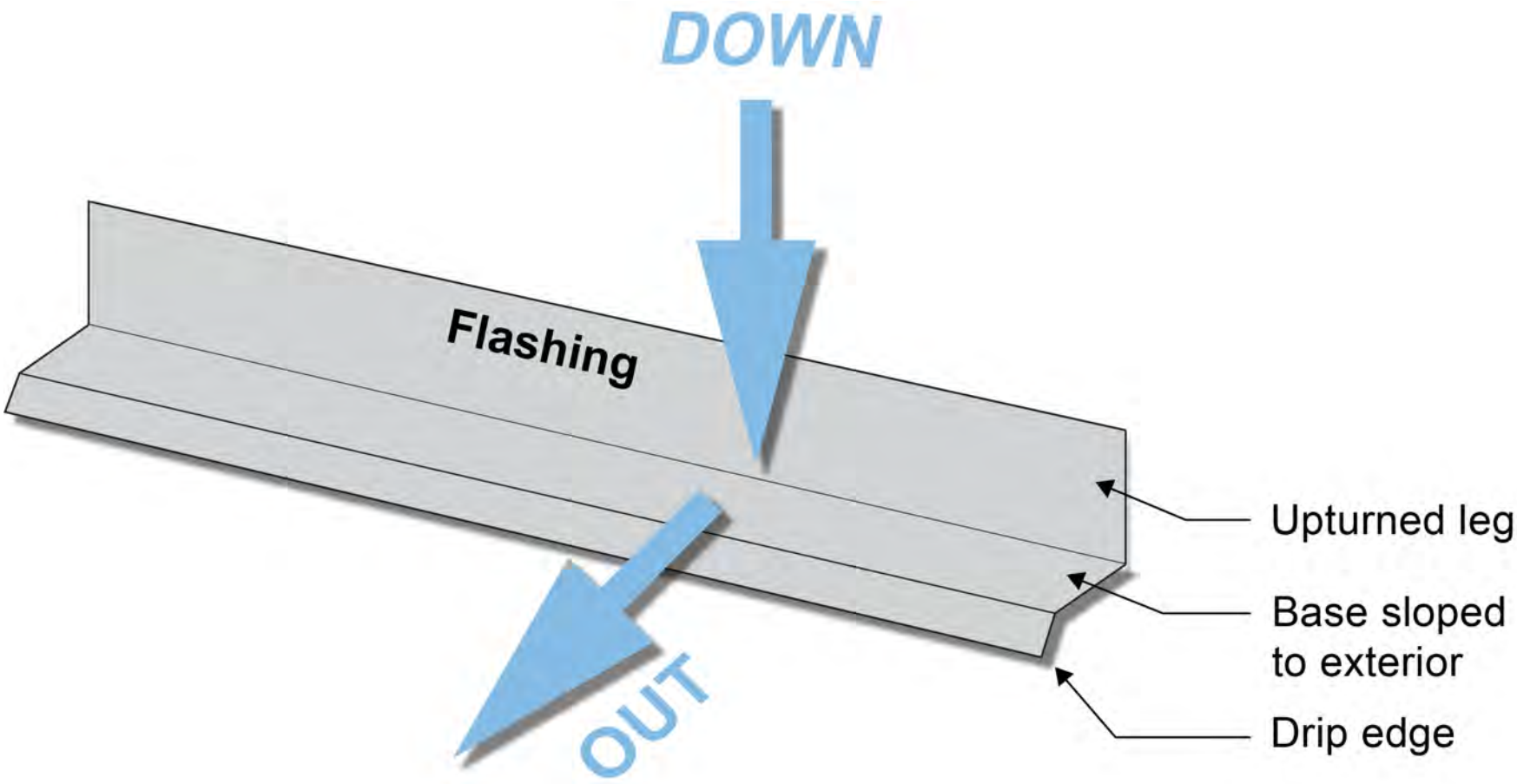
Beer Screen?

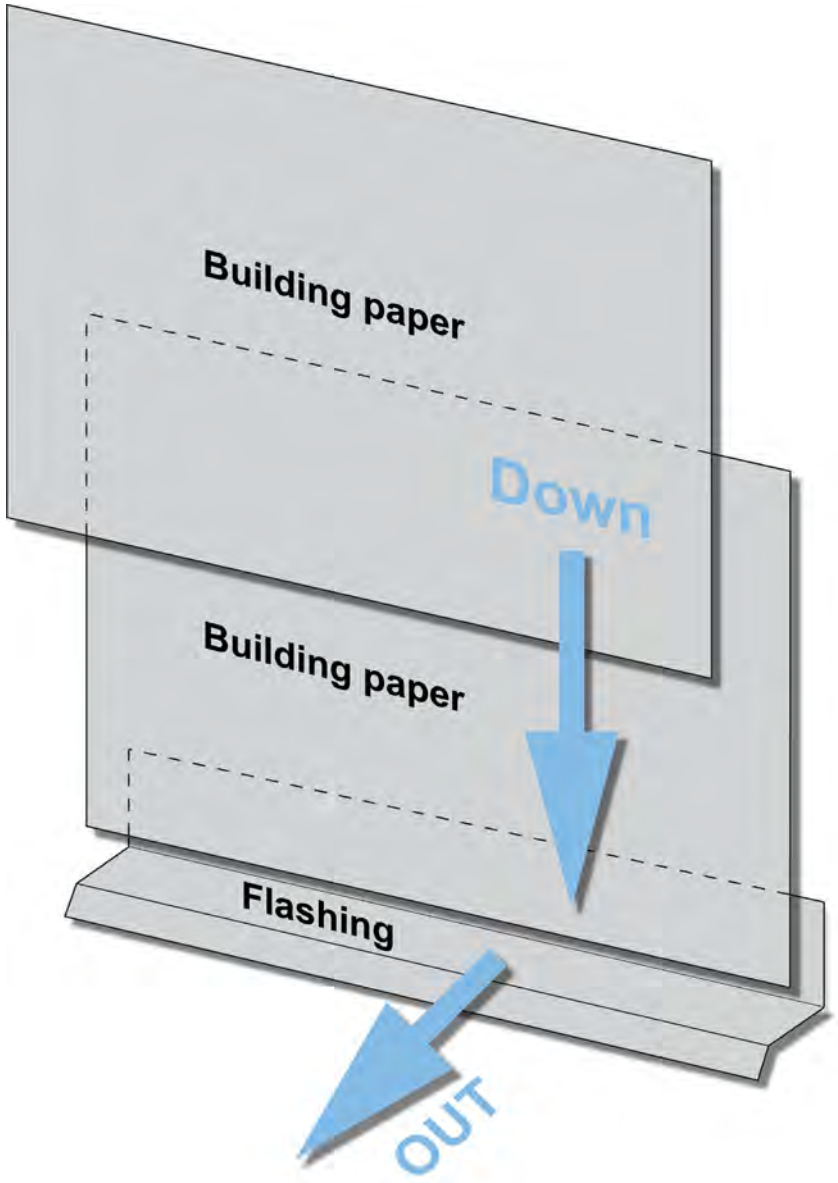

Mill St.
Steam Whistle
Mill St.

Drain the Rain on the Plane

If You Want to Save Cash…Flash

Don’t Be a Dope…Slope

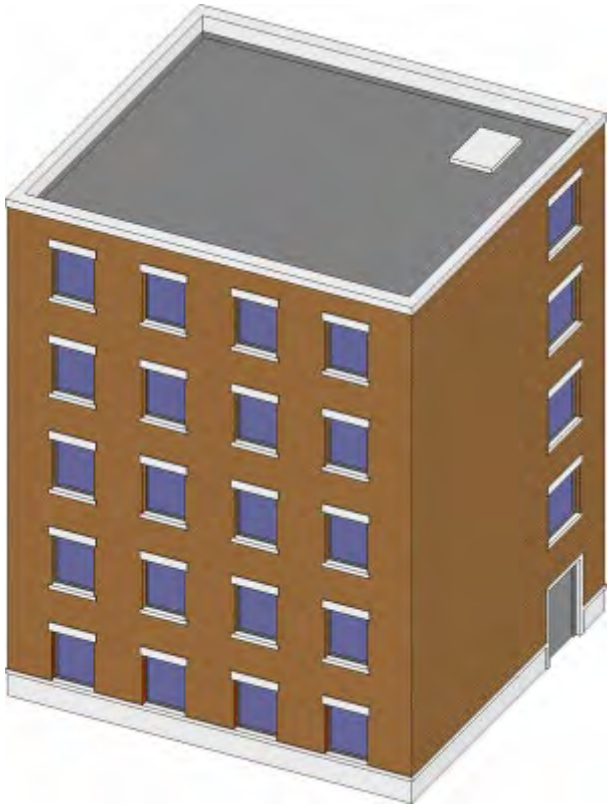

DOWN
Flashing
OUT
Upturned leg
Base sloped
to exterior
Drip edge


Building paper
Down
Building paper
Flashing
OUT

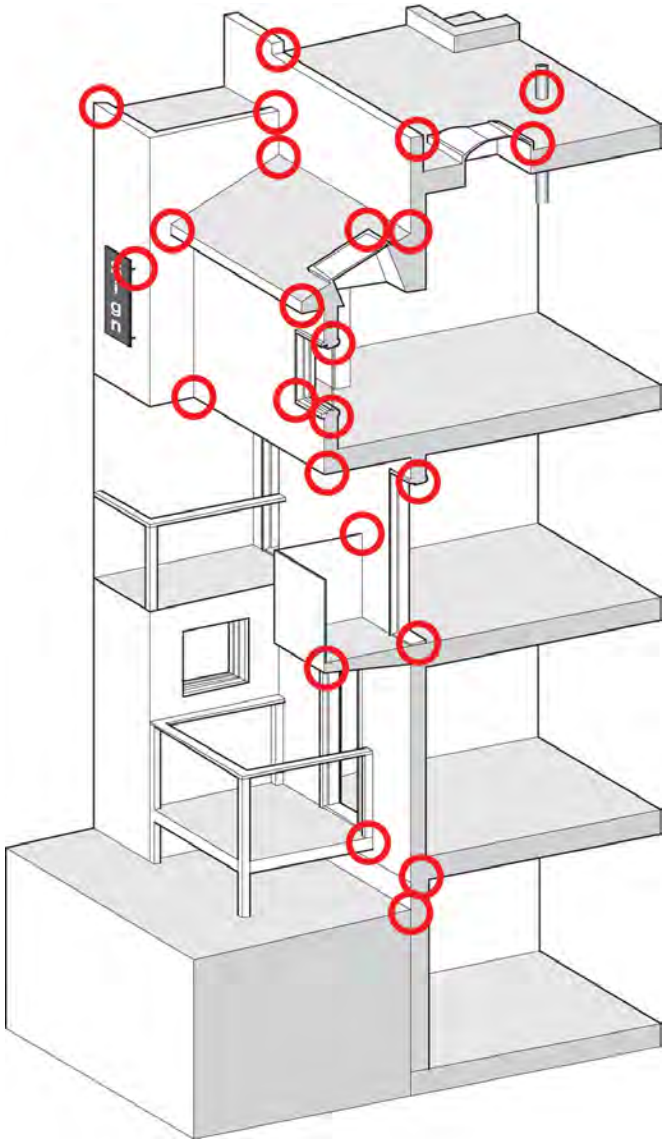

GP
sGlass™
eathing
GP
DensG
Sheathi
CAUTION!
THIS SIDE OUT
ROOFS.

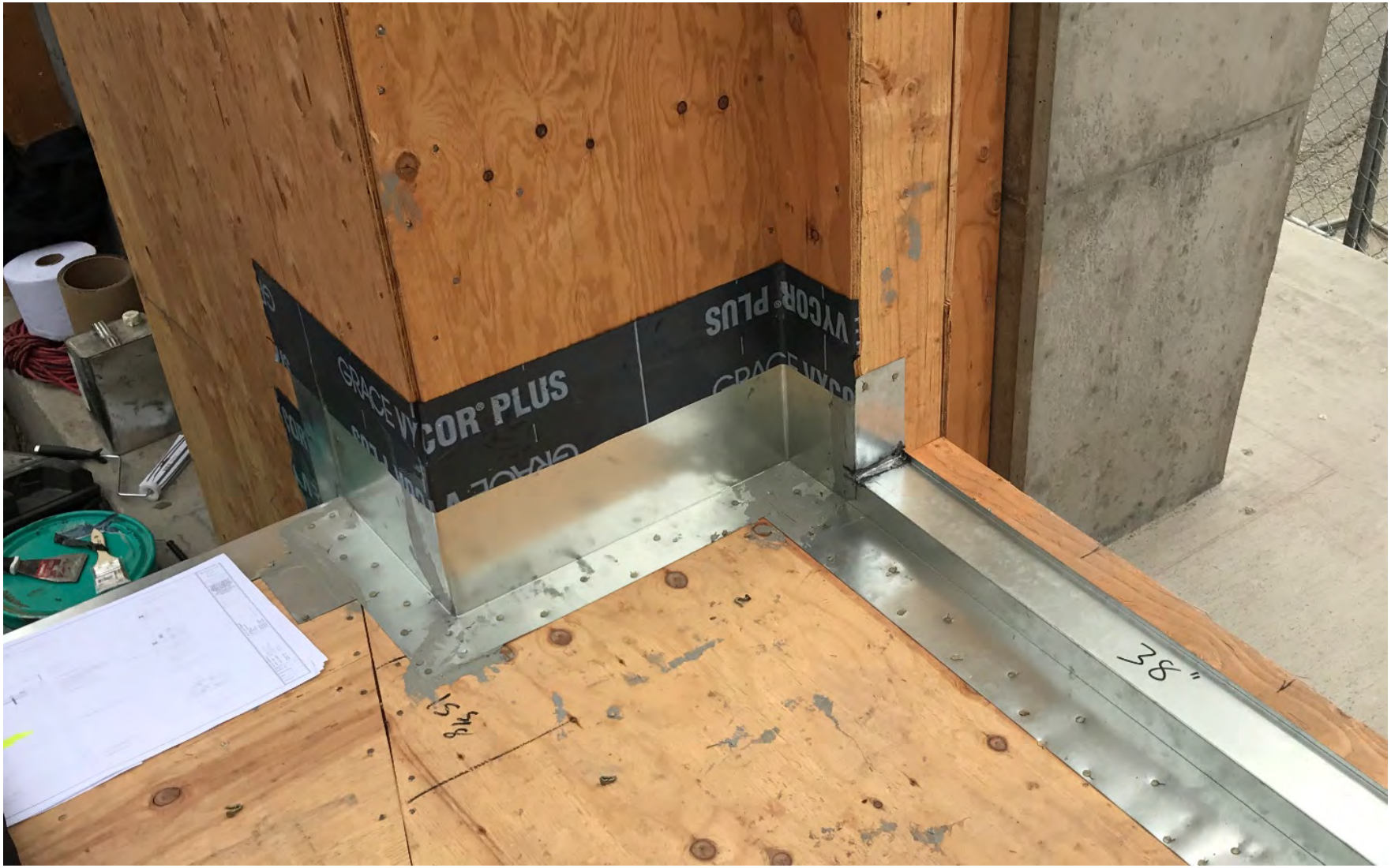

rmax ci ™
Isolant extérie
Thermax ci
Aislamiento Ext
THERM X ci

Commercial Enclosure: Simple Layers



- Structure
- Rain/Air/Vapor
- Insulation
- Finish




GRACE VYCOR® PLUS
36"

GP
DensGlass
Sheathing
Polyguard
www.polyguardproducts.com


DUPONT
MEL-ROL

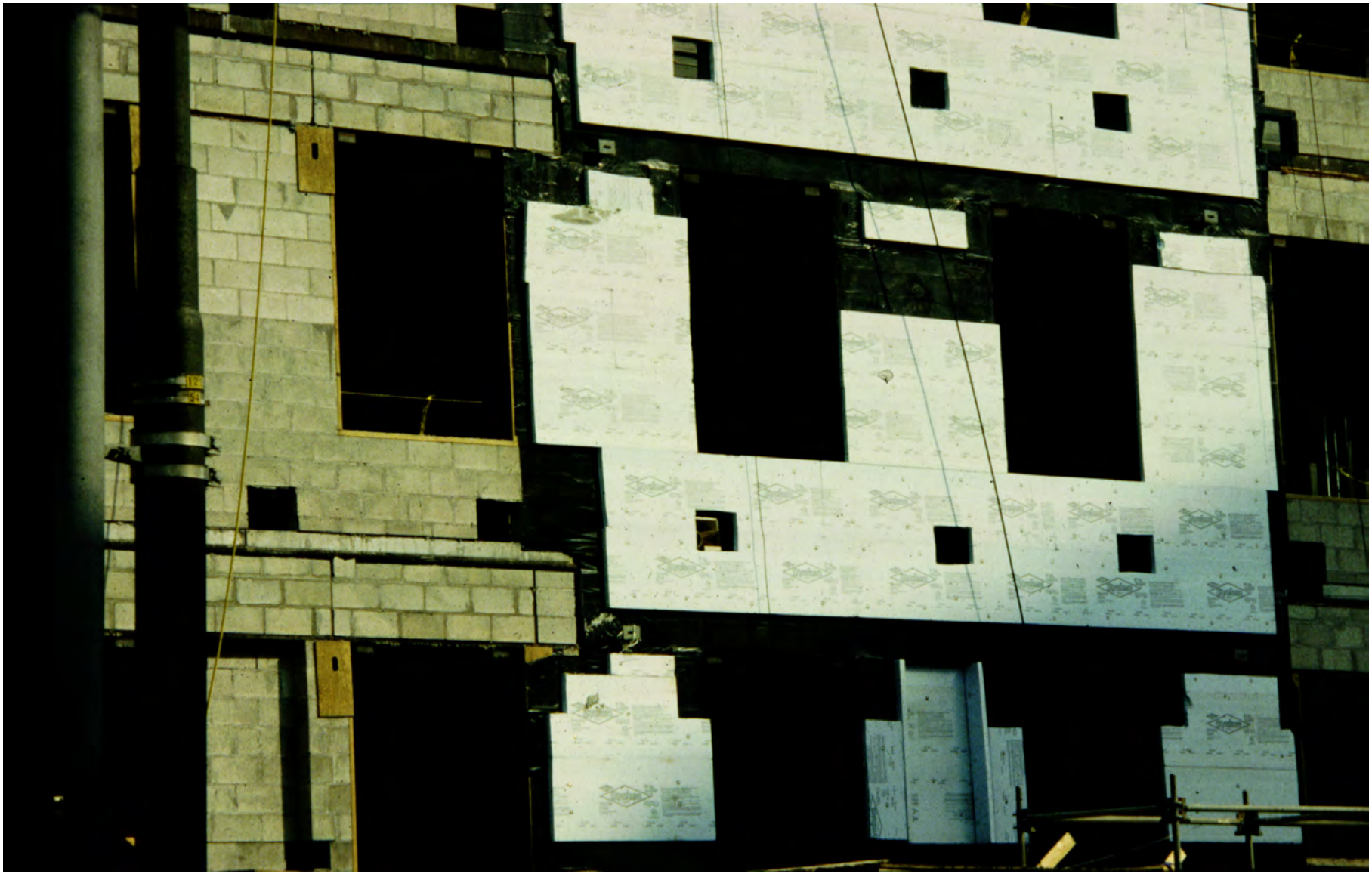
www.polyguard.com
Expect more.


DuPont
Flashing Systems
GOR® PLUS


StraightFlash


StraightFlash
StraightFlash
StraightFlash
StraightFlash
DUPONT
DUPONT


StraightFlash
StraightFlash




HARVARD SCHOOL OF PUBLIC HEALTH


ALL VISITORS
MUST SIGN IN
AT
JOHN MORIARTY
AND ASSOCIATES
FIELD OFFICE
CAUTION
HARD HAT
AREA
J.DERENZO CO.
WORKSITE
508-427-6441


GP
DENSGLASS GOLD


GP
DENSGLASS GOLD
Exterior Sheathing
GP
DENSGLASS GOLD
Exterior Sheathing


Blueskin
CAVITY WALL SYSTEMS


Blueskin VP160


REPUBLIC


AVAILAB
Up to 22,000
Medical or Profes
978-369-4

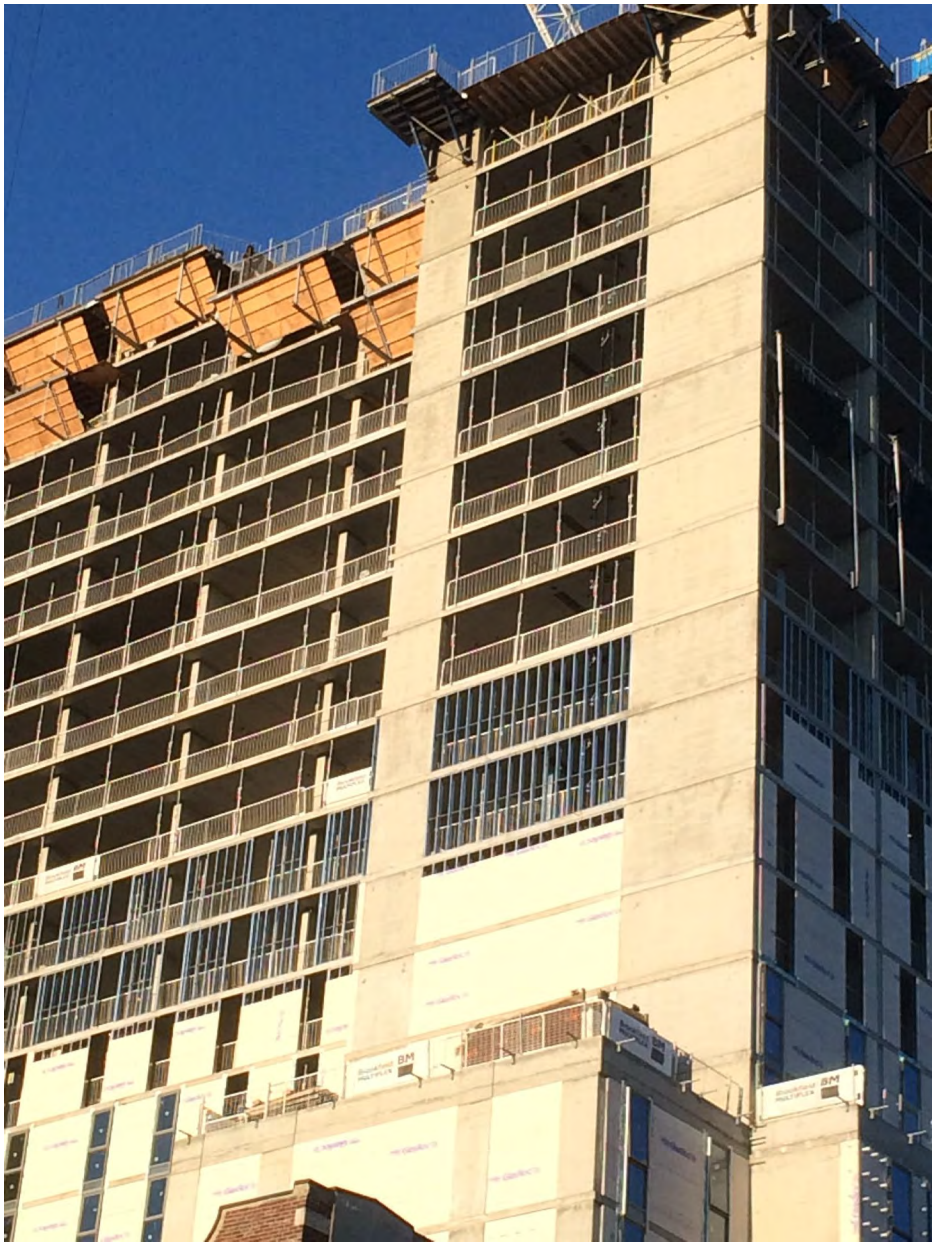

GP
DensGlass
Sheathing


MARKET BASKET
DensGlass


Tyvek
PRIVATE PARKING

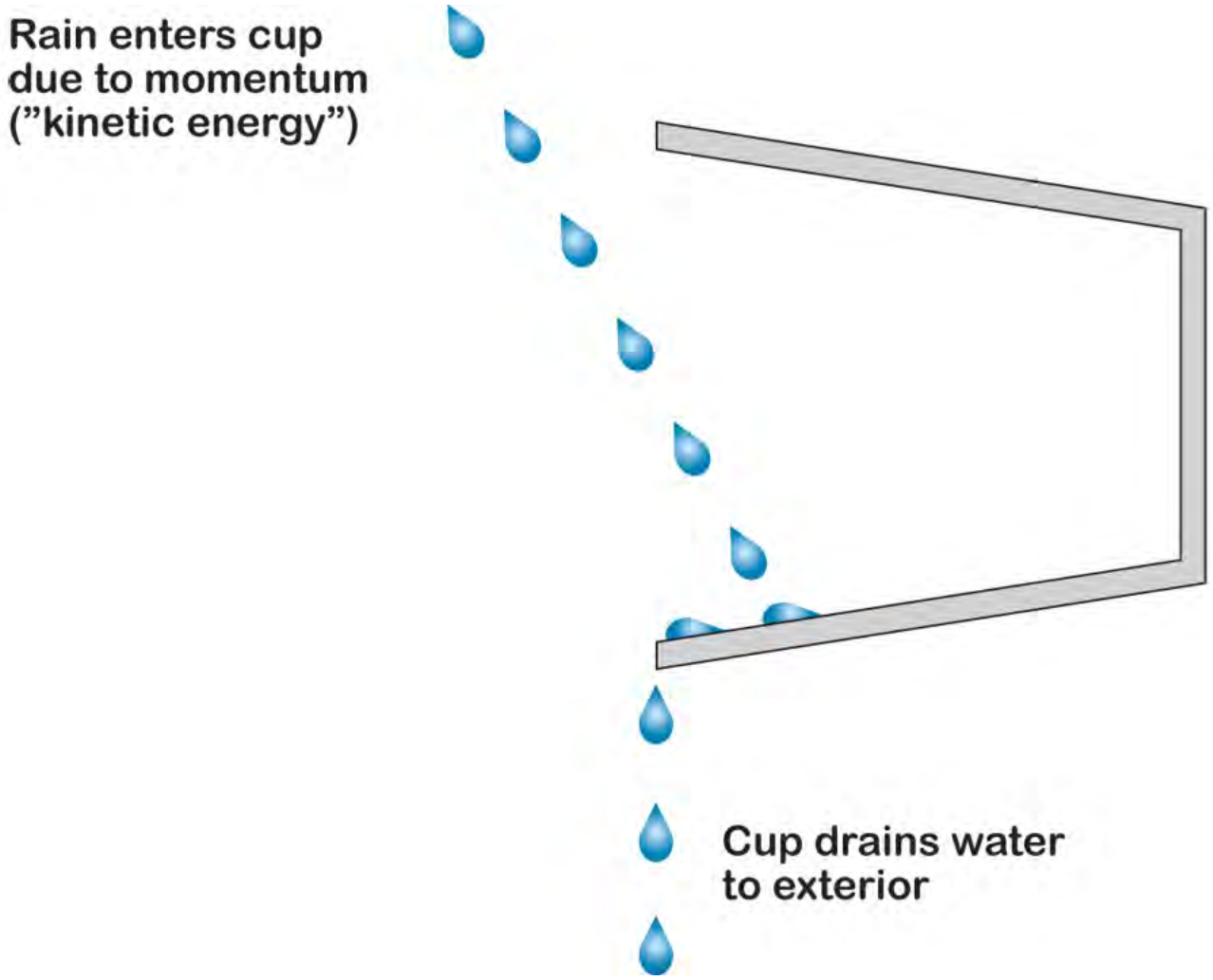

ZIPsystem
AdvanTech Flooring

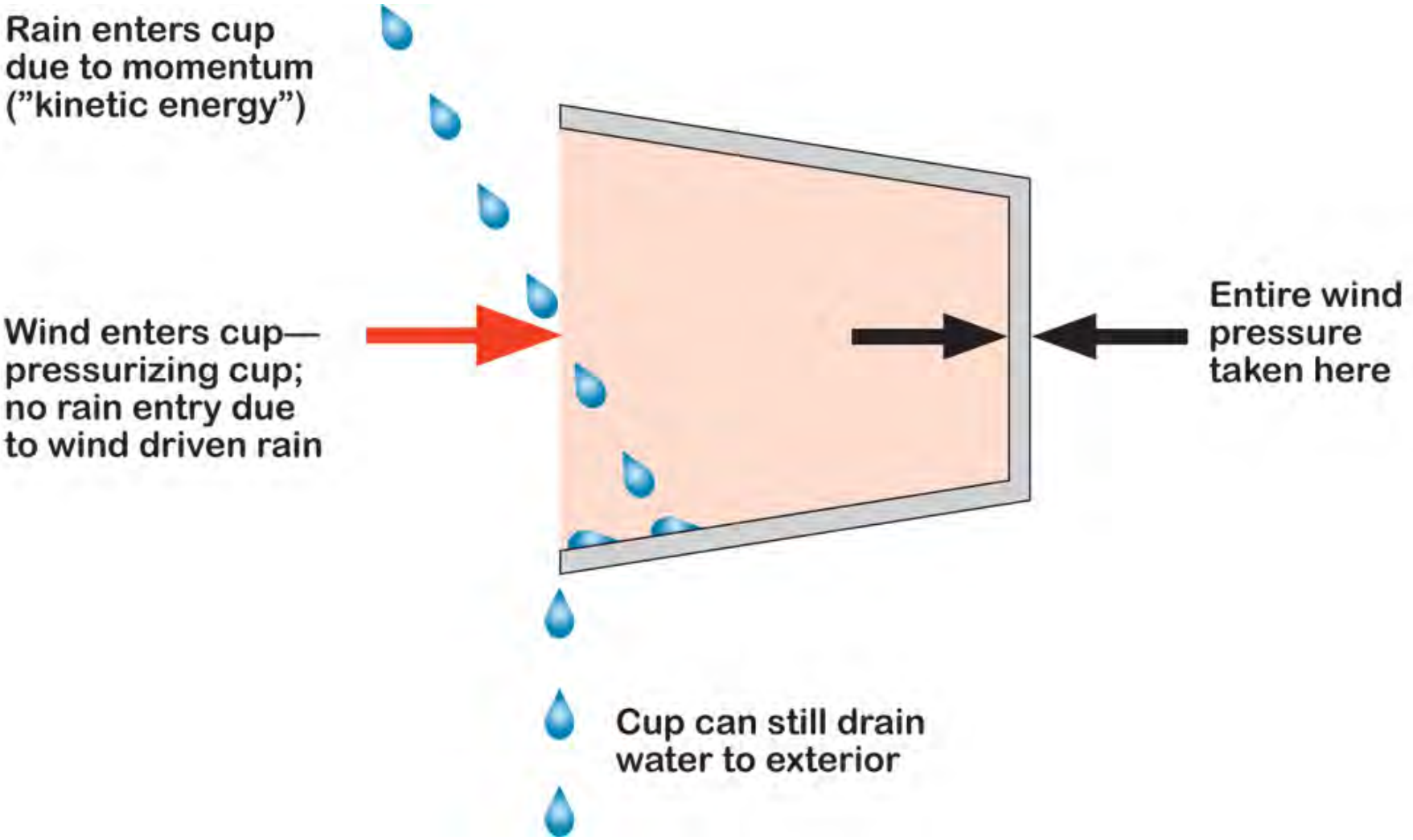

DANGER
CONSTRUCTION
AREA
KEEP OUT
LUCIANO

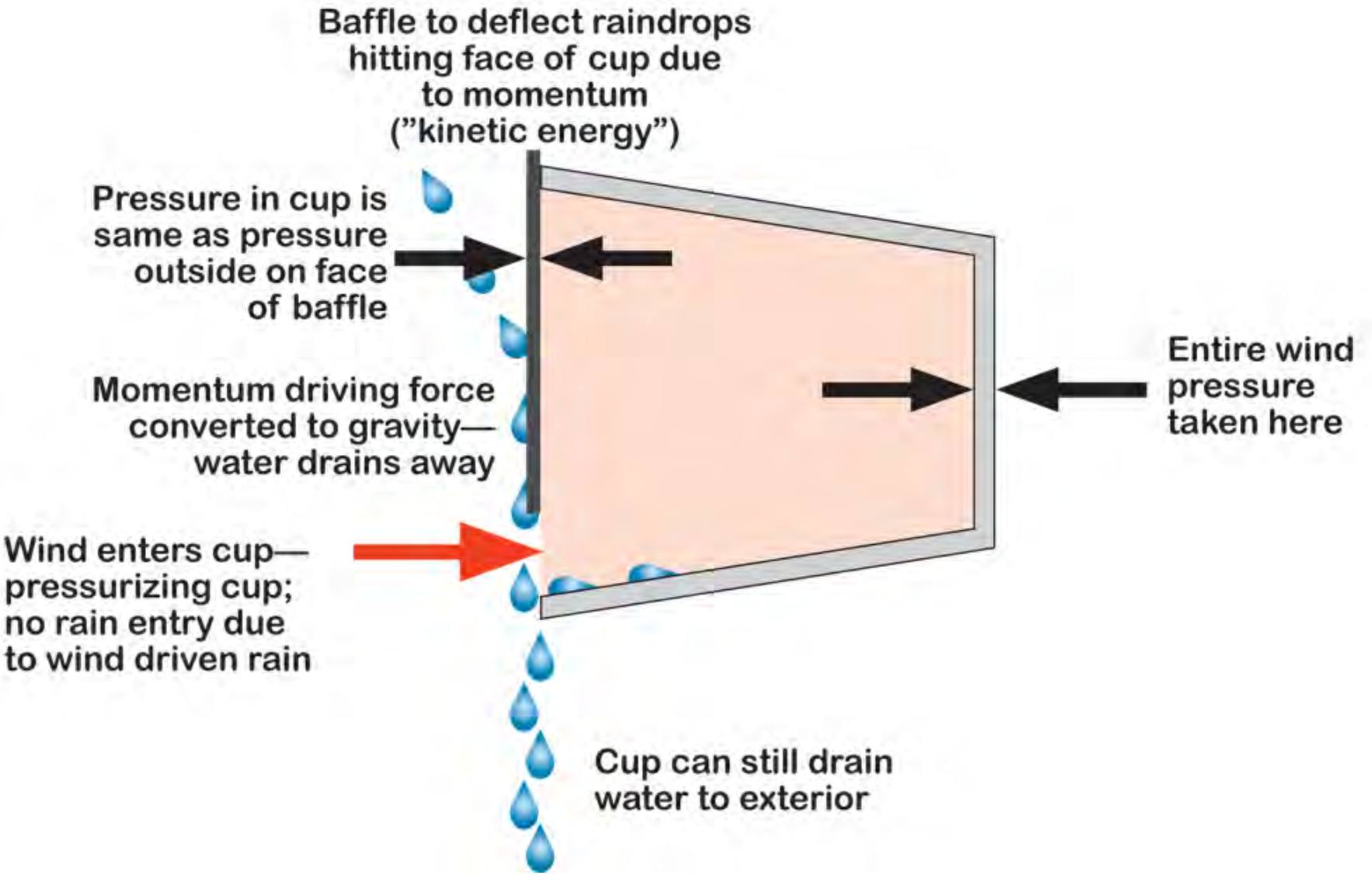


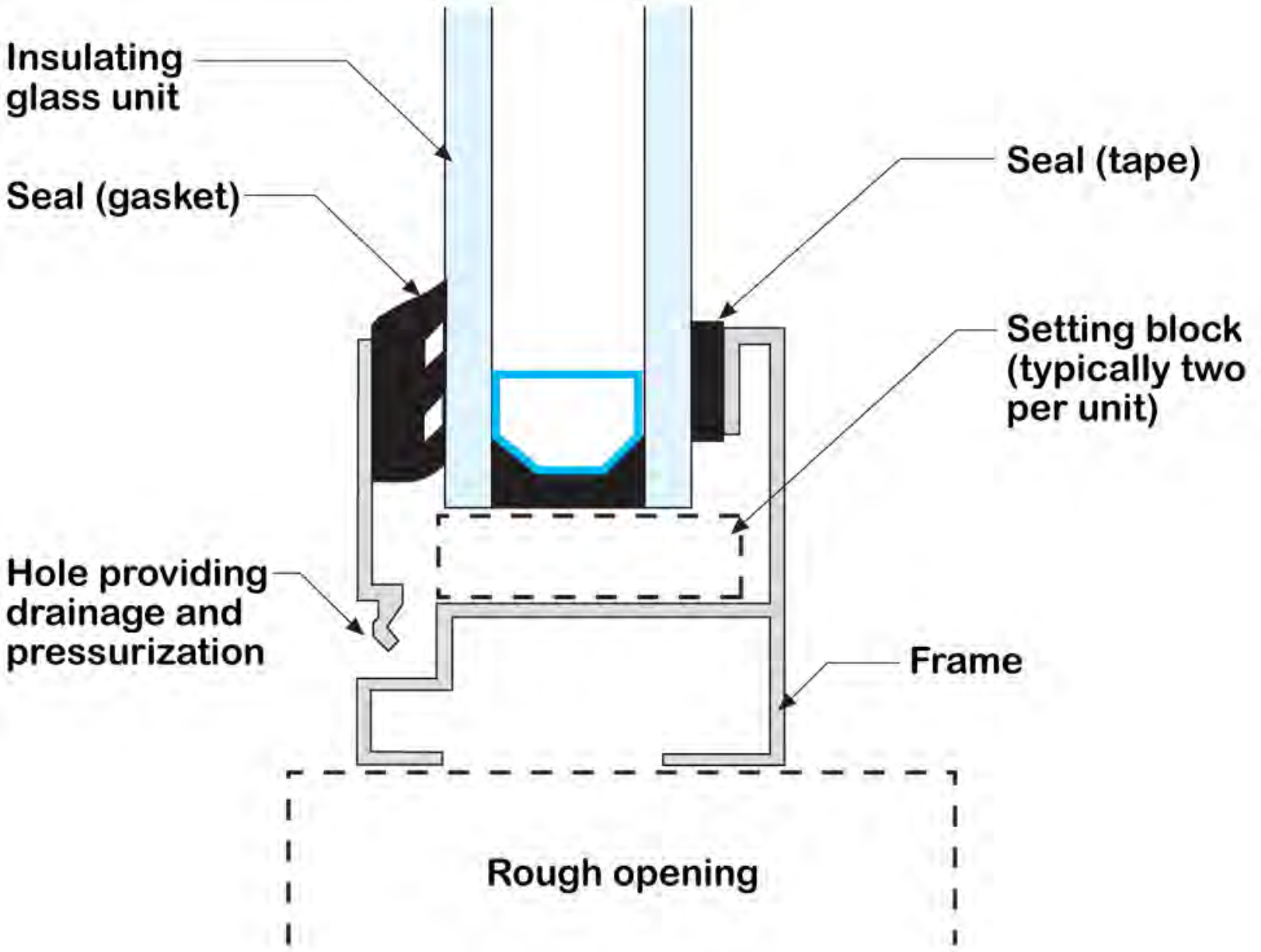

Parking
FOR LEASE

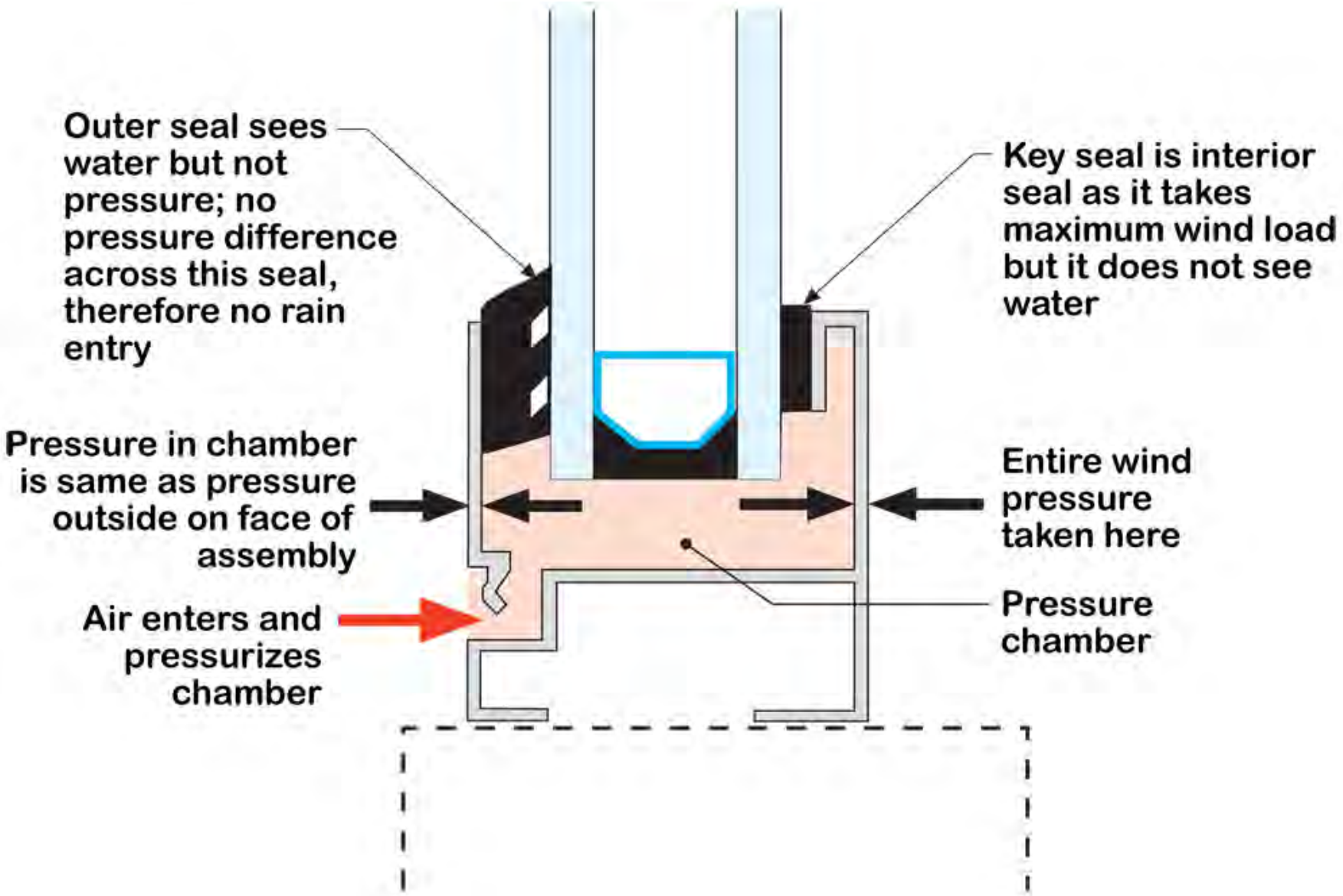

Tribute
Tribute
Tribute

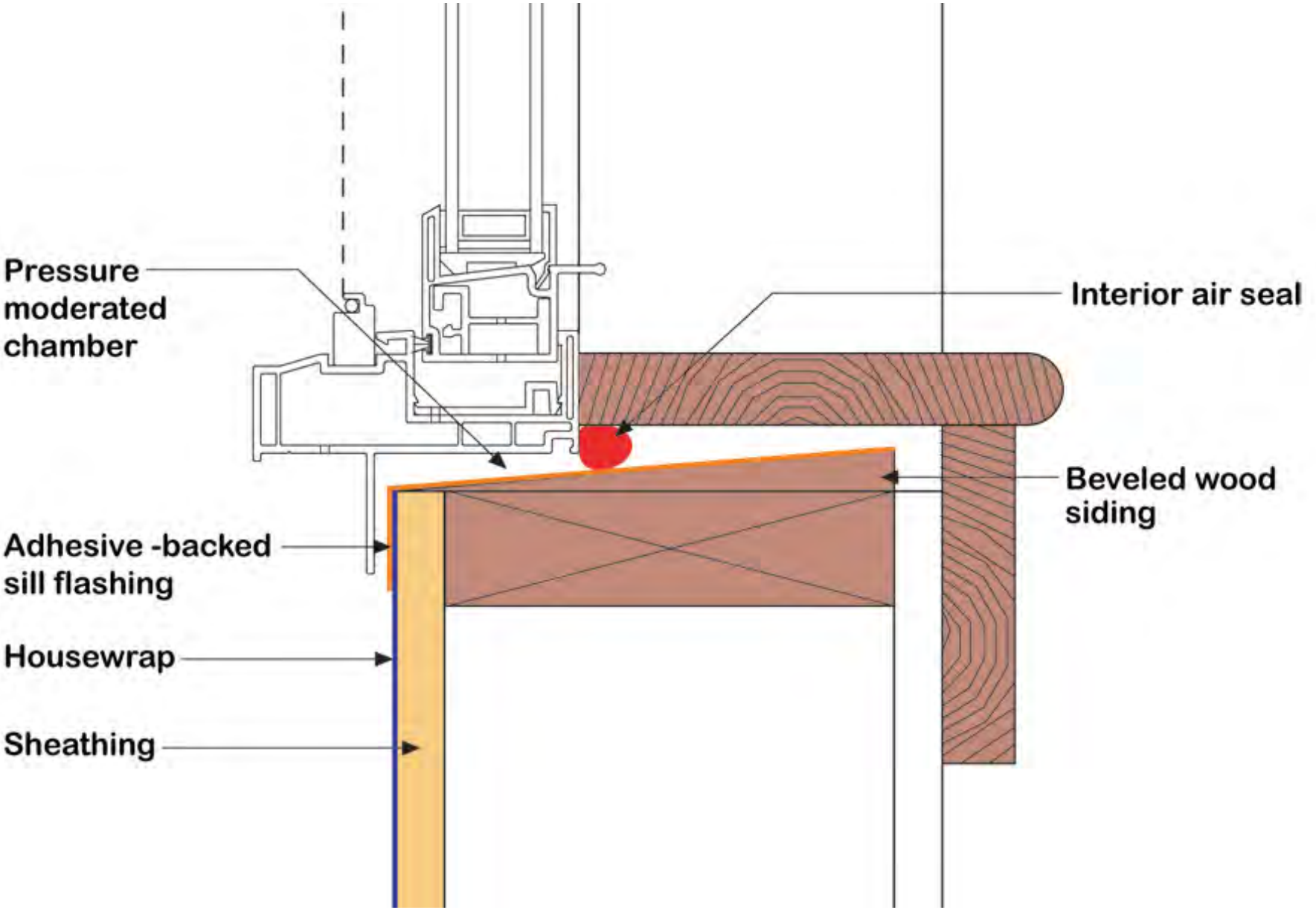

Rain enters cup
due to momentum
("kinetic energy")
Cup drains water
to exterior


Rain enters cup due to momentum ("kinetic energy")
Wind enters cup— pressurizing cup; no rain entry due to wind driven rain
Entire wind pressure taken here
Cup can still drain water to exterior

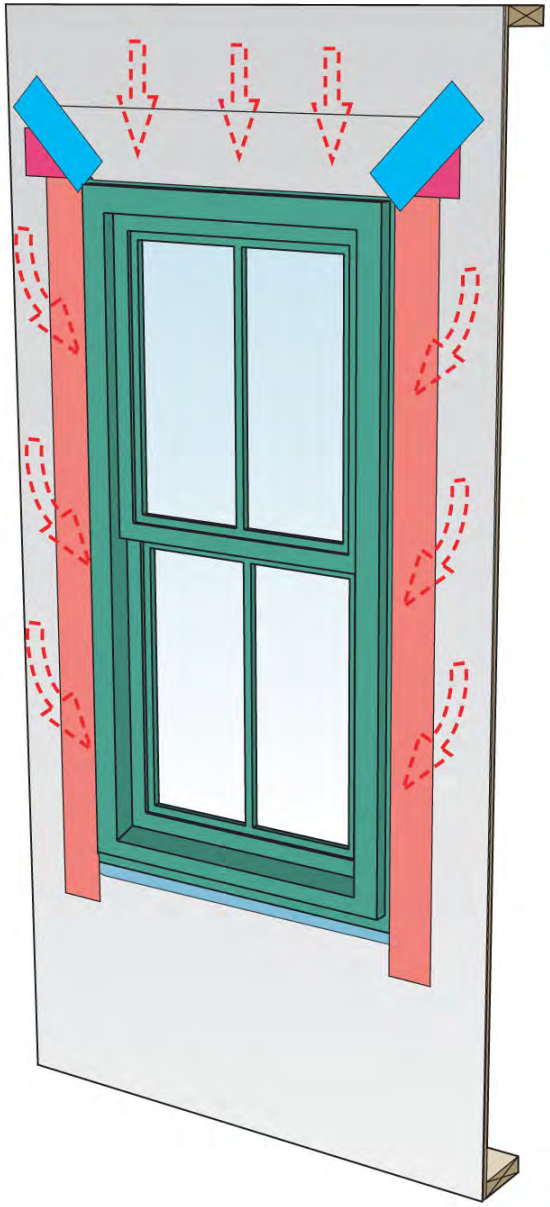

Baffle to deflect raindrops hitting face of cup due to momentum ("kinetic energy")
Pressure in cup is same as pressure outside on face of baffle
Momentum driving force converted to gravity— water drains away
Wind enters cup— pressurizing cup; no rain entry due to wind driven rain
Entire wind pressure taken here
Cup can still drain water to exterior

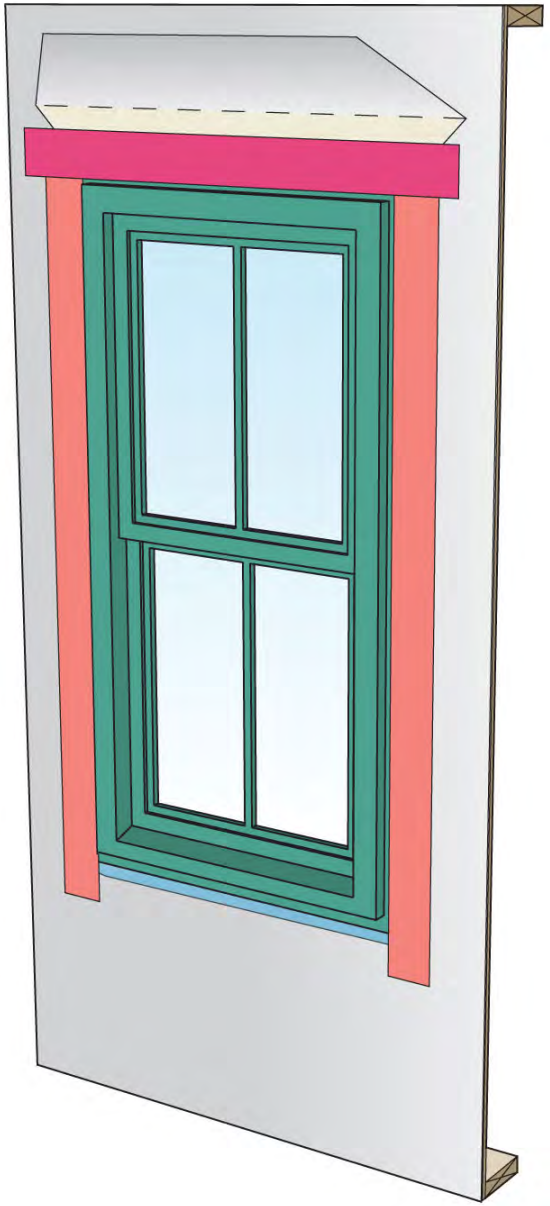

Insulating glass unit
Seal (gasket)
Seal (tape)
Setting block (typically two per unit)
Hole providing drainage and pressurization
Frame
Rough opening

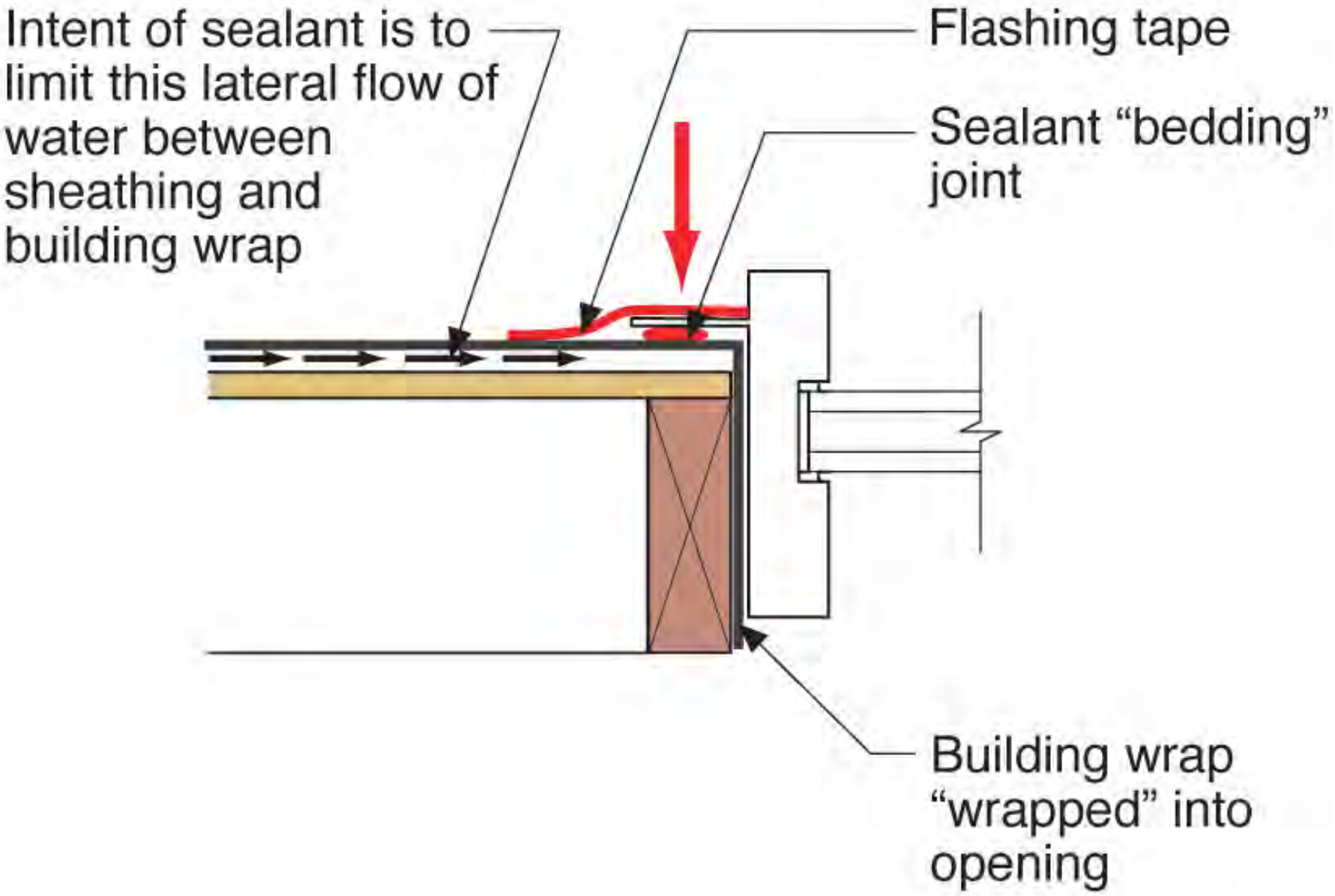

Outer seal sees water but not pressure; no pressure difference across this seal, therefore no rain entry
Key seal is interior seal as it takes maximum wind load but it does not see water
Pressure in chamber is same as pressure outside on face of assembly
Entire wind pressure taken here
Air enters and pressurizes chamber
Pressure chamber

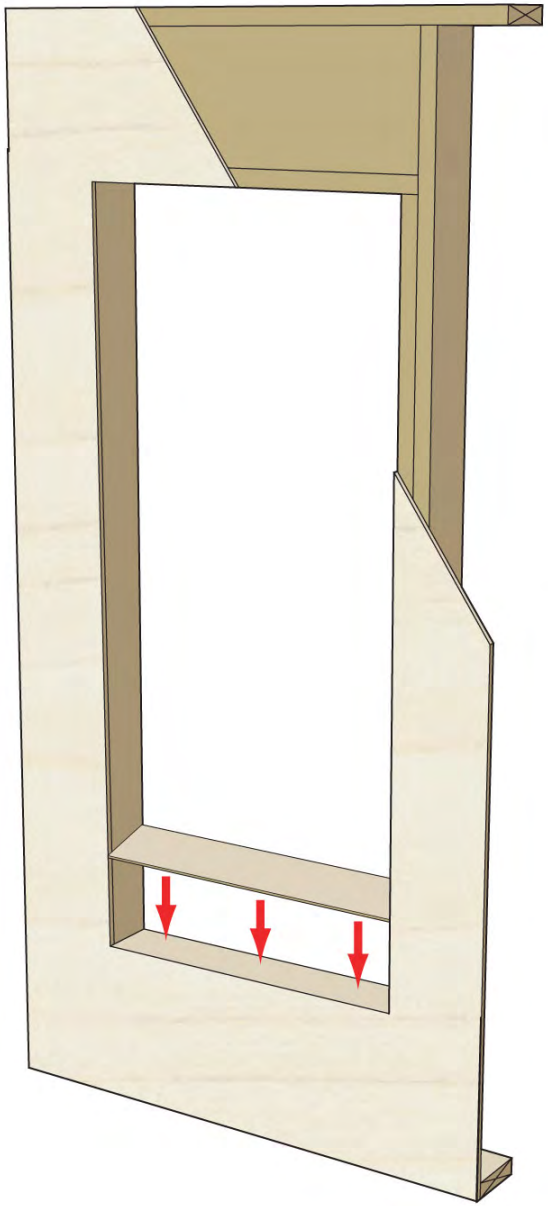

Pressure moderated chamber
Interior air seal
Beveled wood siding
Adhesive -backed sill flashing
Housewrap
Sheathing

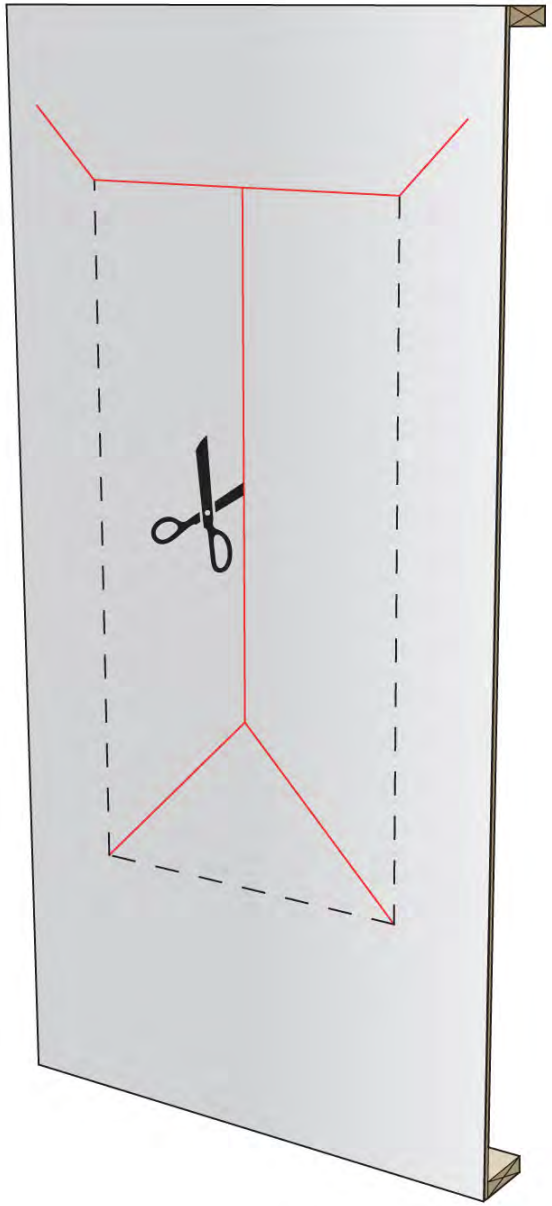

DOW
Styrofoam

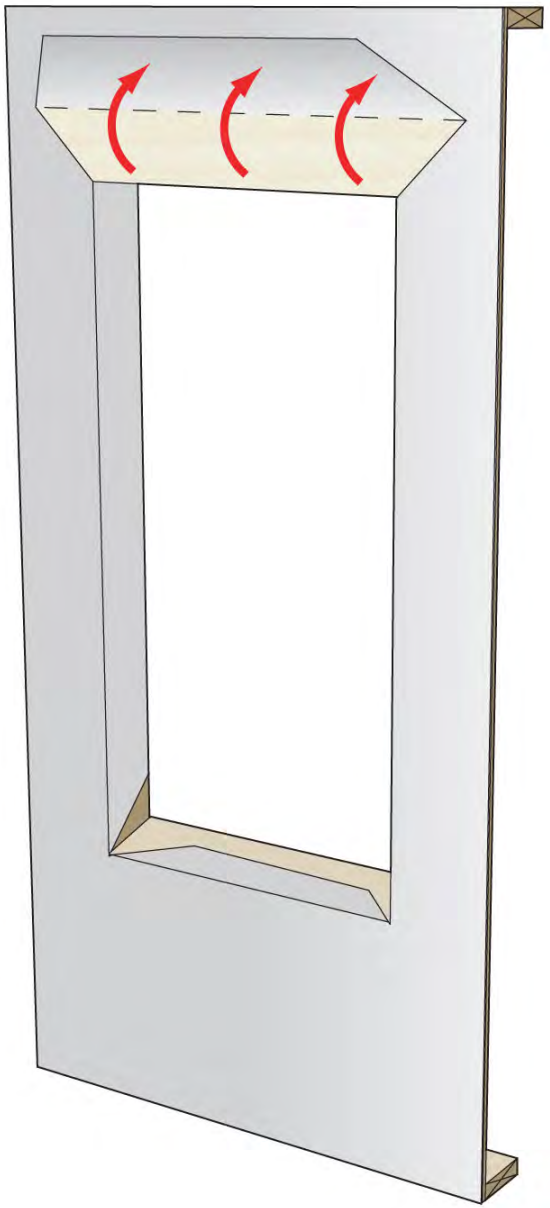


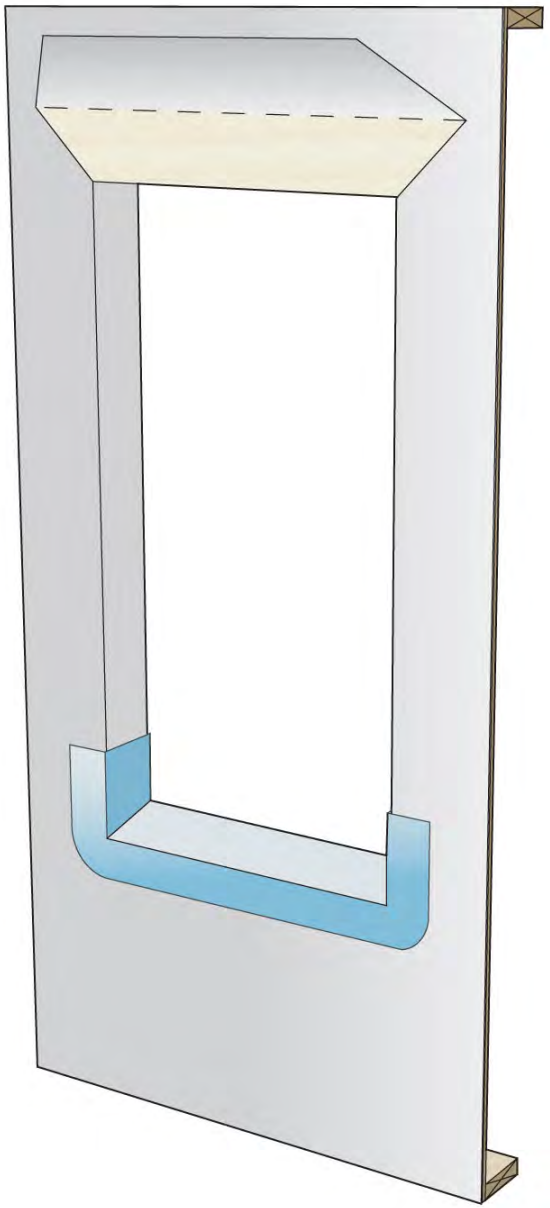


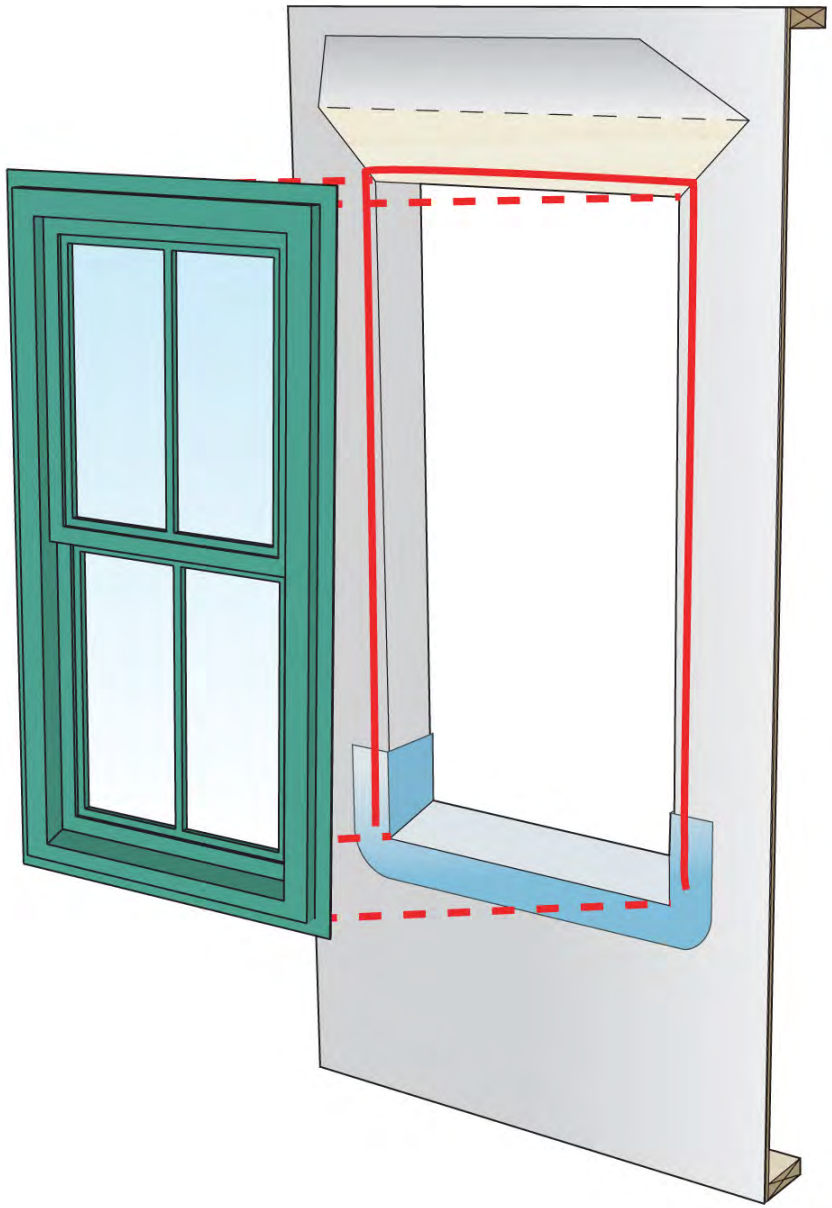

Intent of sealant is to limit this lateral flow of water between sheathing and building wrap
Flashing tape
Sealant "bedding" joint
Building wrap "wrapped" into opening

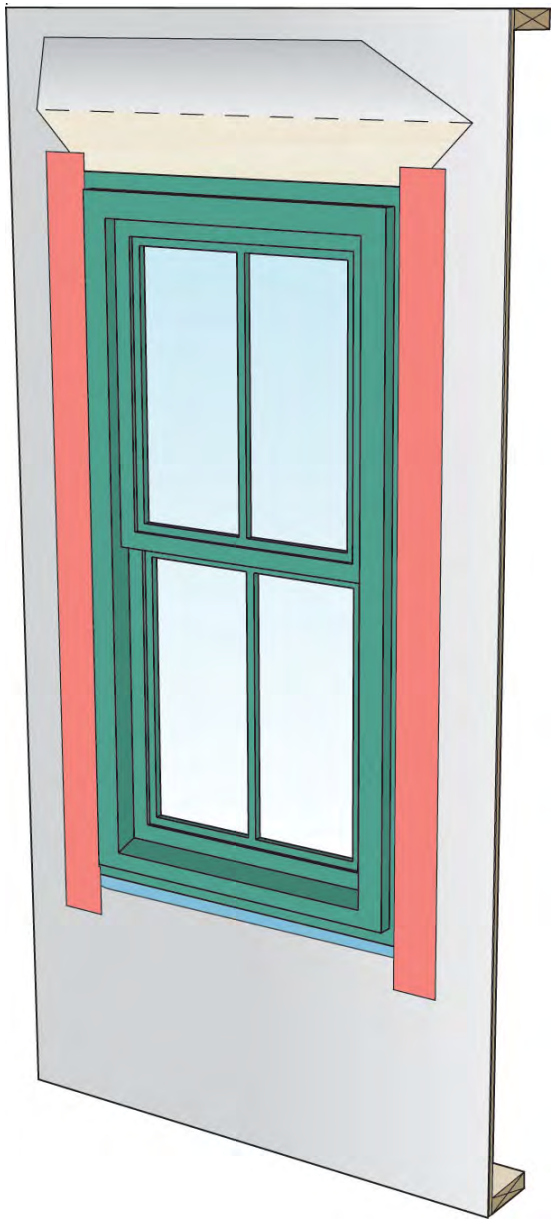


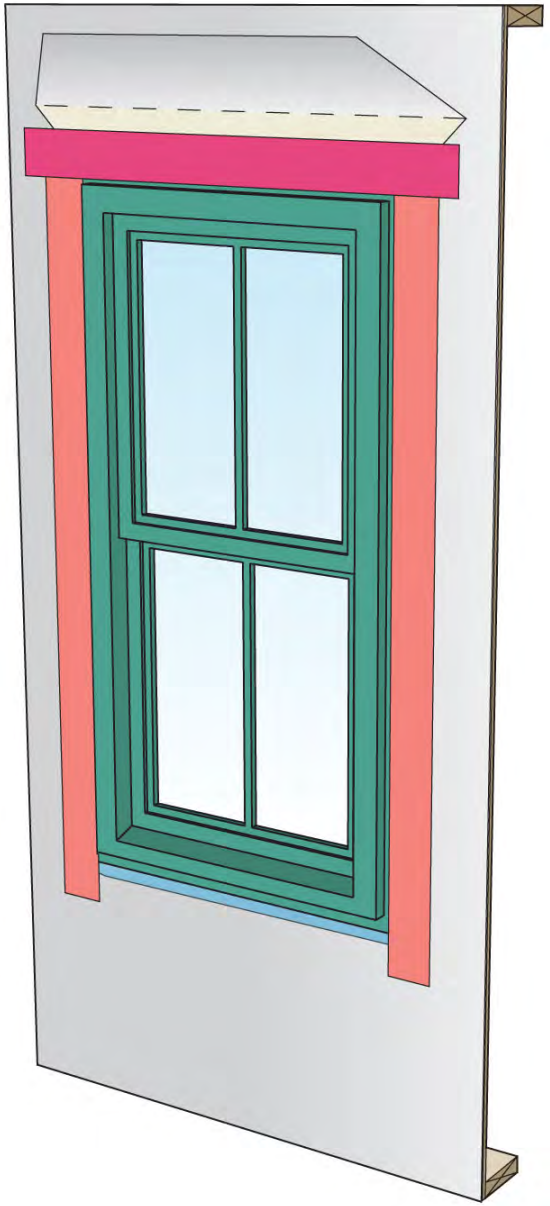


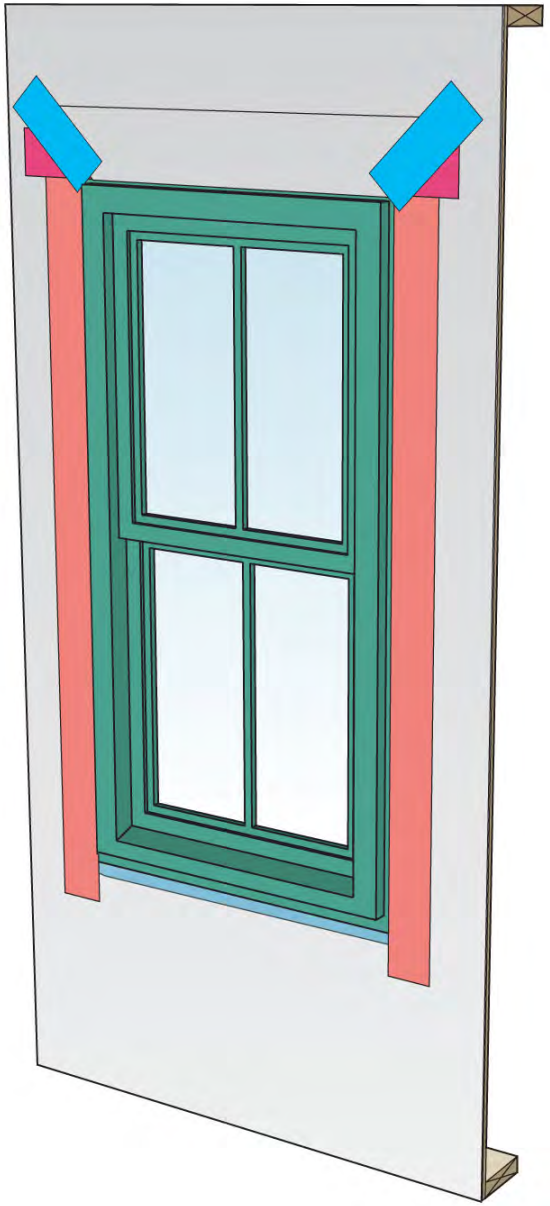


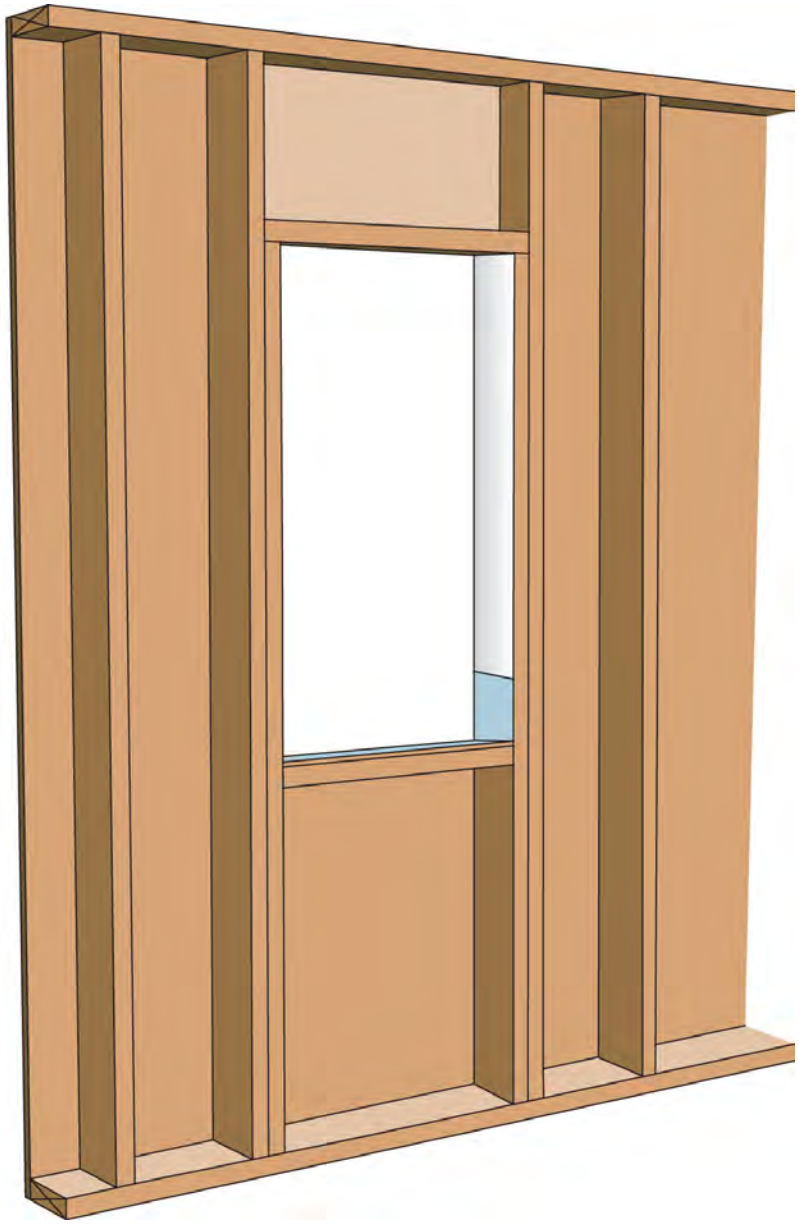


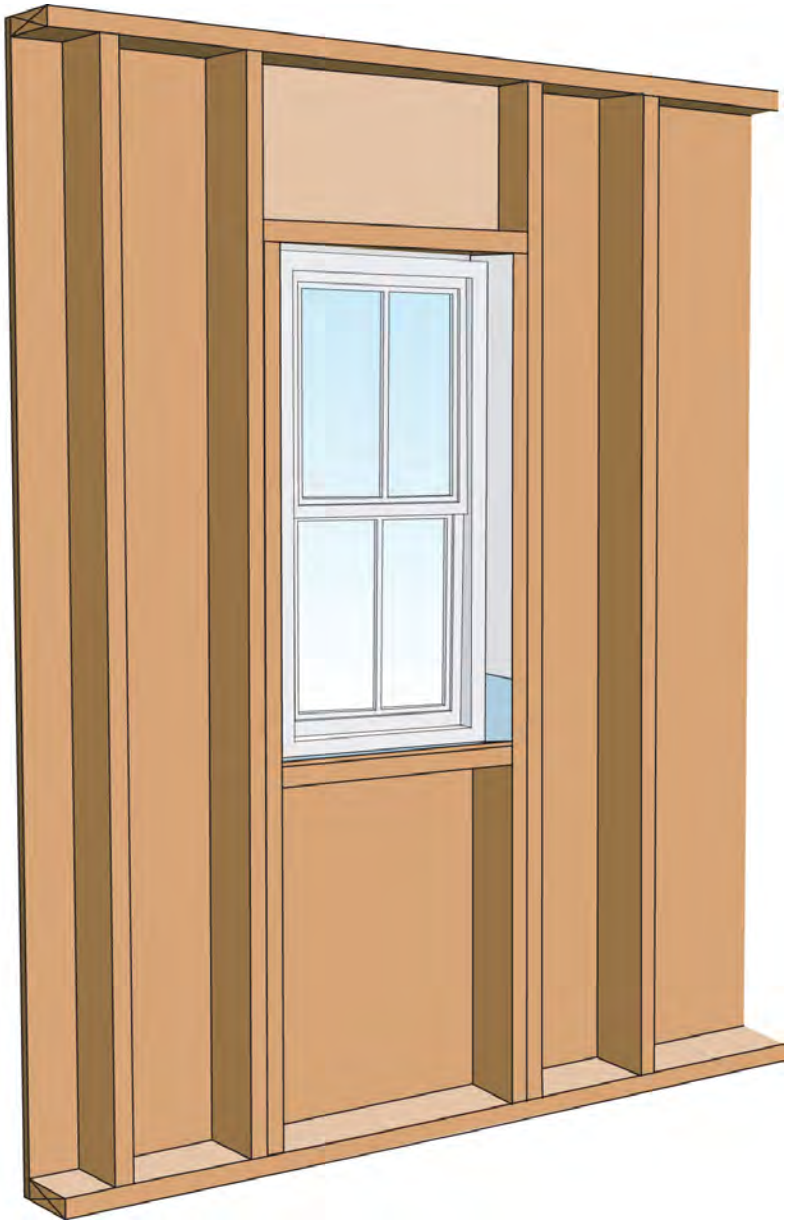




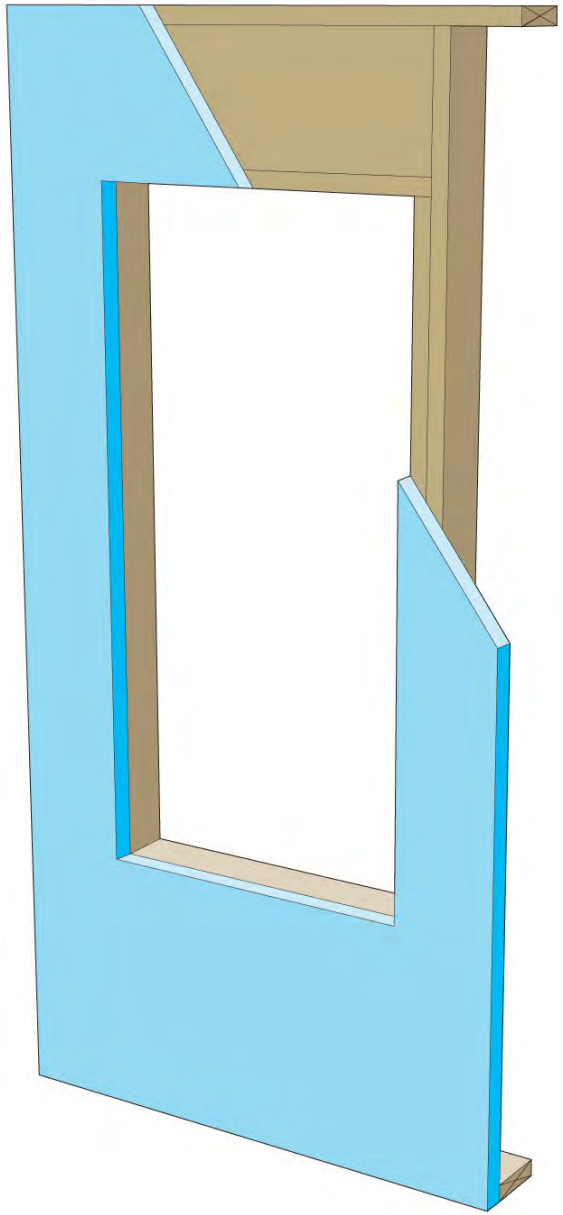


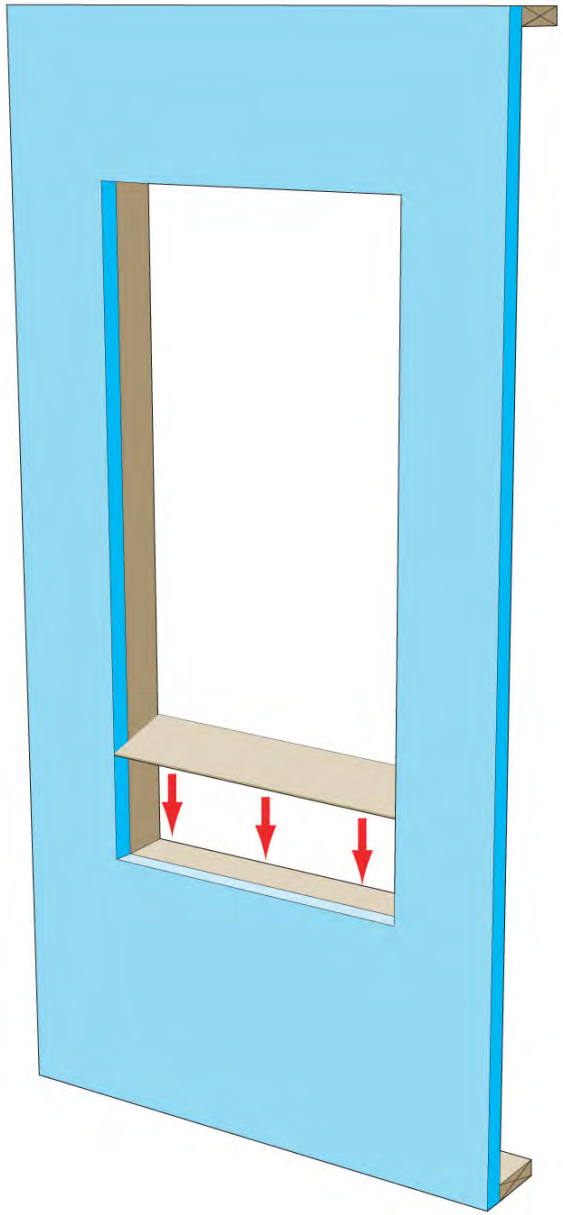


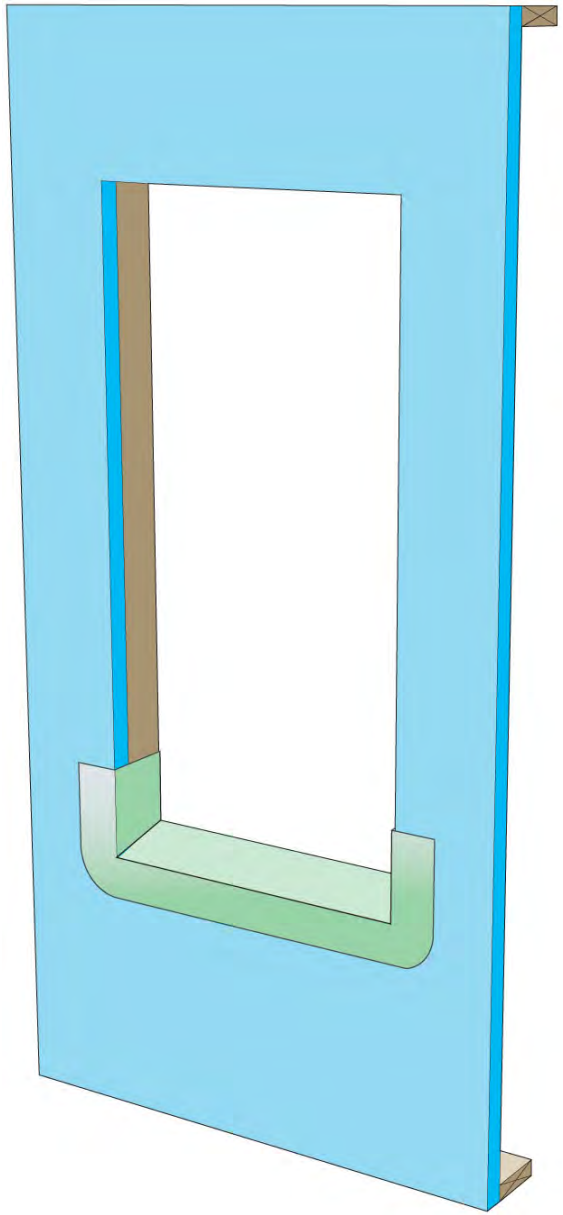


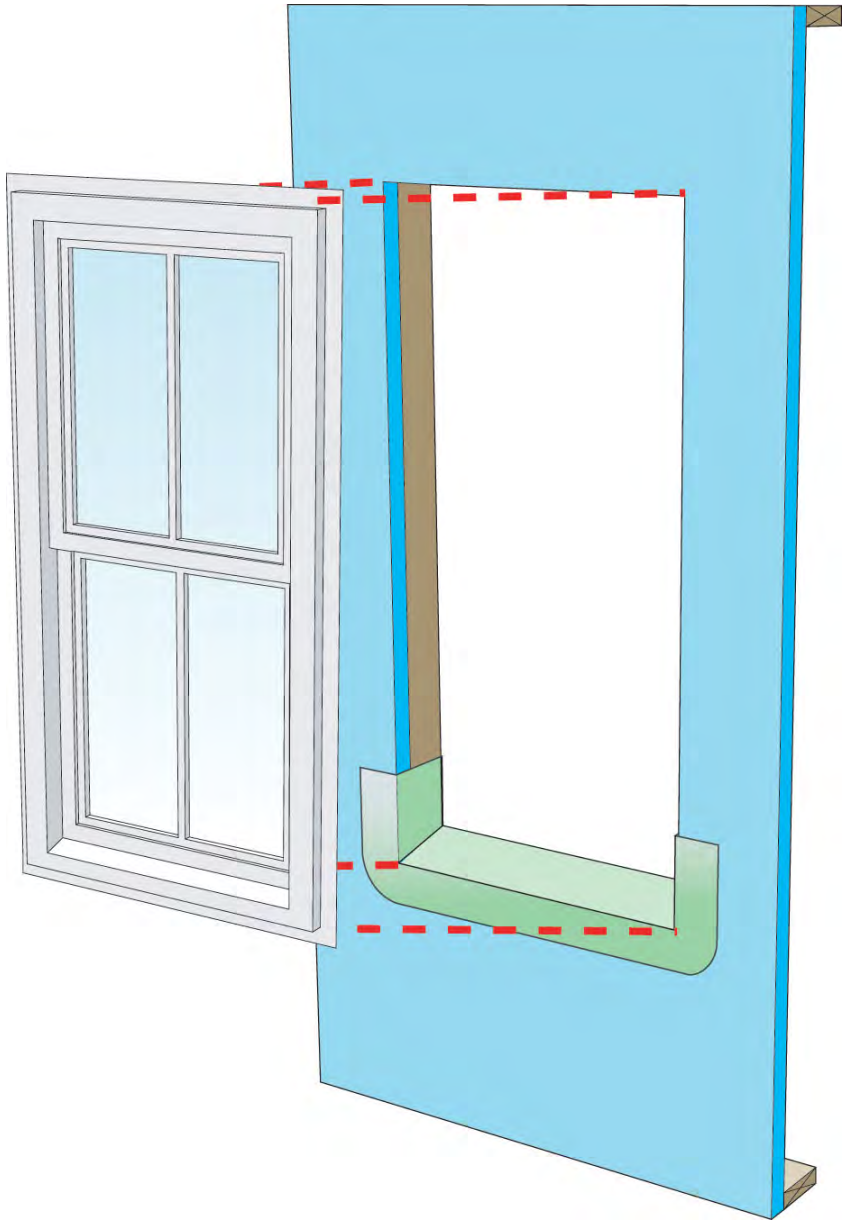


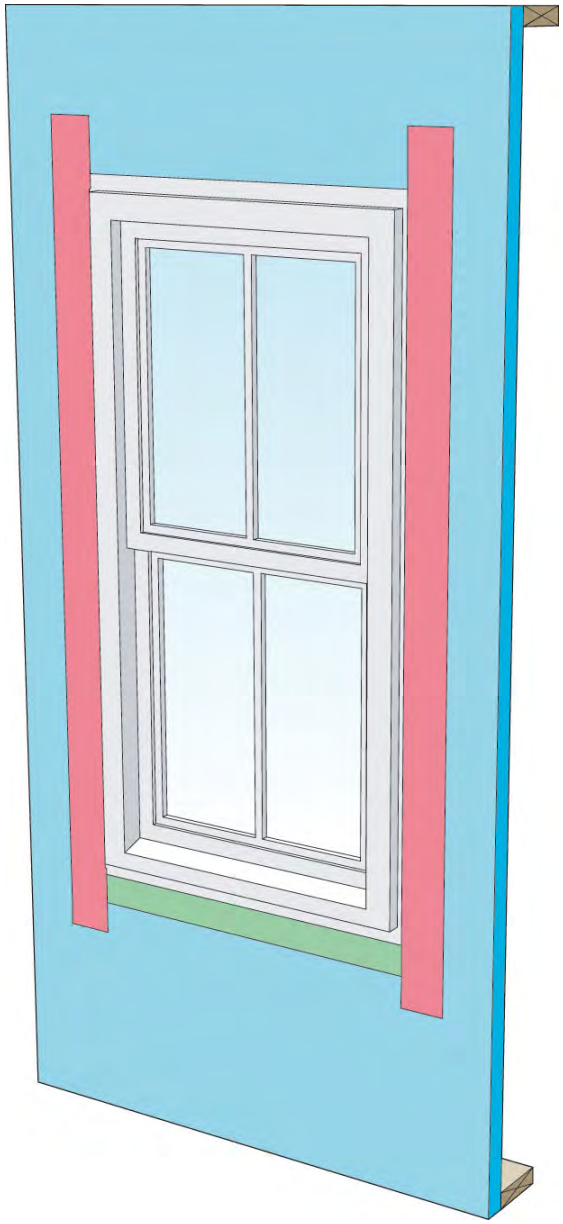

RCI
WARNING: DuPont™ Tyvek®
maintenance requirements
the wall system may impact
AVERTISSEMENT: Le matériau
stalled as an air barrier ac

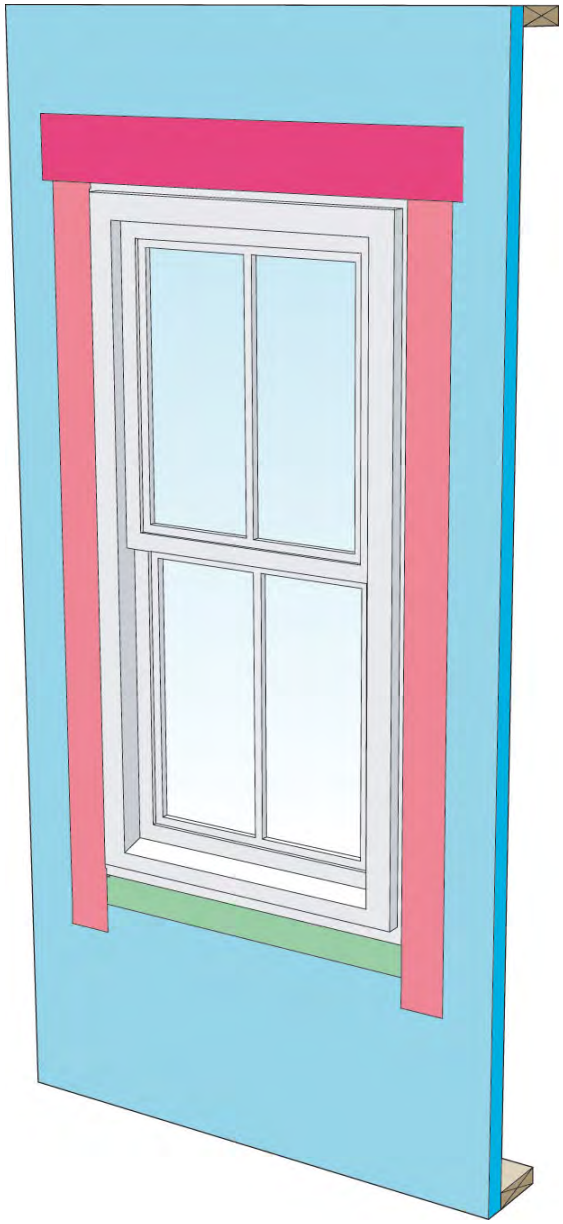


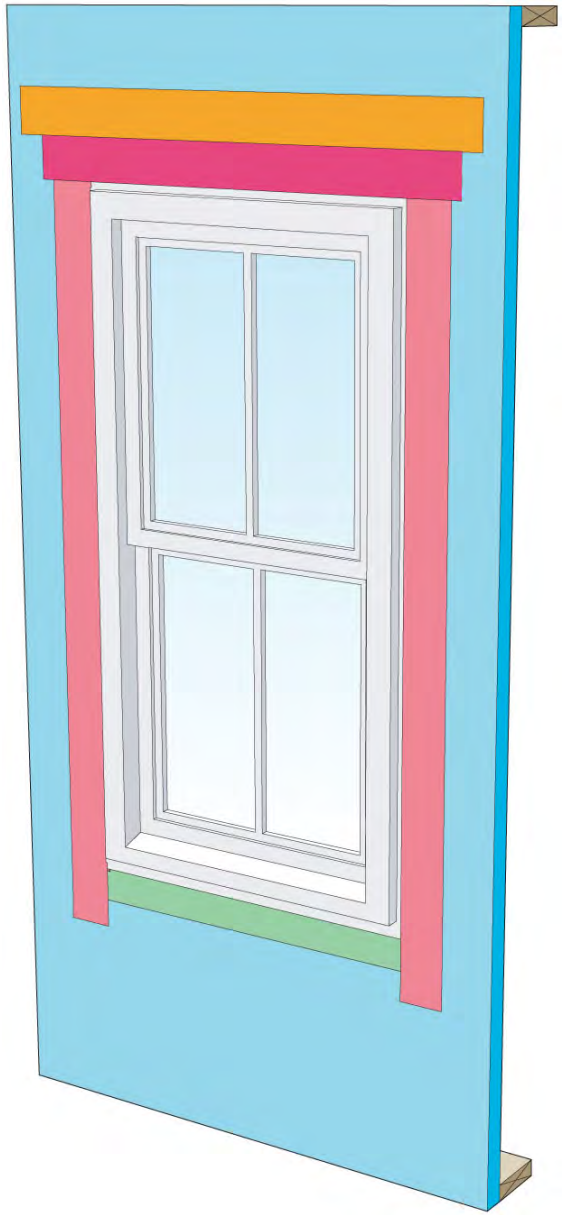


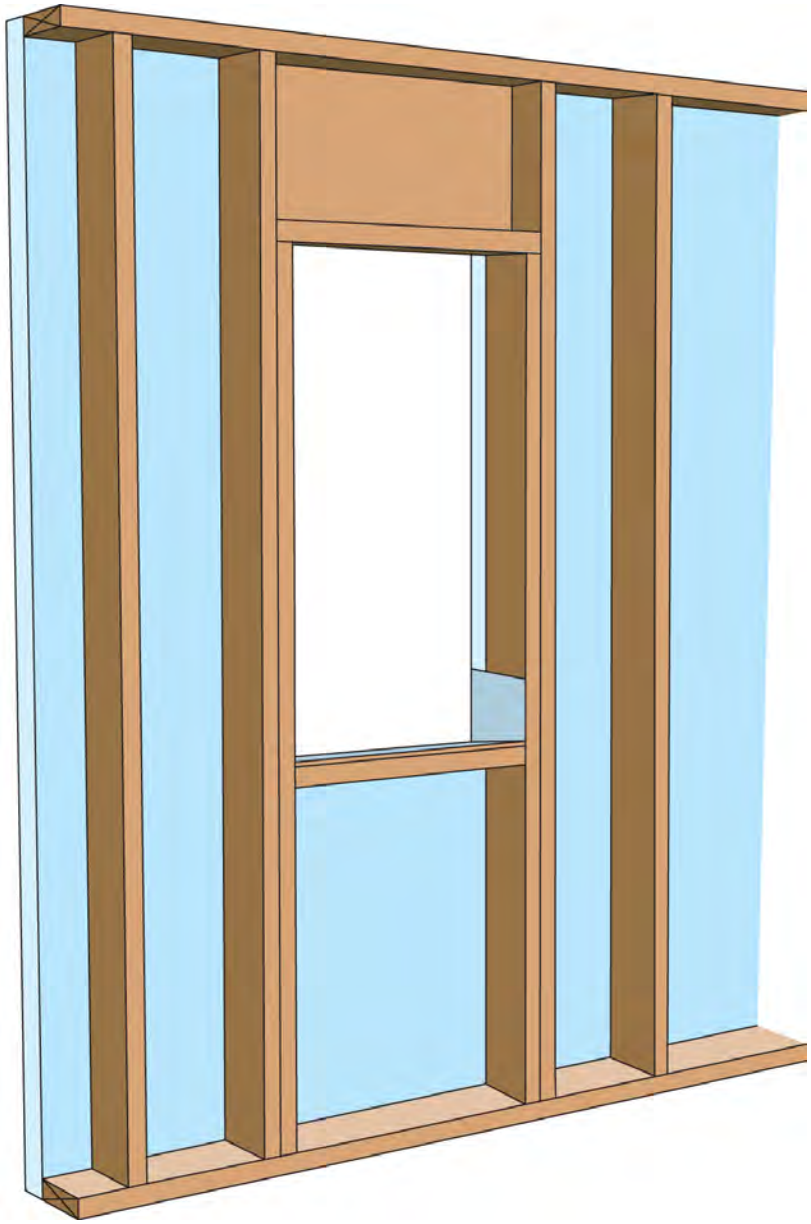


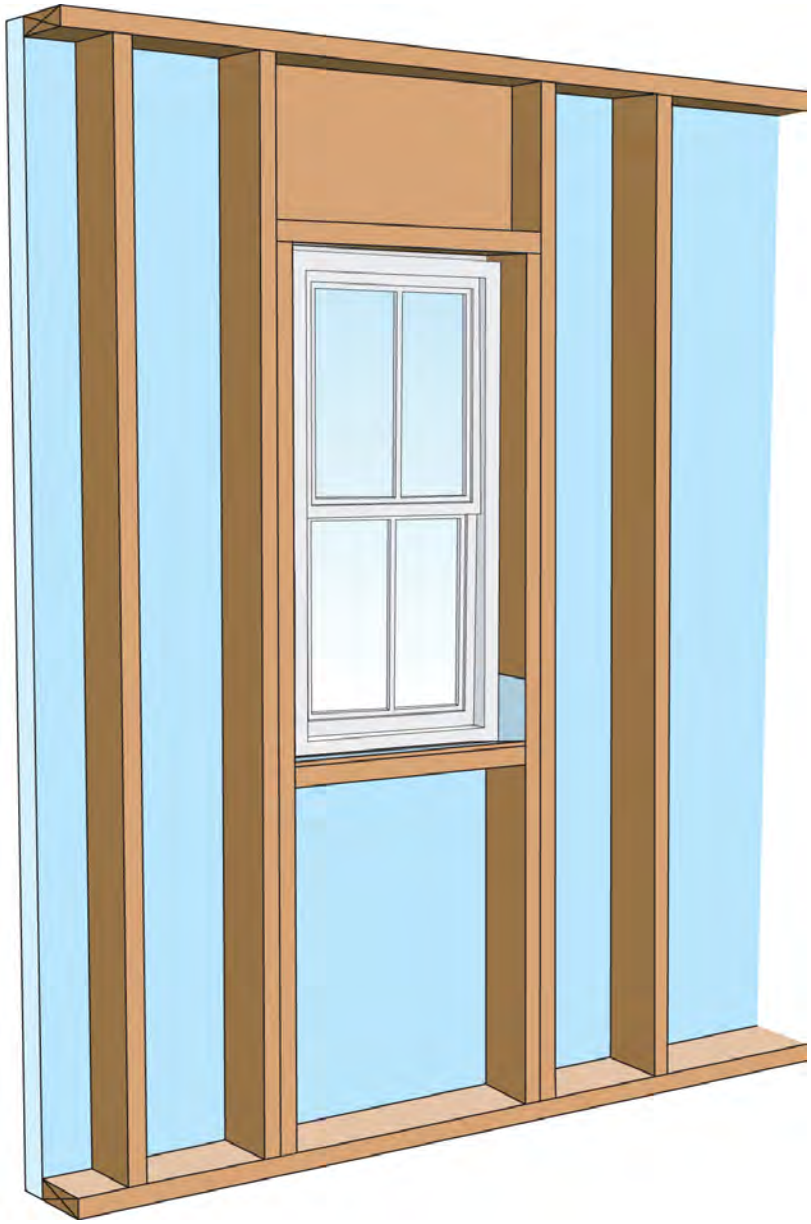


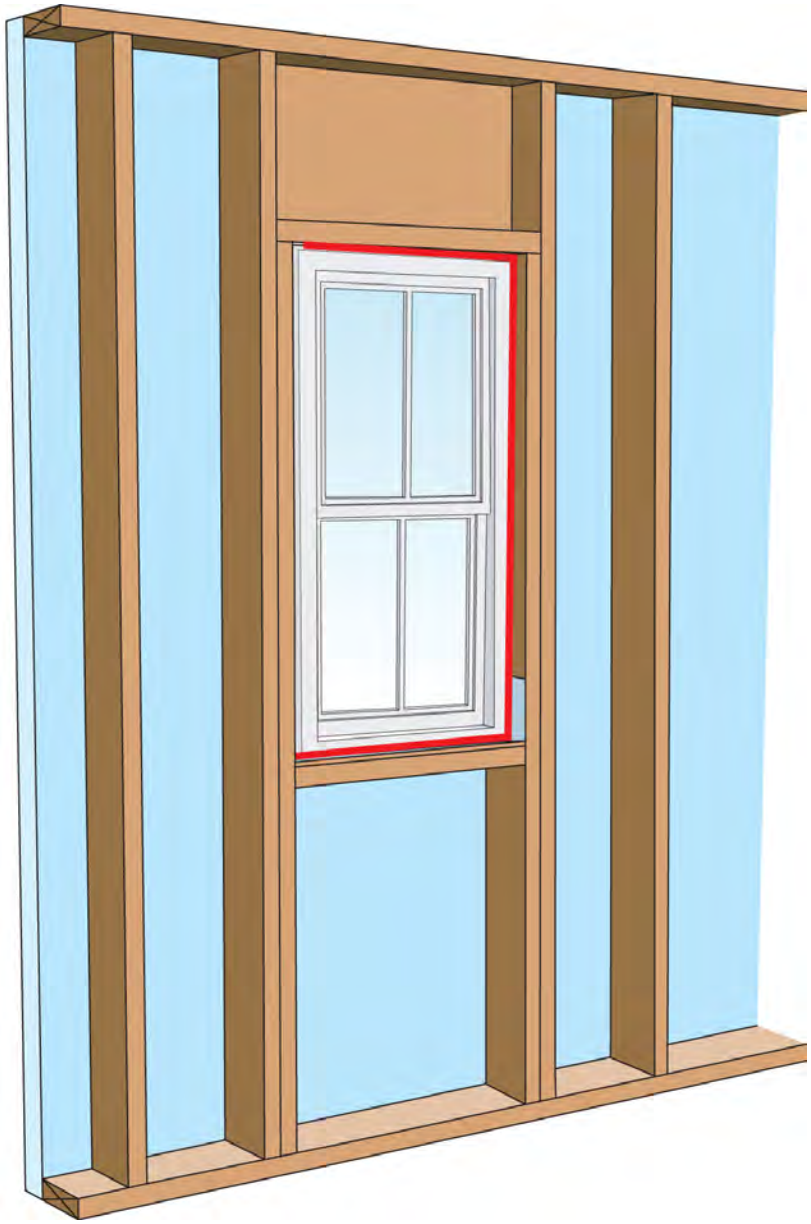




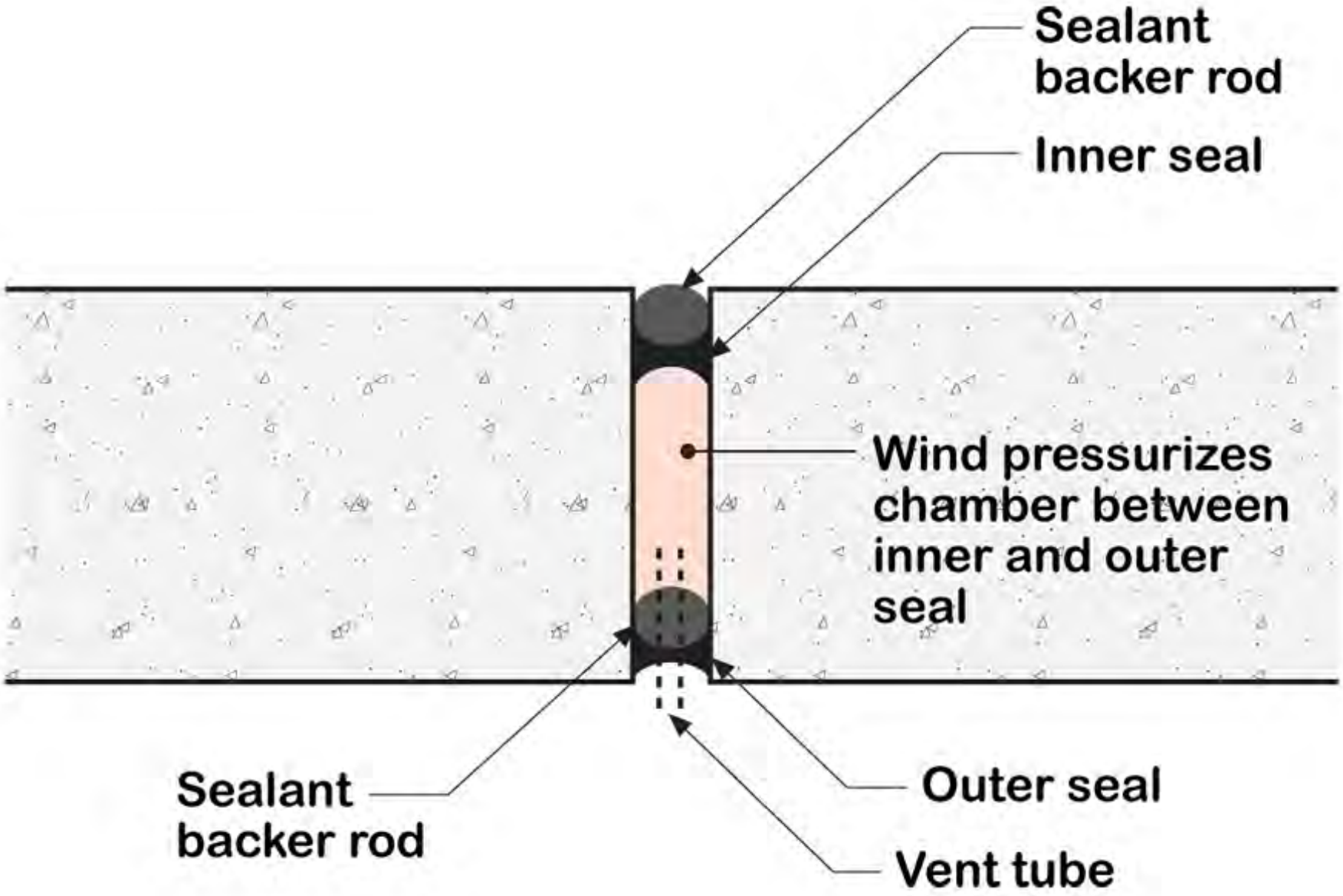


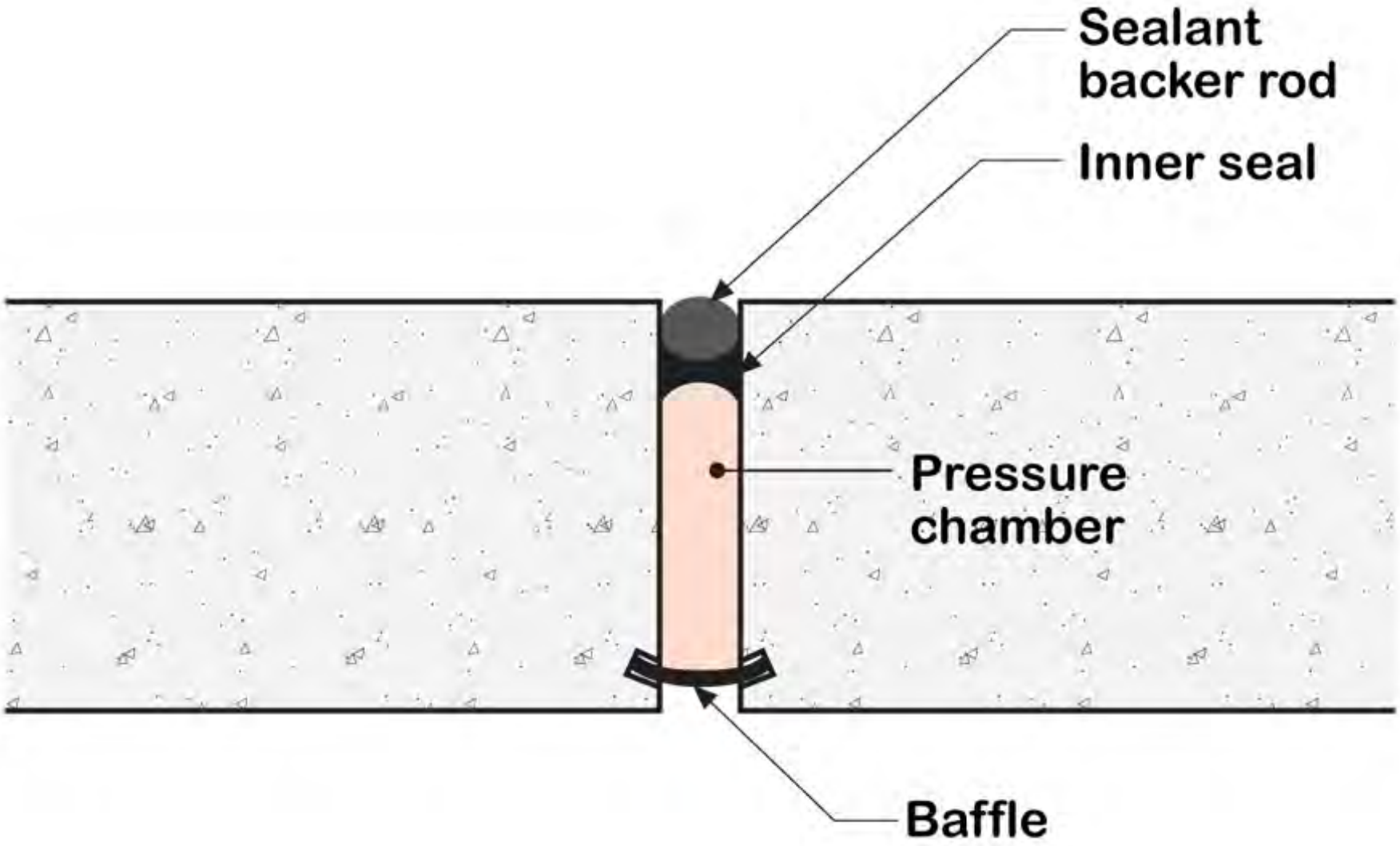


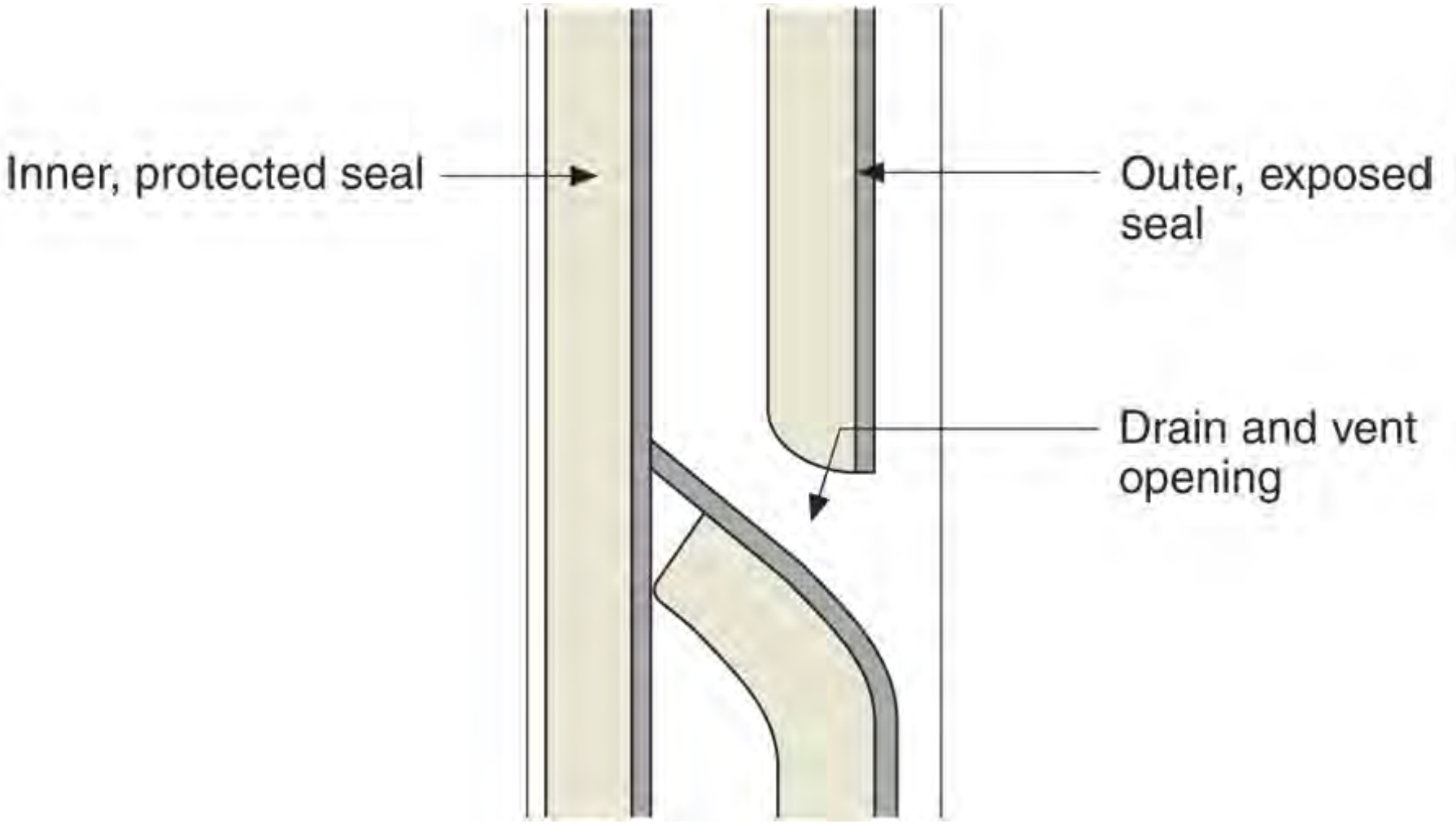


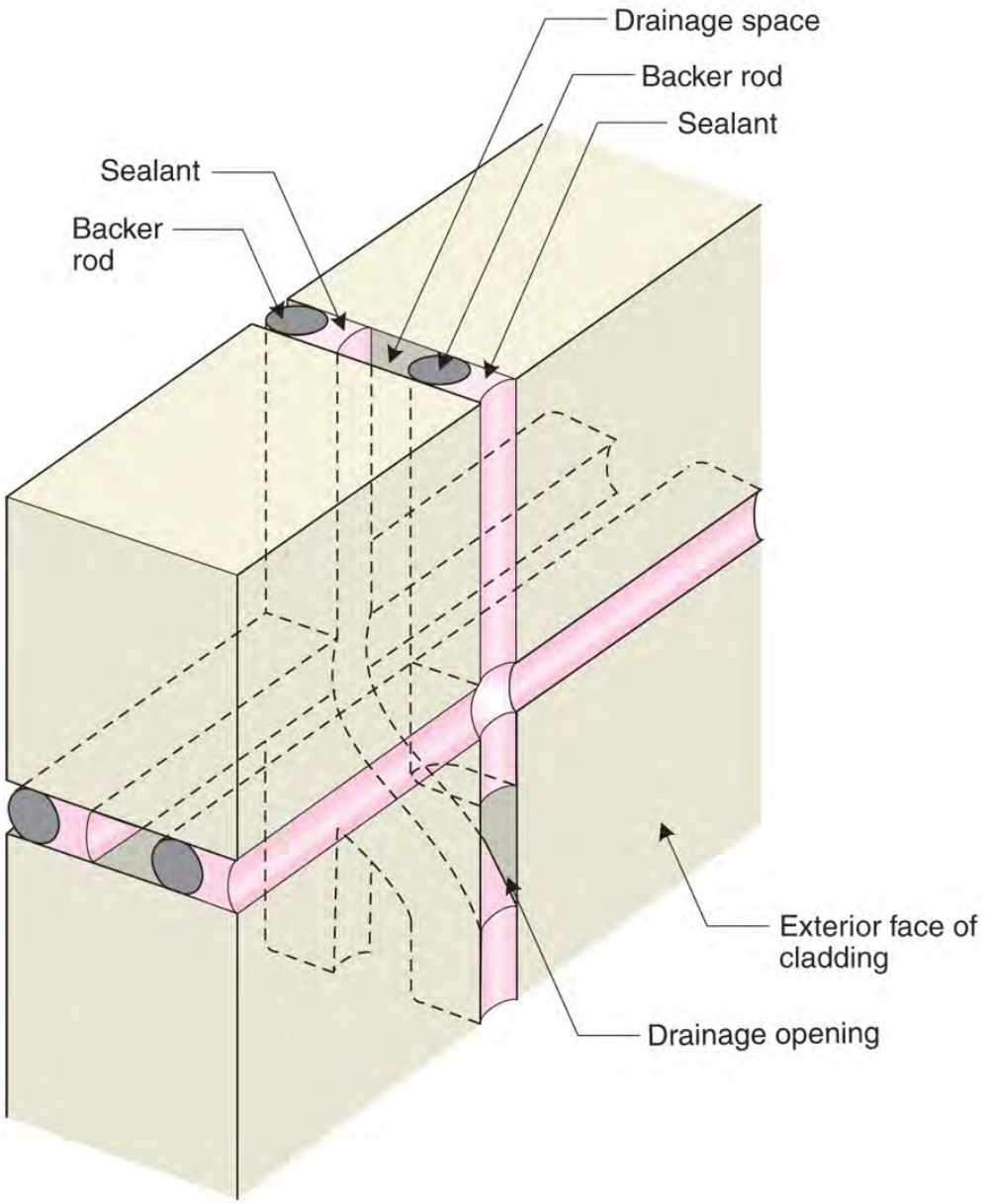



DERMACON


Sealant backer rod
Inner seal
Wind pressurizes chamber between inner and outer seal
Sealant backer rod
Outer seal
Vent tube

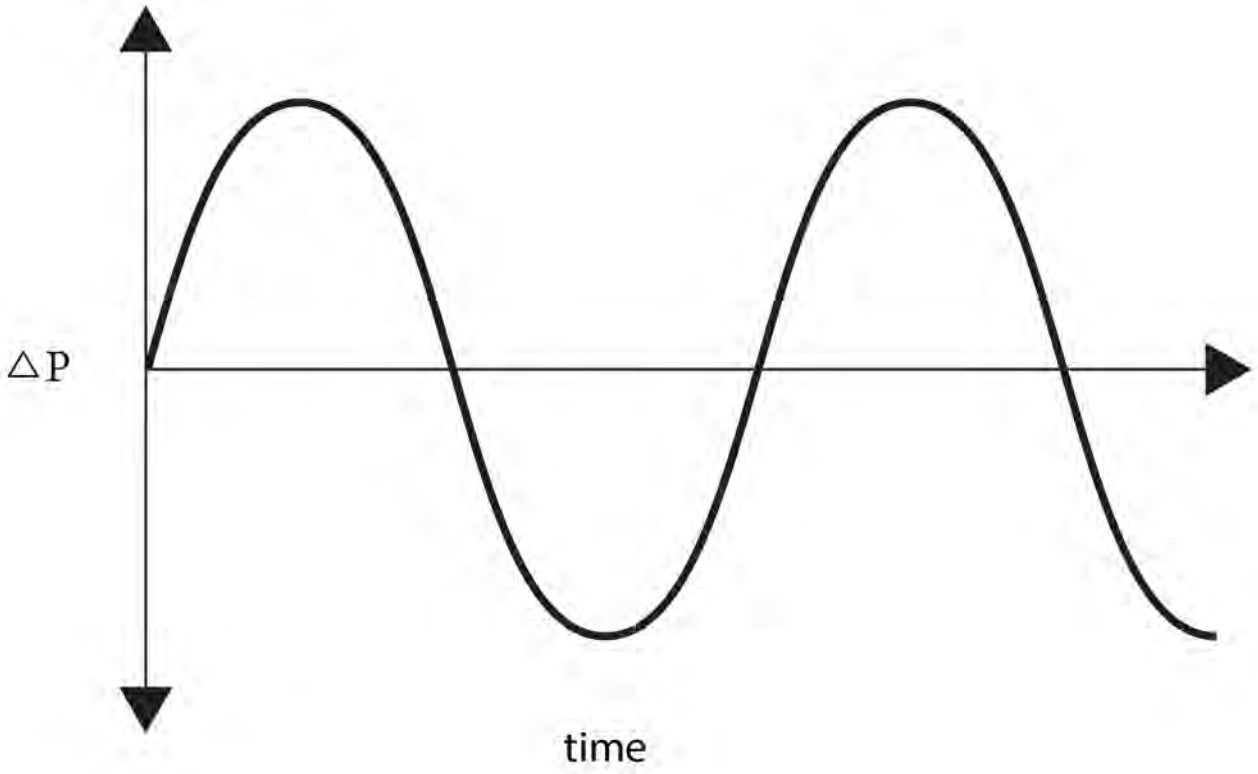

Sealant
backer rod
Inner seal
Pressure
chamber
Baffle

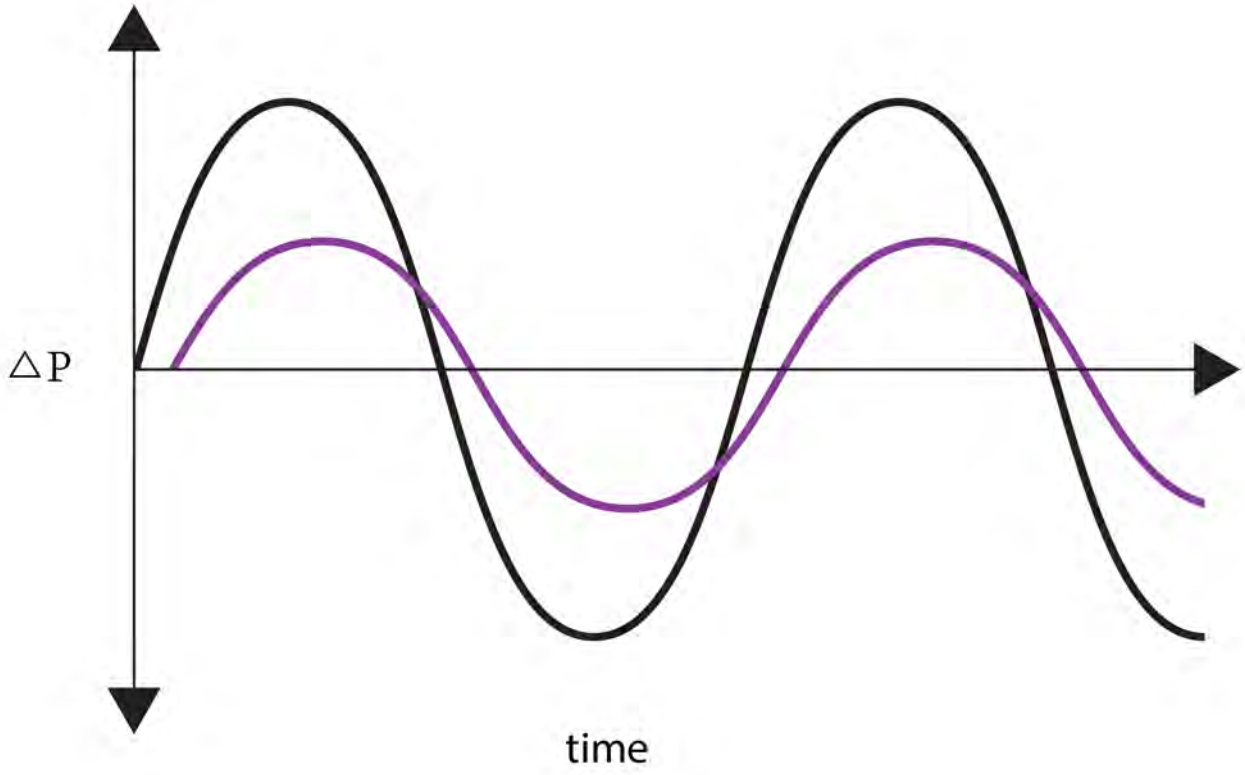

Inner, protected seal
Outer, exposed seal
Drain and vent opening

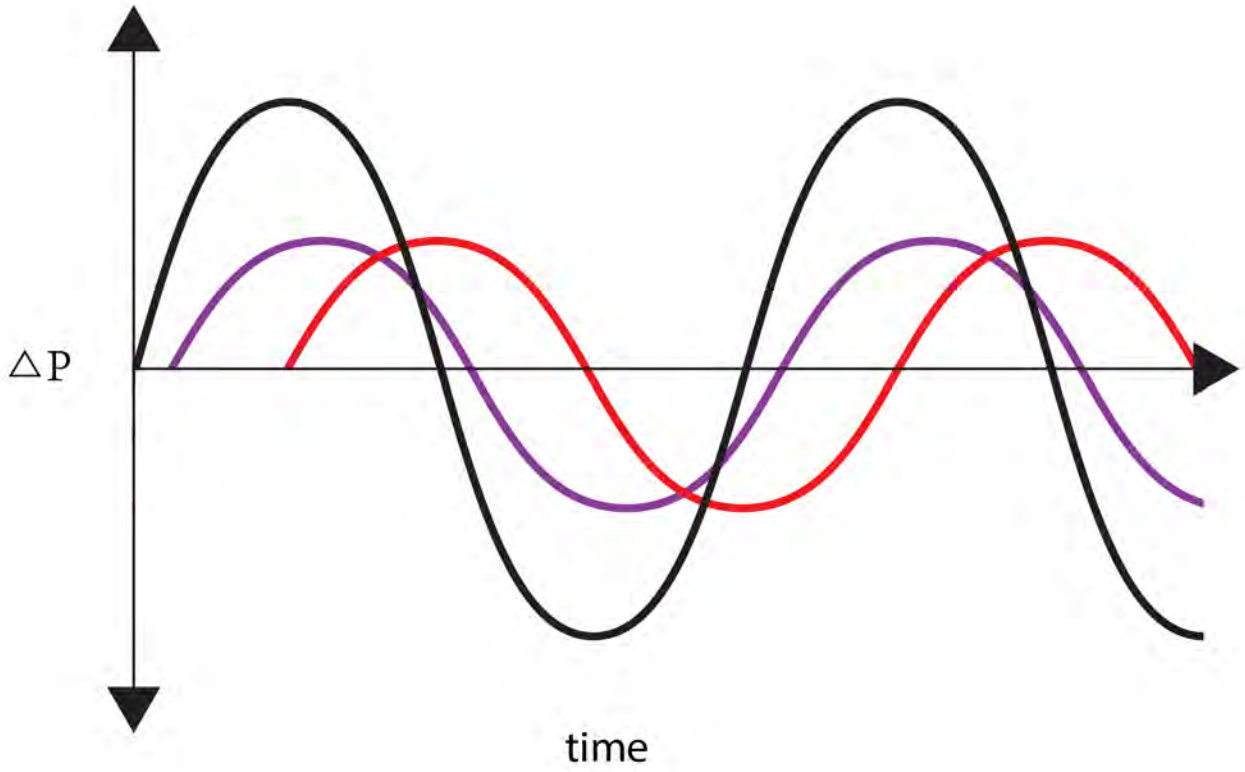

Drainage space
Backer rod
Sealant
Sealant
Backer rod
Exterior face of cladding
Drainage opening

Open Joints vs Closed Joints

Open Joints vs Closed Joints
Limits of Pressure Equalization


△P
time


△P
time


△P
time

- Pressure Equalization Needs to be Perfect
- Pressure Equalization Reduces Drying
- Prevention of Wetting Is Not As Important As Drying
- Assume Things Get Wet…Design Them to Dry
- Ventilated Claddings Promote Drying