

Installing Contractor Insulation Boot Camp

Lesson 7: Attic Air Sealing

ABGC's of Air Sealing



- A. Begin with the top of the thermal boundary (or Attic).
- B. Then the bottom of the thermal boundary (or Basement).
- G. Then prioritize Garage wall connections to any living space and entry door to garage, if applicable.
- C. Then prioritize living (or Conditioned) space, and the garage ceiling if it is attached to the conditioned space.

Seal the largest leaks first.

Attic Air Sealing



Attic accessibility is sometimes limited.

Attic Safety

- Always wear proper personal safety equipment
- Be cautious of hot surfaces
- Ensure proper ventilation or wear a respirator



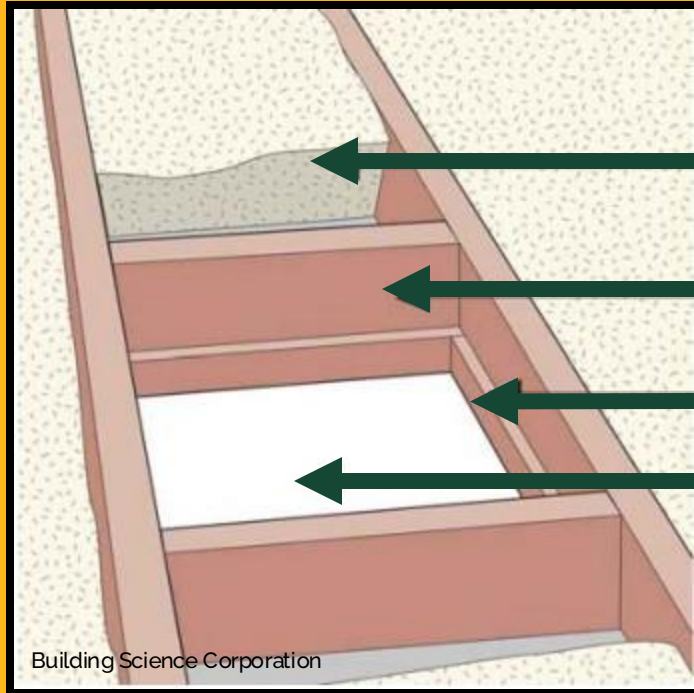
Attic Air Sealing Opportunities

- Bath fan
- Chimney chase – masonry
- Chimney chase – metal pipe
- Duct boot
- Electrical box
- Plumbing stack
- Recessed lights
- Rigid or flex duct and chase
- Top plate penetrations (electrical/plumbing)
- Dropped soffits
- Top plates
- Kneewalls

Attic Access Sealing and Insulating

- Lift off and set aside attic access cover
- Cut two pieces of framing lumber of equal height of ceiling joists to form a box around the access hole
- Mechanically fasten wood cross pieces to joists
- Apply an adhesive backed weather-stripping to the molding or ledge on which the cover will rest
- Cut and fasten insulation blocking material to act as an insulation dam

Attic Hatch



Insulation pulled back
from blocking

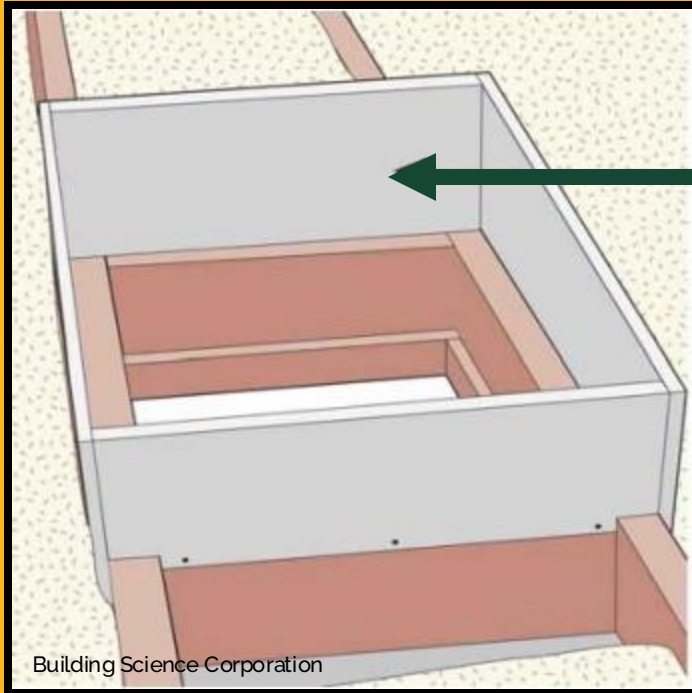
Add wood block

Ledge for hatch

Attic access opening

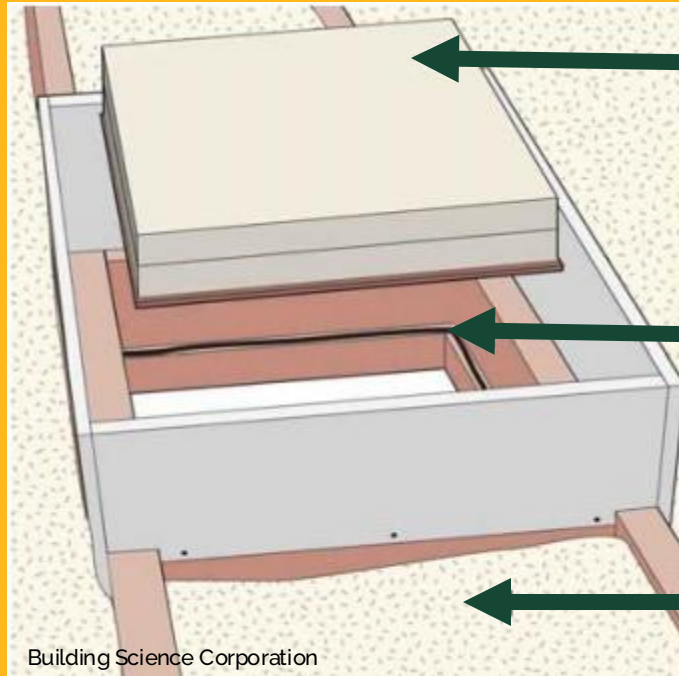
Task – Control air leakage at the attic access hatch.

Attic Hatch



Plywood or OSB
as insulation dam

Attic Hatch

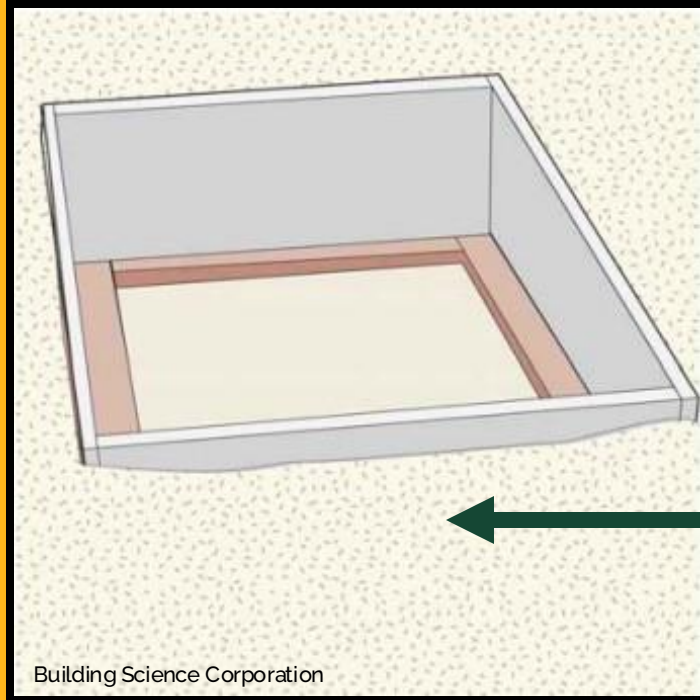


Attach layers of rigid foam board to hatch cover

Add continuous weatherstrip to ledge

Replace insulation

Attic Hatch



Additional
insulation

Attic Hatch

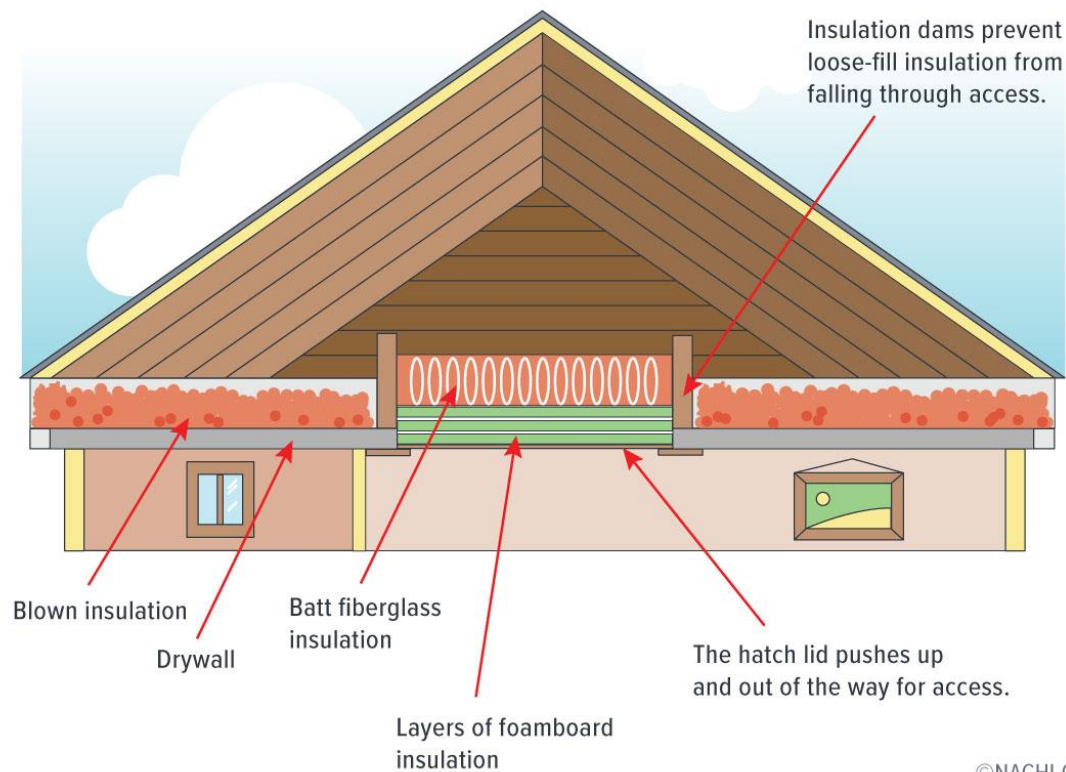


A wood-framed or equivalent baffle or retainer is required to be provided when loose fill insulation is installed, the purpose of which is to prevent the loose fill insulation from spilling into the living space when the attic access is opened, and to provide a permanent means of maintaining the installed R-value of the loose fill insulation.

Insulated Attic Hatch with Blown Insulation

Insulated Attic Hatch with Blown Insulation

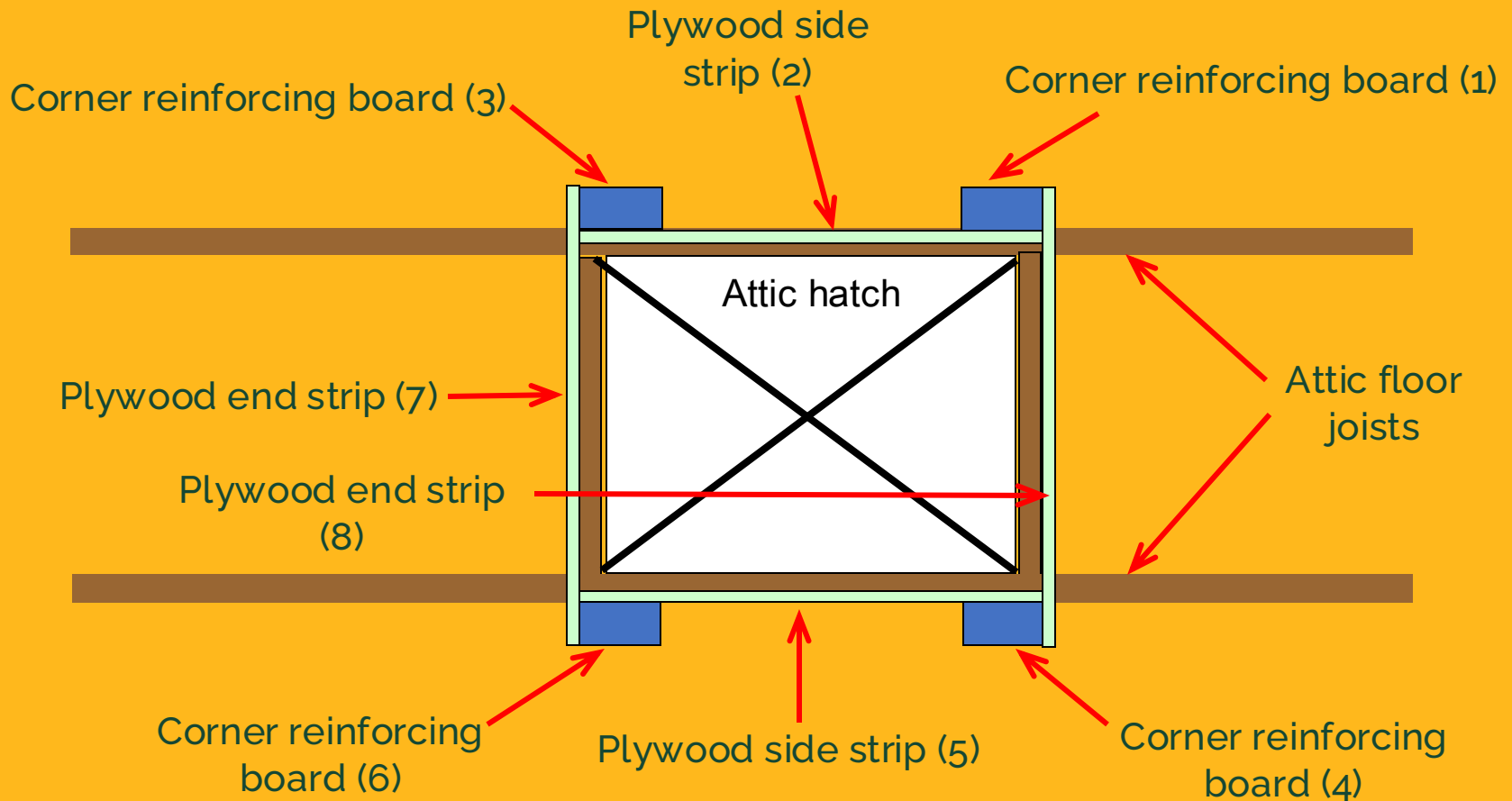
The access hatch should be insulated and air-sealed. Insulation dams must be present to prevent blown insulation from falling through the attic access.



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Attic Hatch with Plywood Dam

Attic Hatch Layout



Attic Hatch Damming



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Program Requirements



Attic Access Cover Qualifications

- Location: This rebate applies only to attic floors that are part of a residential building envelope horizontal barrier to an attic space on occupied homes
- R-value: The assembled R-value must be a minimum of R-30 and to a minimum level equivalent to the surrounding insulation
- Seal qualifications: A weather-stripped and sealed installation is required and must be easily resealable after each entry

Attic Hatches

Insulating Attic Hatches with Rigid Foam Board



The Center for Ecological Technology

Attic Hatch Discussion



What is the importance of insulating an attic hatch?

What part of the attic hatch has the most air leakage?

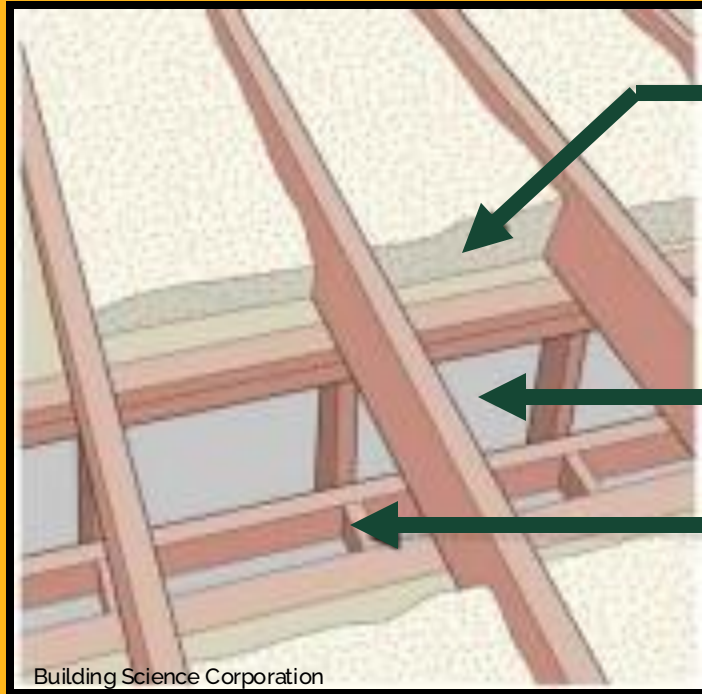
To what R-value should an attic hatch be insulated?

What material is most effective in insulating an attic hatch?

Drop Soffit Sealing and Insulating

- Expose the dropped soffit, including the framing.
- Measure and pre-cut the ABM to be used to cover the drop or opening in the ceiling.
- Fix in place the ABM using adhesive or fasteners.
- Air-seal all edges of ABM to framing use sealant.

Air Sealing a Dropped Soffit



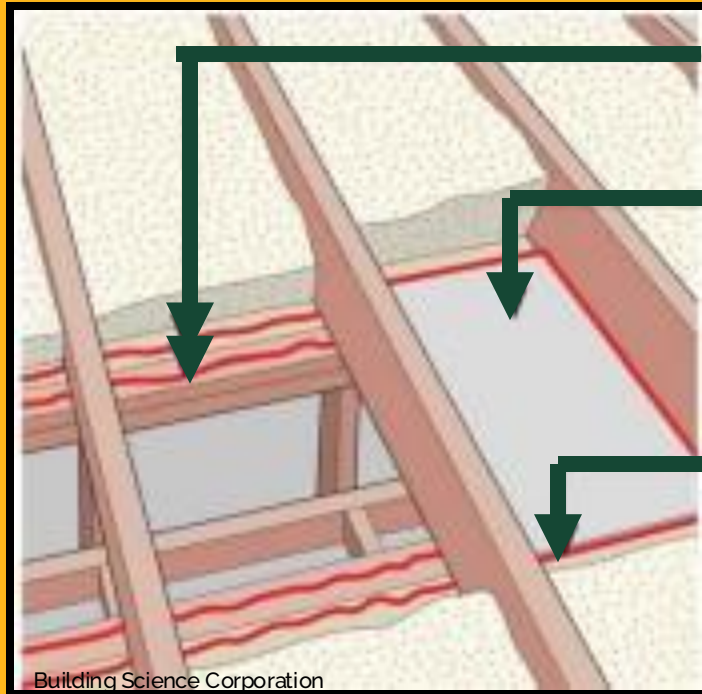
Insulation pulled back to
expose dropped soffit

Open stud cavity

Dropped soffit framing

Task – Control air leakage between the conditioned space below and the unconditioned attic space above at dropped soffits.

Air Sealing a Dropped Soffit

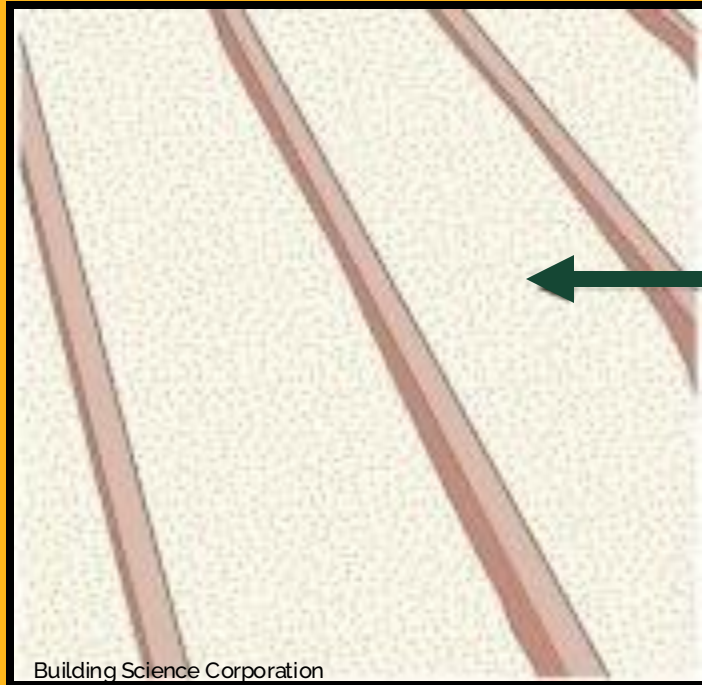


Insulation pulled back to
expose dropped soffit

Open stud cavity

Dropped soffit framing

Air Sealing a Dropped Soffit



Insulation installed over
closure board

Air Sealing an Open Chase

What is a chase?

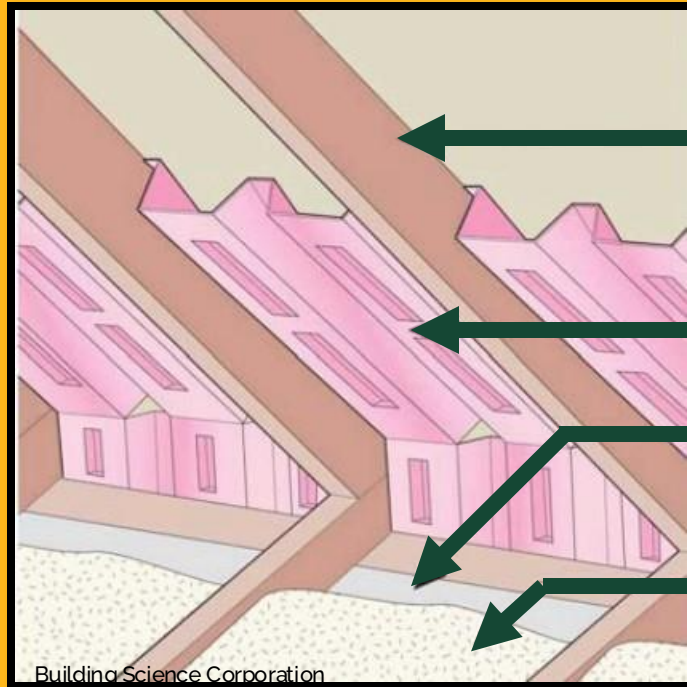


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Exterior Top Plate at Soffit – Sealing and Insulating

- Fully expose the top plate and fold or cut the baffle to make a vertical backstop.
- Fix baffle in place leaving the top plate fully exposed for maximum insulation.
- Seal the gypsum board/top plate joint with sealant
- (Option 1) Using a foam pack, spray foam to backstop extending over gypsum board/top plate joint. Do not seal ventilation space behind insulation baffle.
- (Option 2) Install fiberglass batt insulation (or other suitable material) as support and blocking for baffle.

Air Sealing a Top Plate



Roof rafter

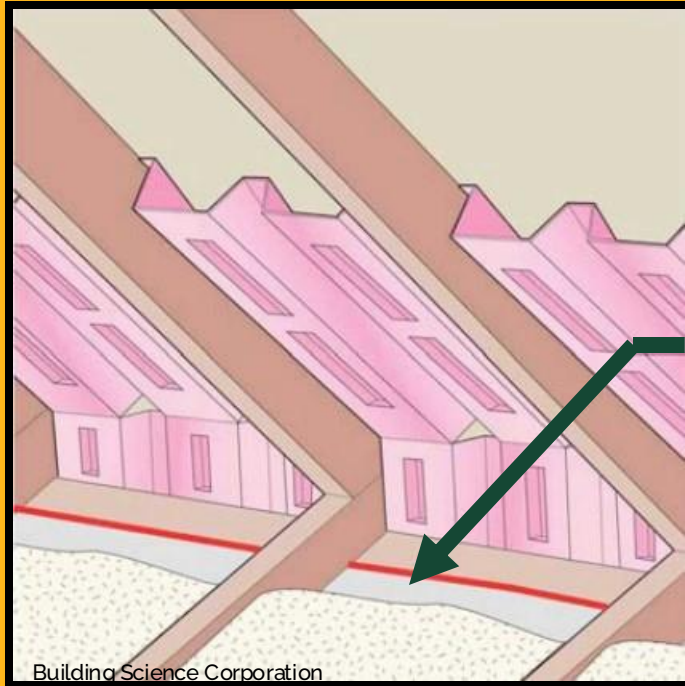
Insulation Baffle

Ceiling gypsum board

Insulation pulled back
for access

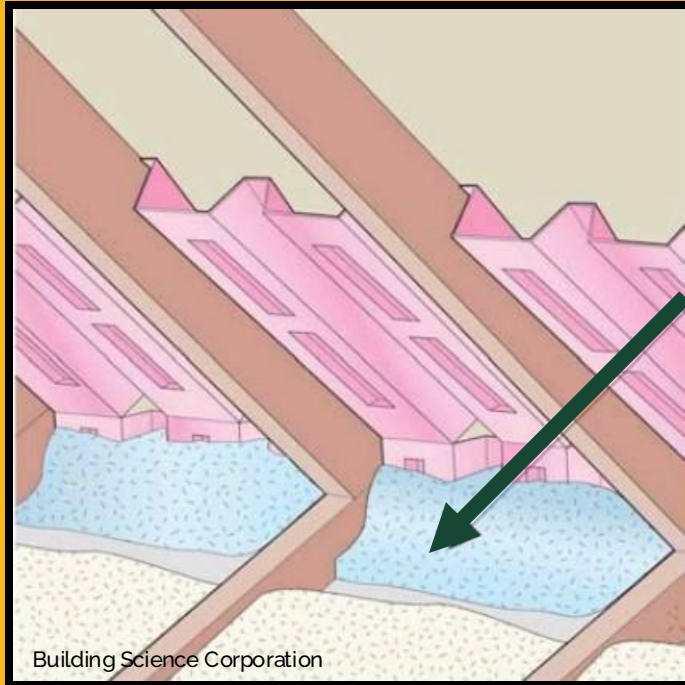
Task – Control air leakage at top plate, provide insulation coverage of top plate, direct attic ventilation air.

Air Sealing a Top Plate



Continuous bead of
sealant

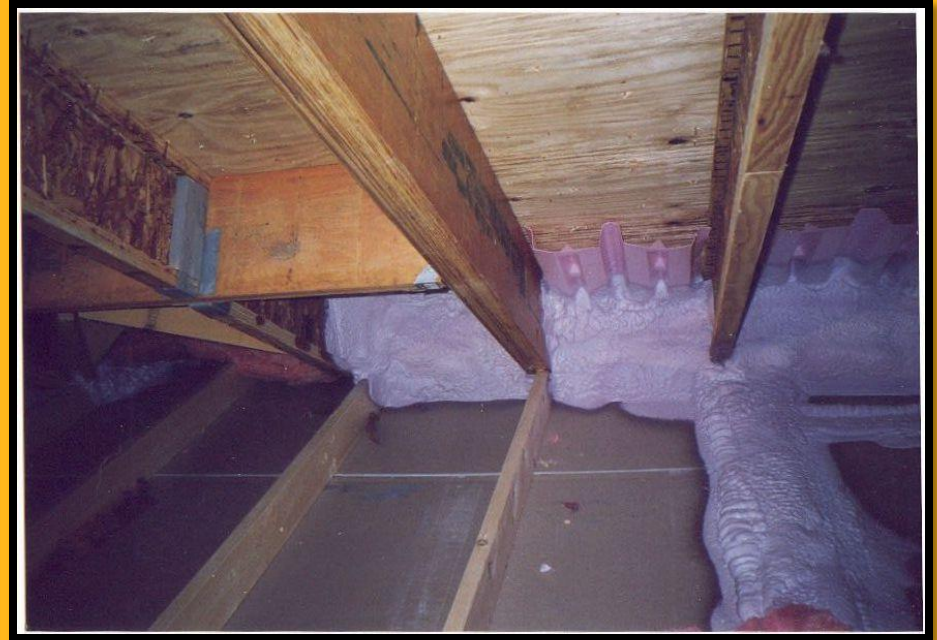
Air Sealing a Top Plate



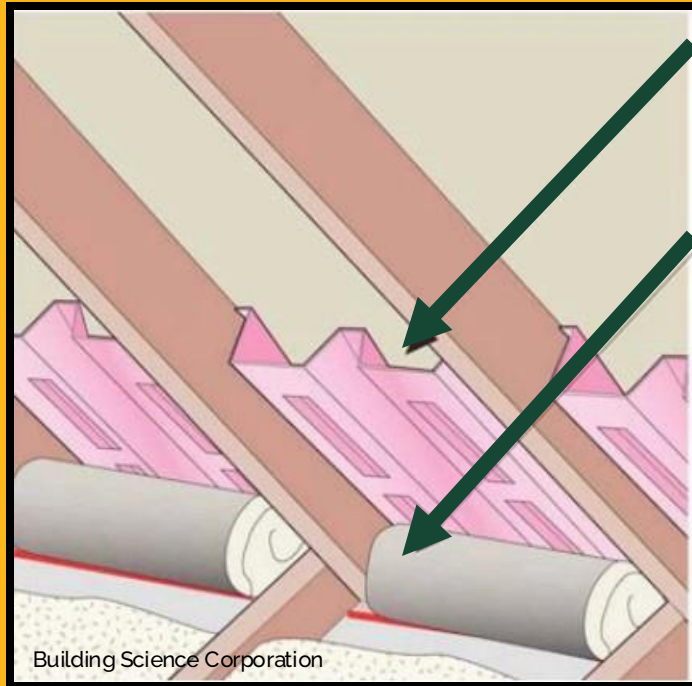
Spray foam top plate
air seal

Air Sealing a Top Plate

Two-part foam
installed to seal
between the top
plate and the vent



Air Sealing a Top Plate



1 inch ventilation space

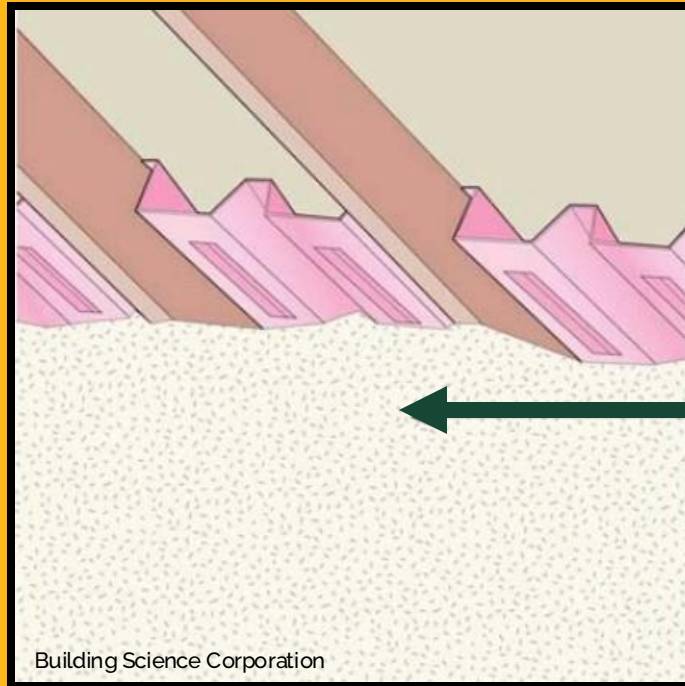
Spray foam top plate
air seal

Air Sealing a Top Plate

Damming a baffle



Air Sealing a Top Plate



Additional insulation

Two Story Wall – Sealing and Insulating

- Expose wall cavity area.
- (Option 1) Pre-cut ABM to fit cavity behind band board.
- Align AMB with bottom edge of band board and fasten.
- Seal all four edges of installed bottom plate with sealant.

Two Story Wall – Sealing and Insulating

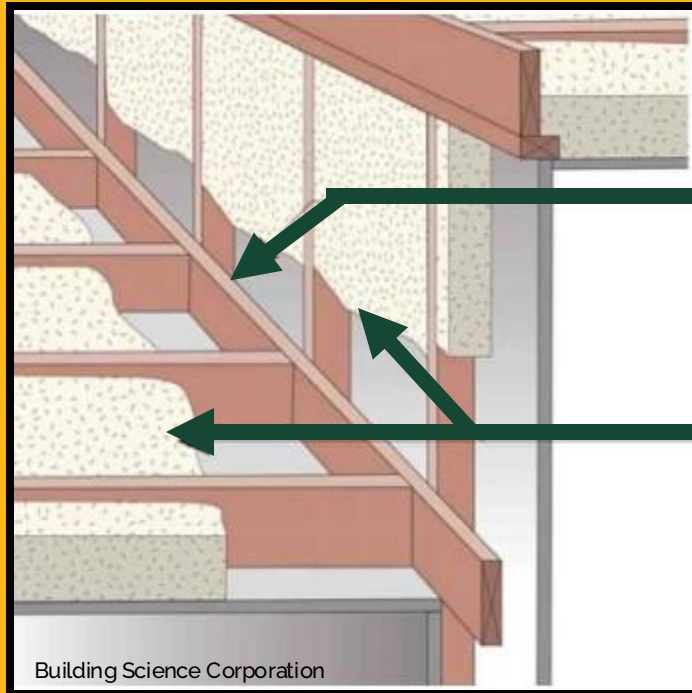
- (Option 2) Friction fit backing (e.g., fiberglass insulation) in cavity to the level of the bottom edge of the band board. Adjust so that the top of the backing is at the bottom edge of the band board.
- Using a foam pack, spray foam onto the backing to completely fill the bottom of the cavity.
- Installing insulating sheathing over wall framing and extend upwards above top band board to act as insulation dam.

Two Story Wall

Two Story Wall – Sealing and Insulating



Two Story Wall

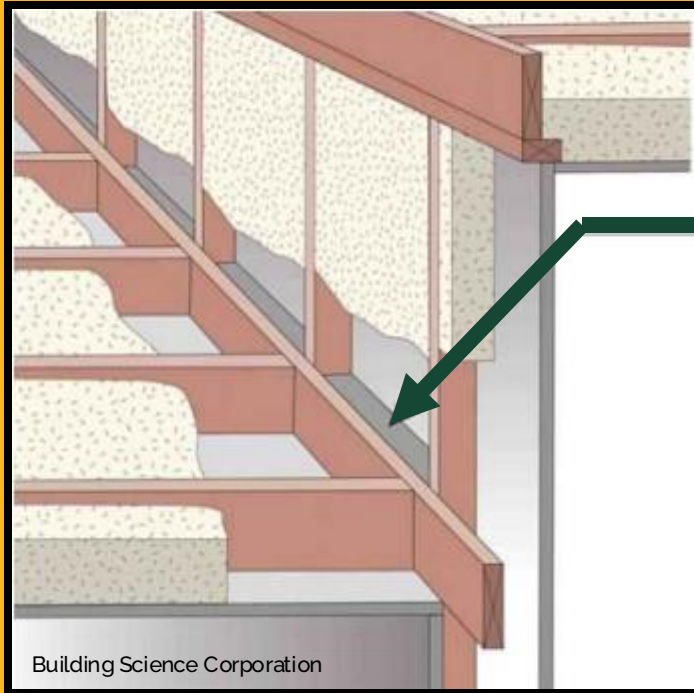


Open cavity

Insulation pulled
back for access

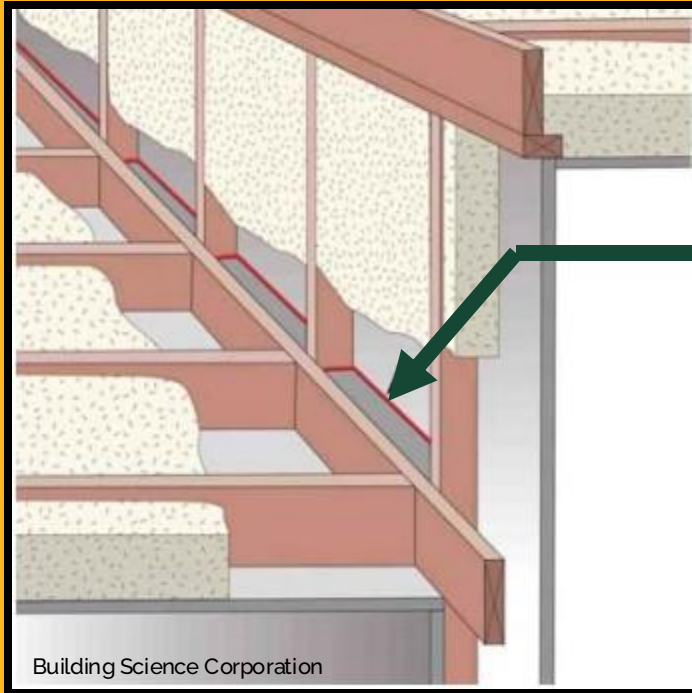
Task – Control air leakage through wall
cavity into attic space.

Two Story Wall



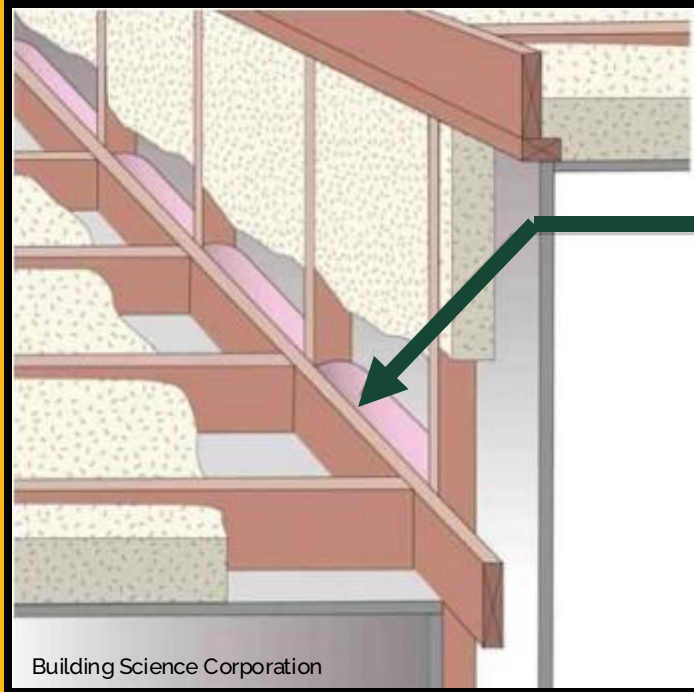
Solid wood blocking or
rigid foam board

Two Story Wall



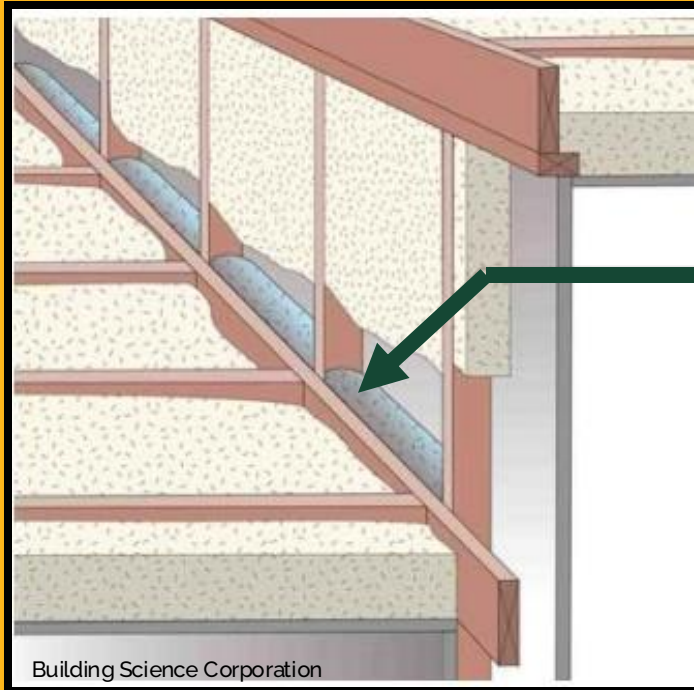
Continuous bead of sealant
around entire perimeter of
closure

Two Story Wall



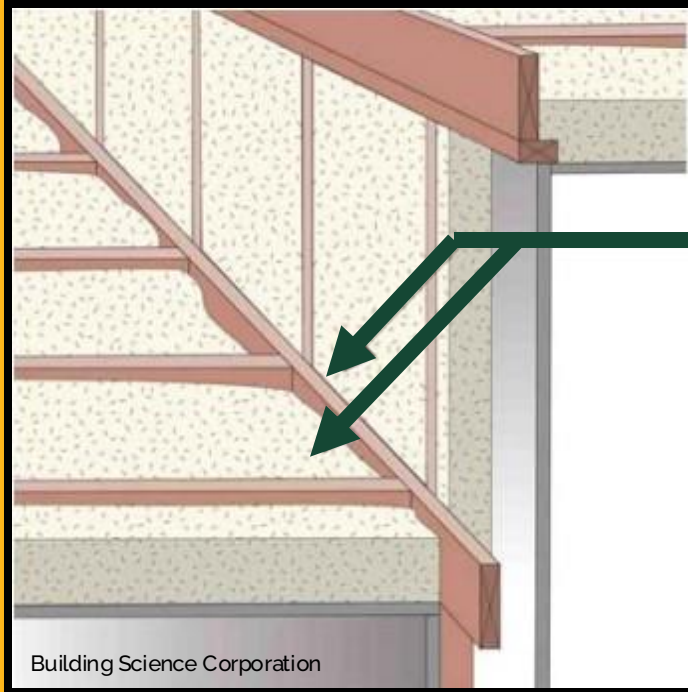
Fiberglass batt
insulation as backing
for spray foam

Two Story Wall



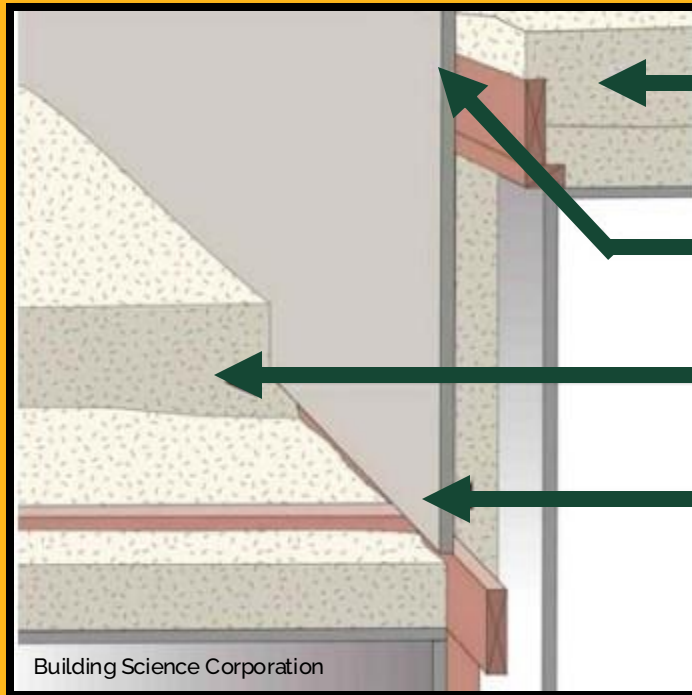
Spray foam covers fiberglass insulation backing.

Two Story Wall



Replace cavity
insulation

Two Story Wall



Additional insulation

Insulating sheathing
acts as insulation dam

Additional insulation

Add insulating sheathing

Bathroom Exhaust Fan Ceiling

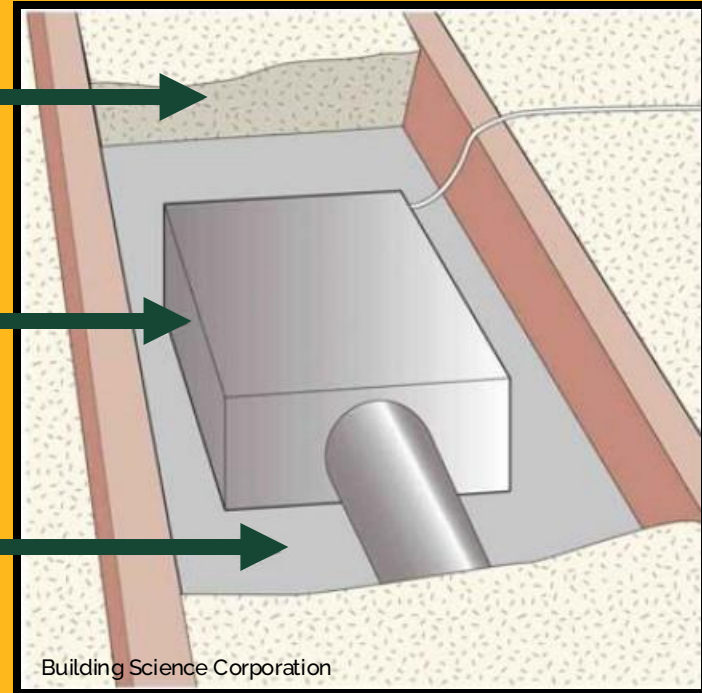
- Expose ceiling gypsum board approximately 12 inches on both sides of fan.
- Create a 5-sided box with ABM which will comfortably fit over the fan ensuring all corners are sealed.
- Scribe and cut access in the box for the exhaust duct outlet.
- Seal box to ceiling with sealant.
- Seal notched ABM to exhaust outlet.

Bathroom Fan

Insulation pulled
back for access

Bath exhaust fan

Ceiling gypsum
board



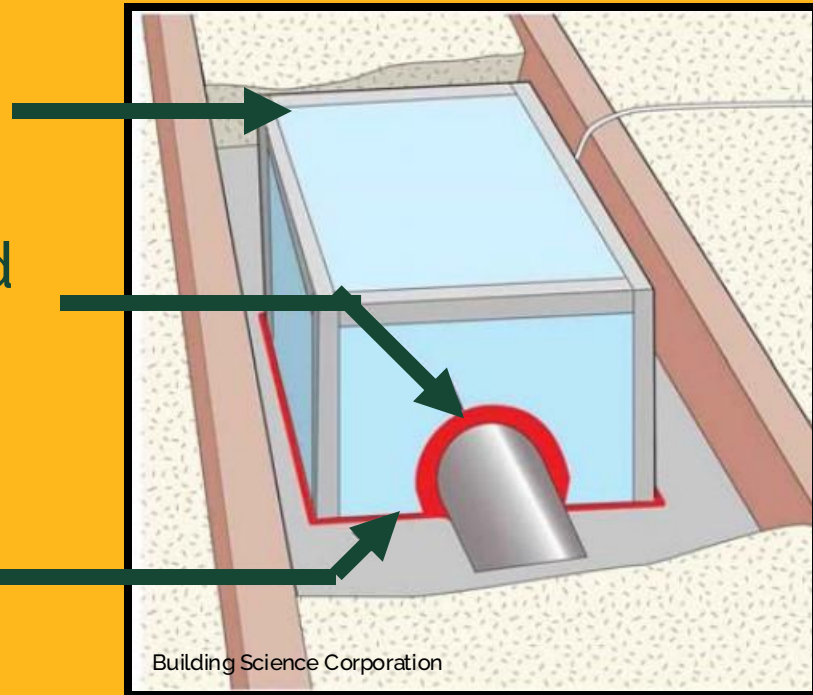
Task – Control air leakage at the bathroom fan and create an insulation shield.

Bathroom Fan

Rigid foam box with
all seams taped

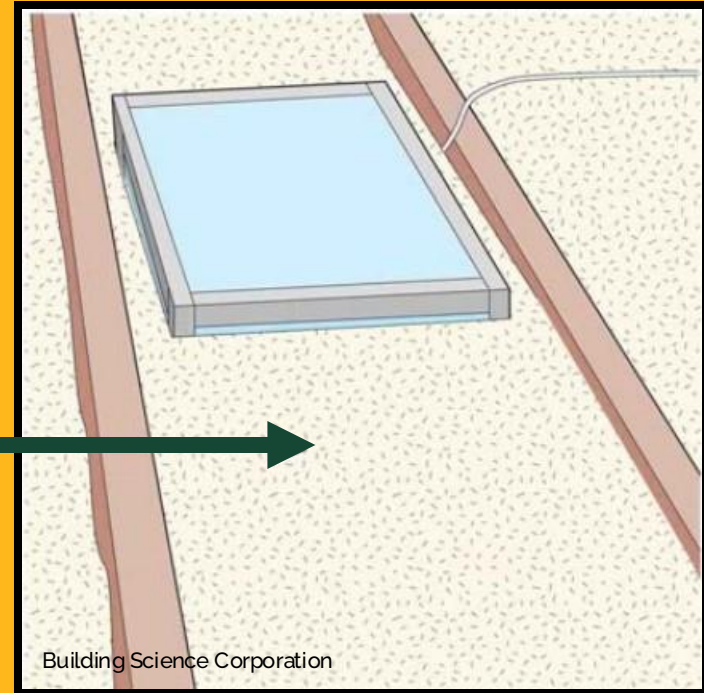
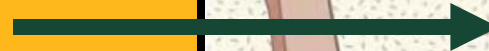
Rigid foam notched around
exhaust pipe and sealed

Continuous bead
of sealant



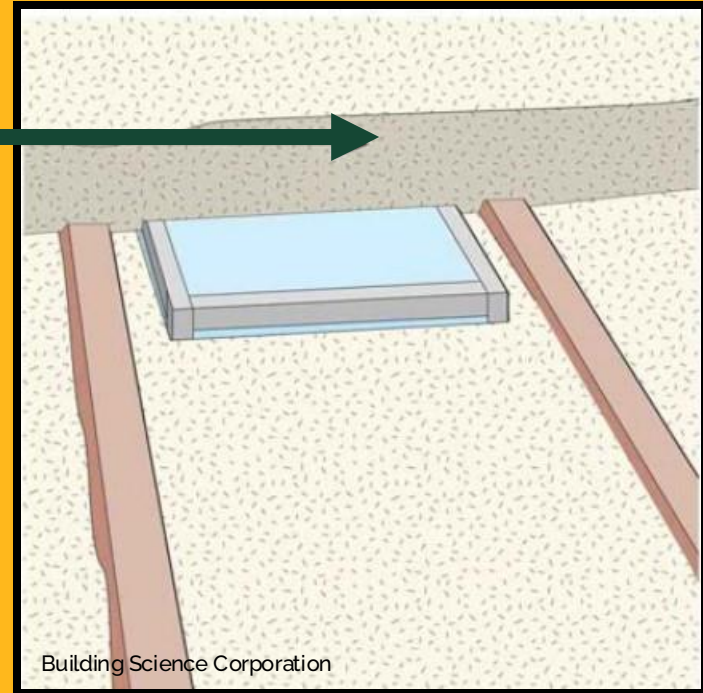
Bathroom Fan

Insulation replaced



Bathroom Fan

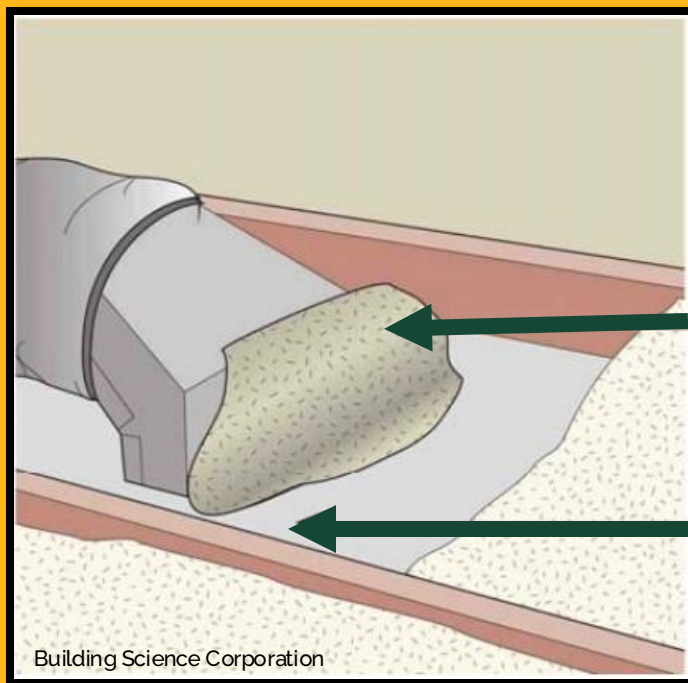
Additional insulation



Duct Boot Sealing

- Expose duct boot.
- Seal all sides of the duct boot to the gypsum board with spray foam or bead of sealant.
- Replace insulation.
- Sealing spaces between duct boots and conditioned space shall be completed as air sealing (and shall not be done as duct sealing) and must be completed prior to duct sealing. (Page 53 Implementation Manual)

Duct Boot

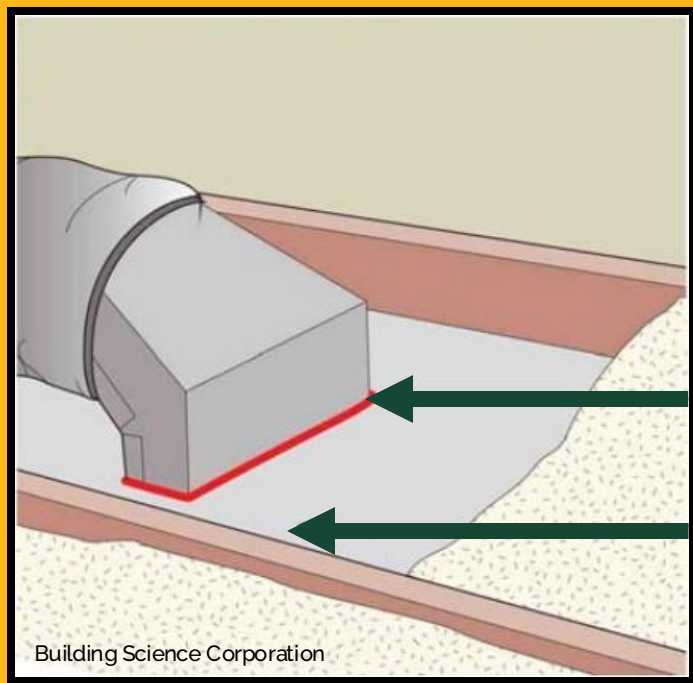


Spray foam covering
ceiling boot penetration

Ceiling gypsum board,
insulation pulled away
from duct boot

Task - Control air leakage at the duct boot
ceiling penetration.

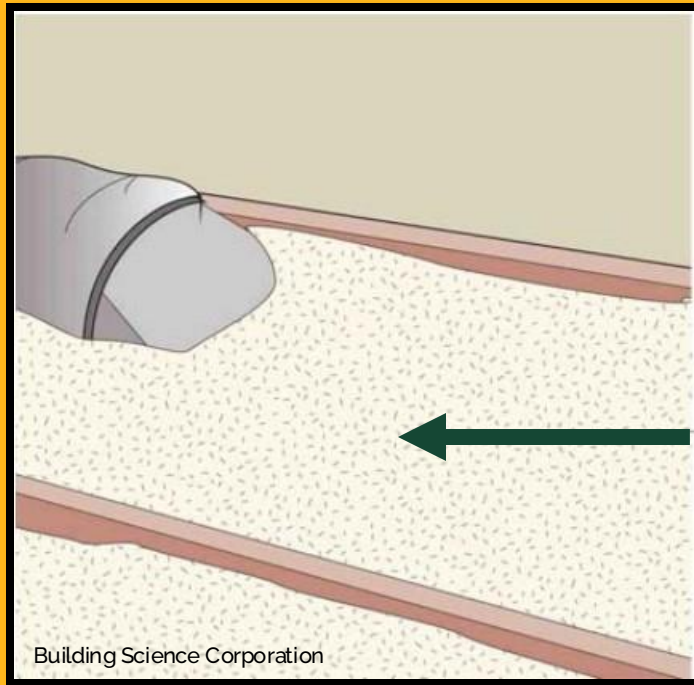
Duct Boot



Continuous bead of sealant

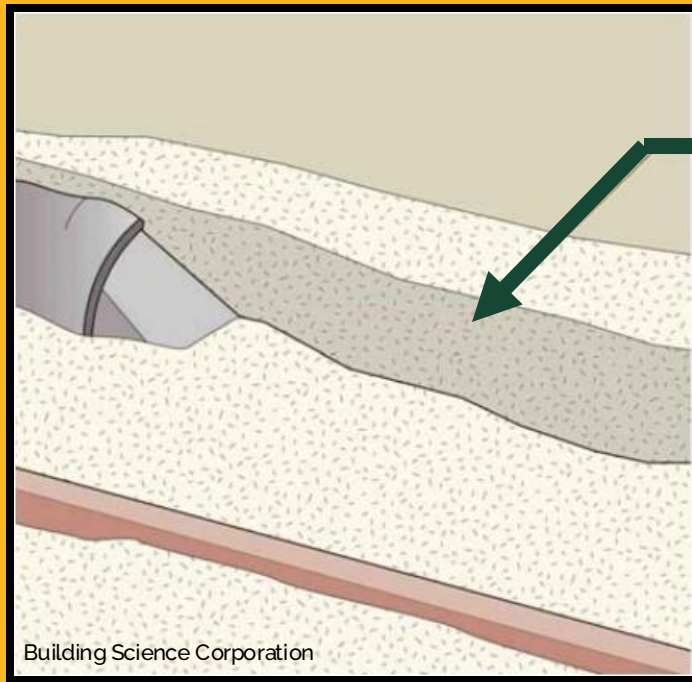
Ceiling gypsum board,
insulation pulled away from
duct boot

Duct Boot



Replace insulation

Duct Boot

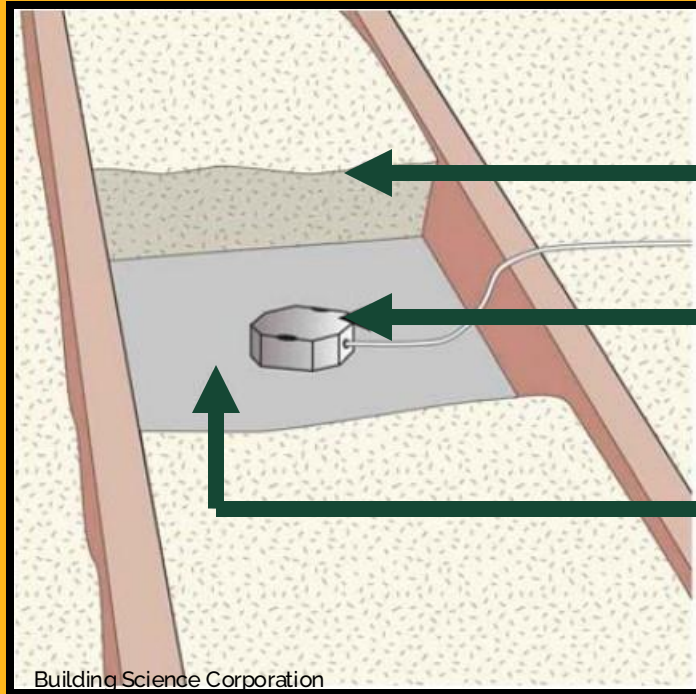


Additional insulation
installed

Junction Box Sealing

- Expose box and approximately 12 inches of ceiling gypsum board.
- Seal the box to the gypsum board, wire entry points, and any box openings.

Air Sealing a Junction Box



Insulation pulled back

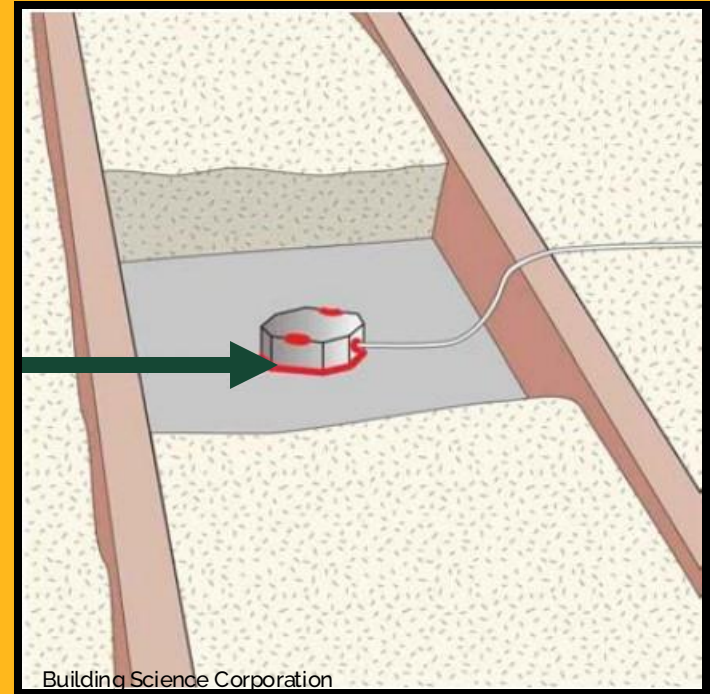
Electrical box

Ceiling gypsum board

TASK – Control air leakage through and around the electrical box.

Air Sealing a Junction Box

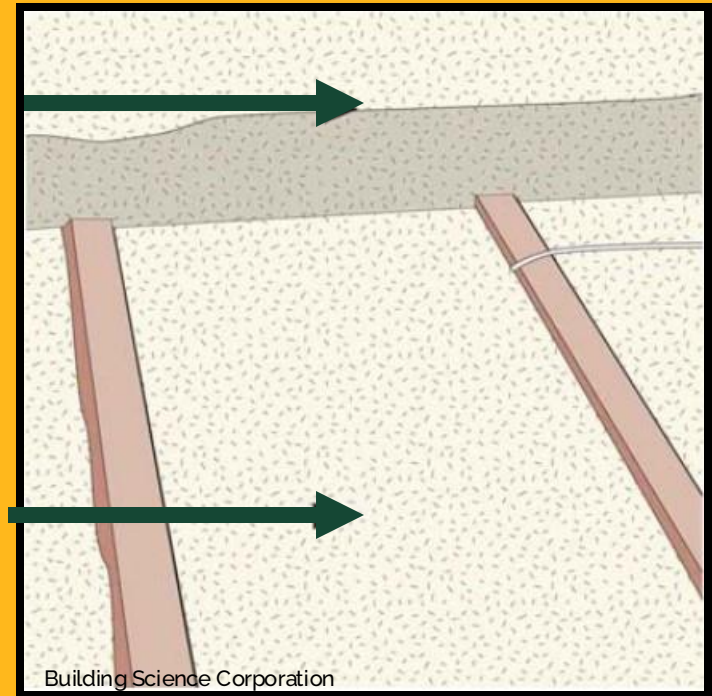
Continuous bead of sealant



Air Sealing a Junction Box

Additional insulation

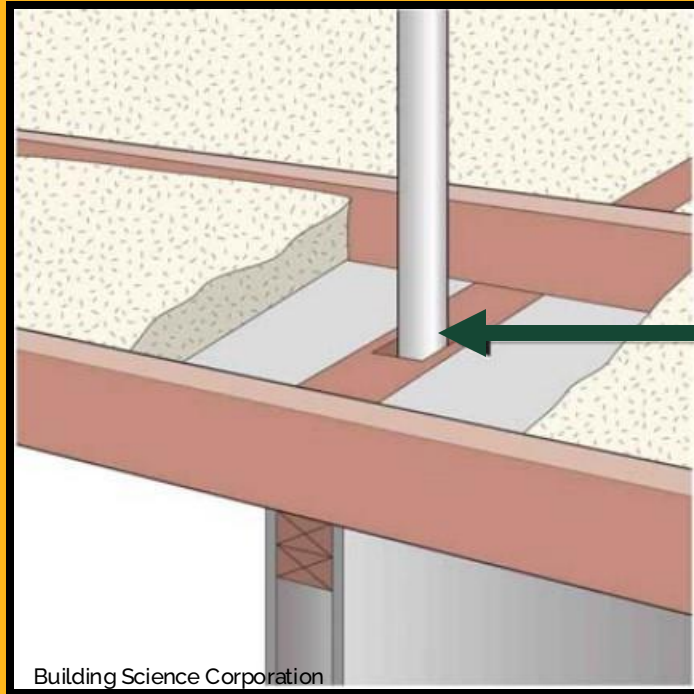
Replace insulation



Plumbing Stack Sealing

- Expose all top plate and plumbing stack.
- Seal the top plate with sealant and the plumbing stack with foam.

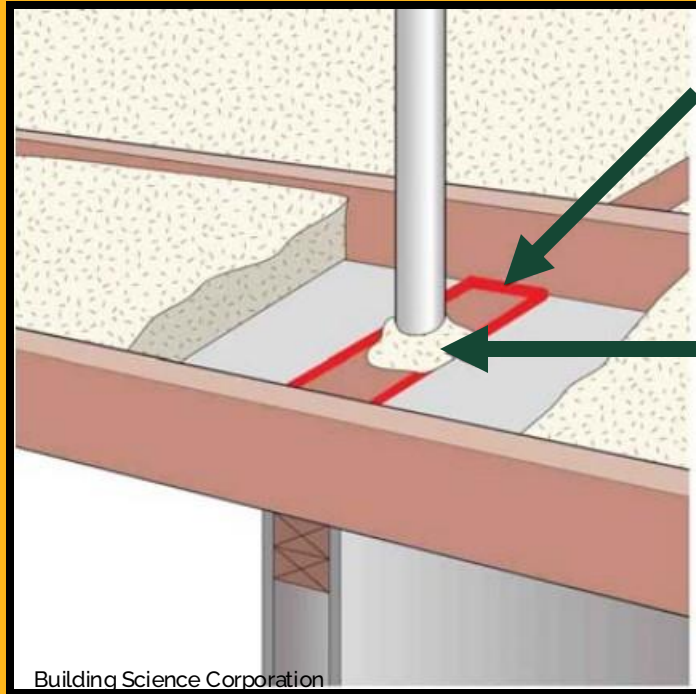
Air Sealing a Plumbing Stack



Hole in top plate
for plumbing stack

Task – Control air leakage at the penetration.

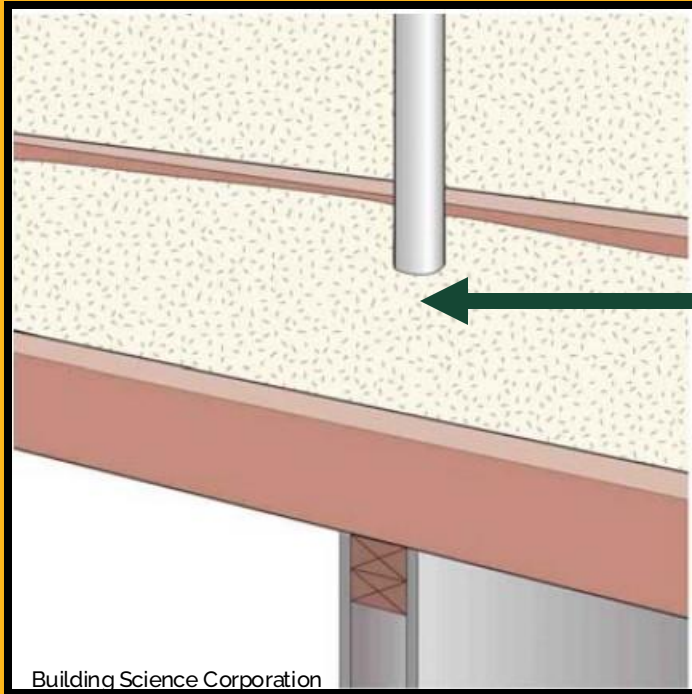
Air Sealing a Plumbing Stack



Continuous bead
of sealant

Spray foam around
plumbing penetration

Air Sealing a Plumbing Stack

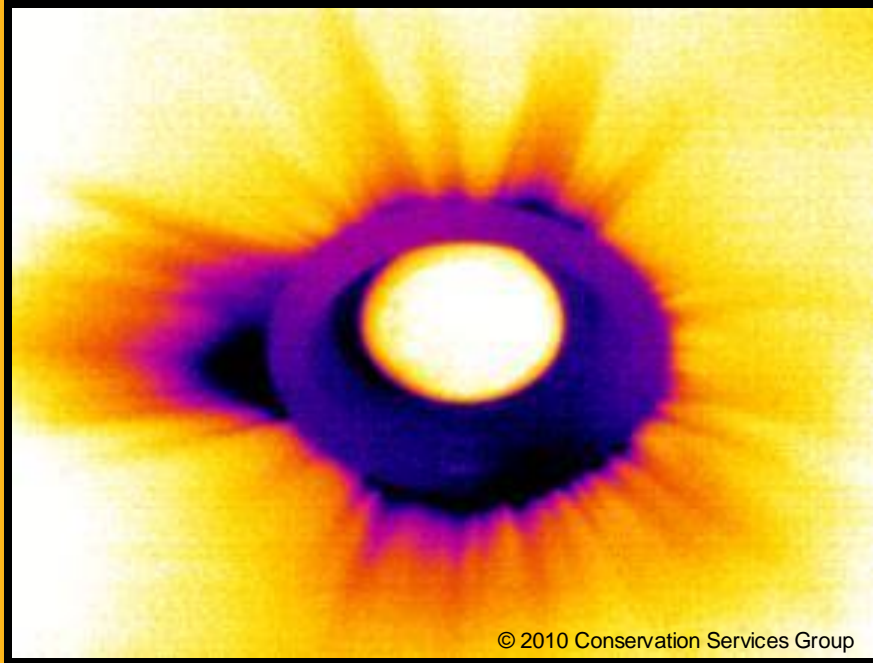


Replace insulation

Recessed Ceiling Light Sealing

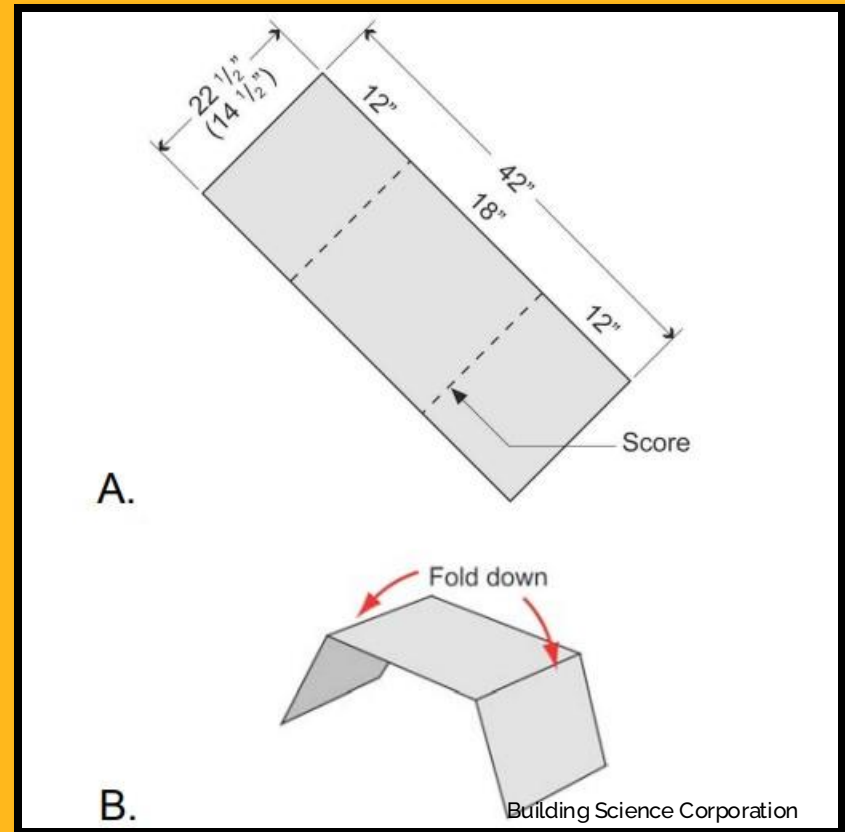
- Expose ceiling gypsum board approximately 12 inches on both sides of the recessed can. Add sealant at joist to gypsum board box.
- Precut 5/8 piece of drywall 42 inches long by 22 1/2" (for 24" o.c.) or 14 1/2" (for 16 o.c.).
- Score back side of gypsum board at 12 inches from ends. Break along scored lines and form an inverted "U" shape of ABM to keep insulation 3" from can.

Non-IC Recessed Lights



Recessed Ceiling Light

- Install gypsum board side closure.
- Tape seams of gypsum board box and join to ceiling with sealant.
- Replace bulb with LED bulb to reduce heat build-up.



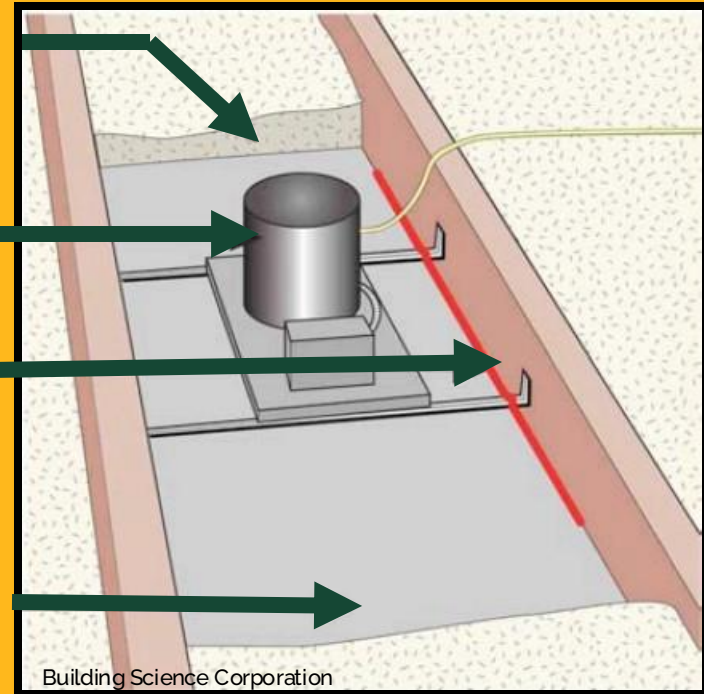
Recessed Ceiling Light

Insulation pulled
back for access

Recessed light

Add sealant bead

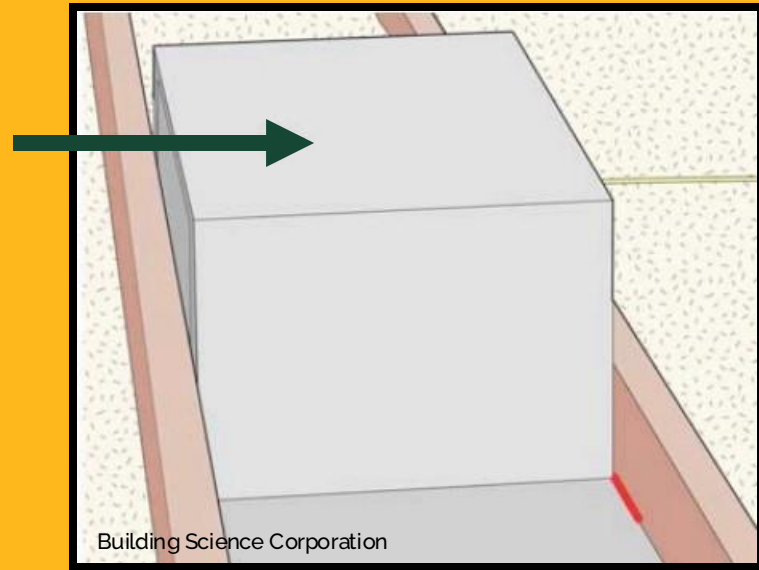
Ceiling gypsum board



TASK – Control air leakage through the recessed light, control air leakage between the recessed light and gypsum board ceiling, and create an insulation shield.

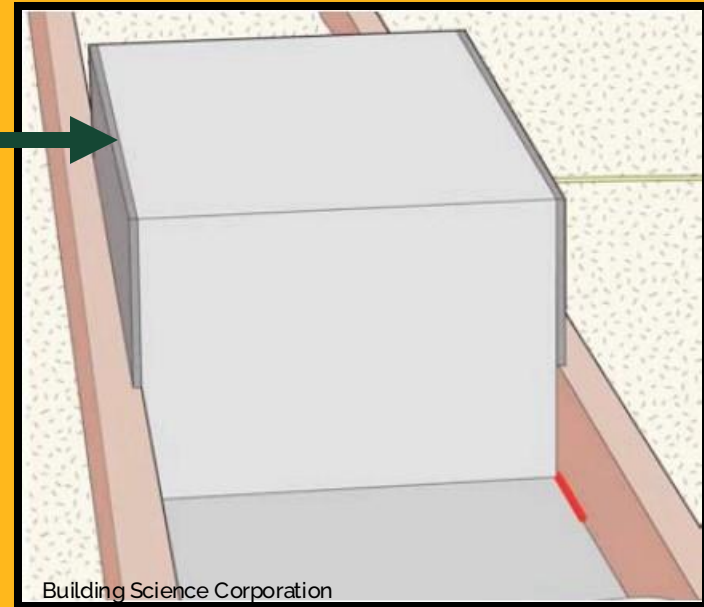
Recessed Ceiling Light

Inverted gypsum
board “U”



Recessed Ceiling Light

Gypsum board
side closure

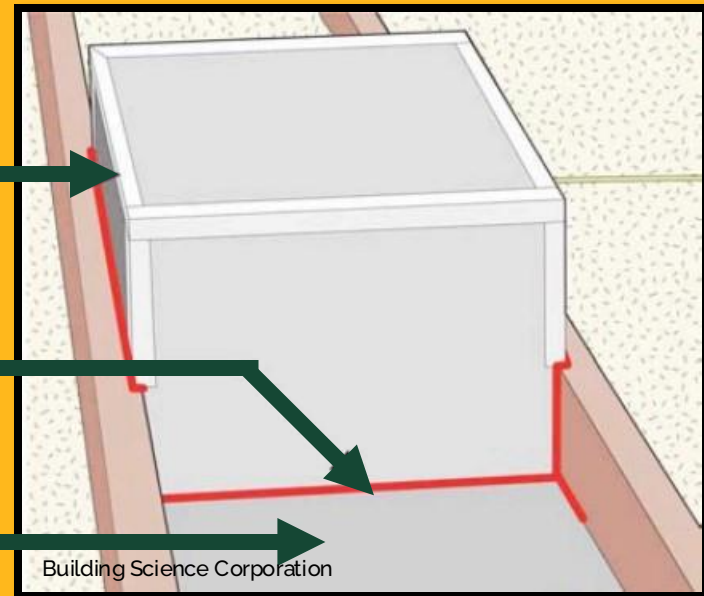


Recessed Ceiling Light

Seams of gypsum
board box taped

Continuous bead
of sealant

Replace insulation



Recessed Ceiling Light



Air-Sealing Recessed Lights



Air Sealing Around IC & Non-IC Recessed Lights



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What is a chase?

A chase is a vertical space in a wall, which provides an area for pipes, wires, or ducts to run through. A chase may run up the wall from the basement to the attic or upper part of your home.

Chase Examples



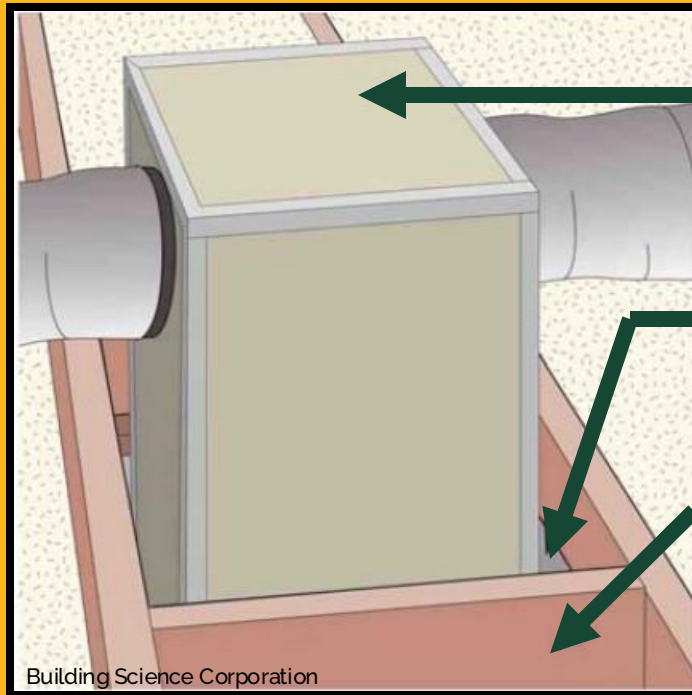
Chases Examples



Rigid Duct and Duct Chase

- Expose the chase and framing area.
- Measure and cut ABM into strips to be fastened to framing.
- Seal all framing joints around the chase with sealant.
- Place ABM on framing leaving $\frac{1}{4}$ " gap between rigid duct and ABM. Fasten in place with fasteners.
- Seal the ABM to the duct with sealant as well as the joints in the ABM.

Rigid Duct & Chase



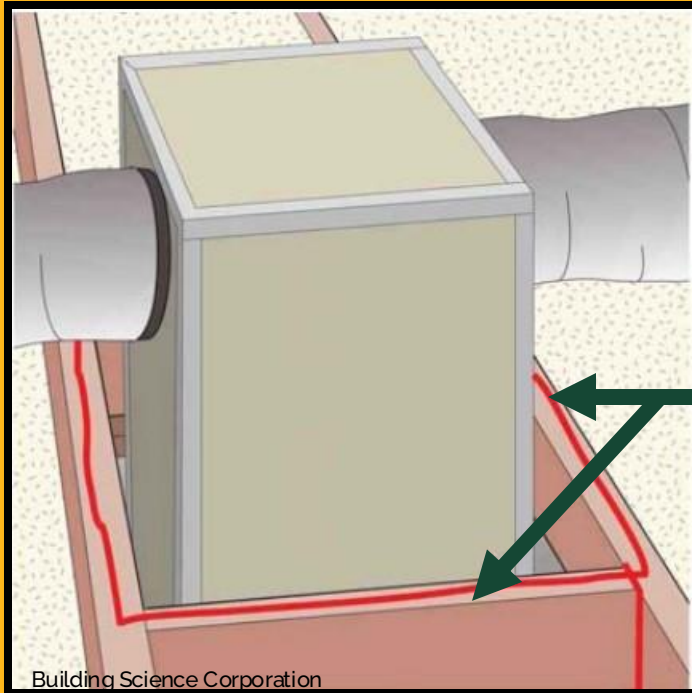
Duct

Chase framing; open to below

Add wood blocking; pull
insulation back from
blocking access

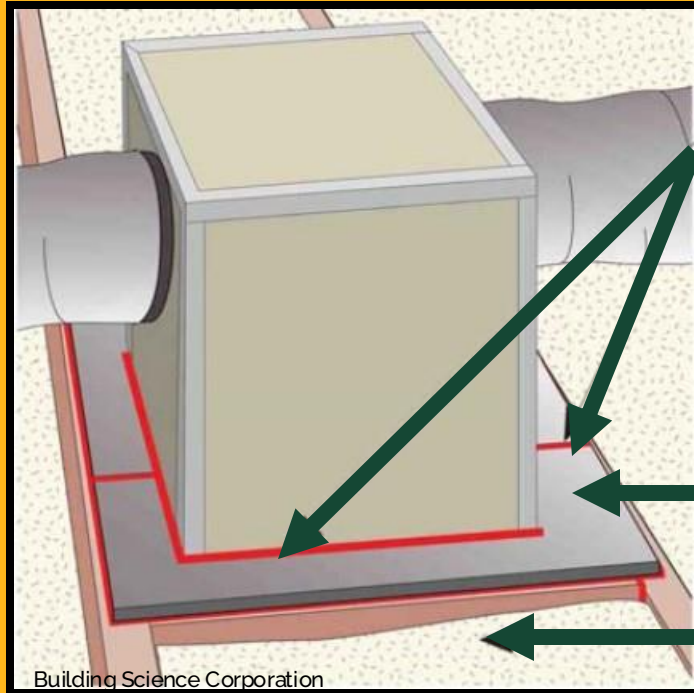
Task - Control air leakage at the duct chase.

Rigid Duct & Chase



Continuous bead of sealant

Rigid Duct & Chase

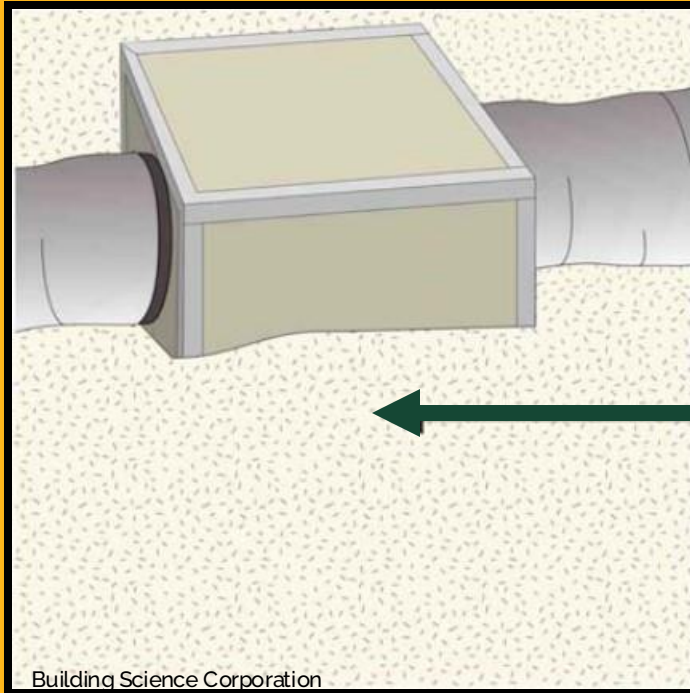


Continuous bead of sealant

Plywood, OSB, gypsum board
or duct board

Replace insulation

Rigid Duct & Chase

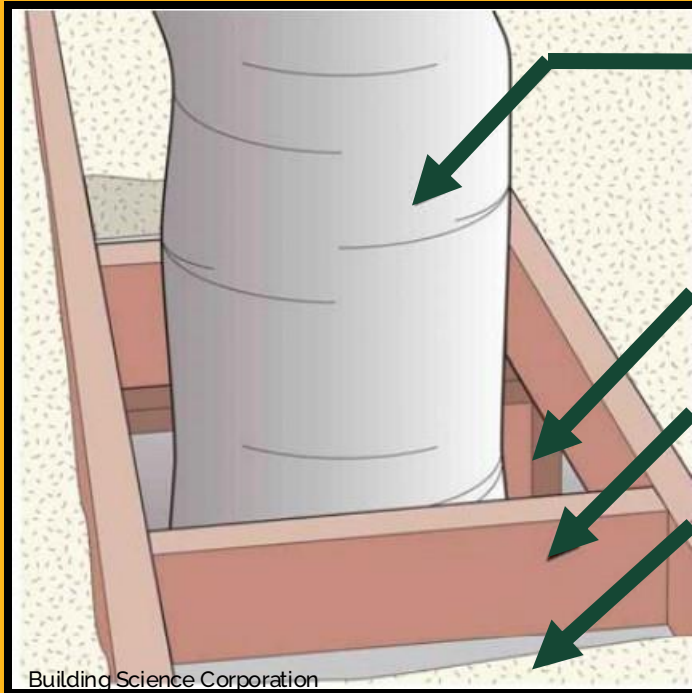


Additional insulation

Flex Duct and Duct Chase

- Expose the chase and framing area.
- Measure and cut ABM to cover entire chase.
- Cut ABM into two halves and then cut half circles to encompass the flex duct.
- Seal all framing joints around the chase with sealant. Lay a generous continuous bead of sealant along the top edge of the chase framing.
- Place ABM on framing and in contact with duct. Fasten in place with fasteners.
- Seal the ABM to the duct with sealant. Also seal the joints in the ABM.

Flex Duct & Duct Chase



Duct

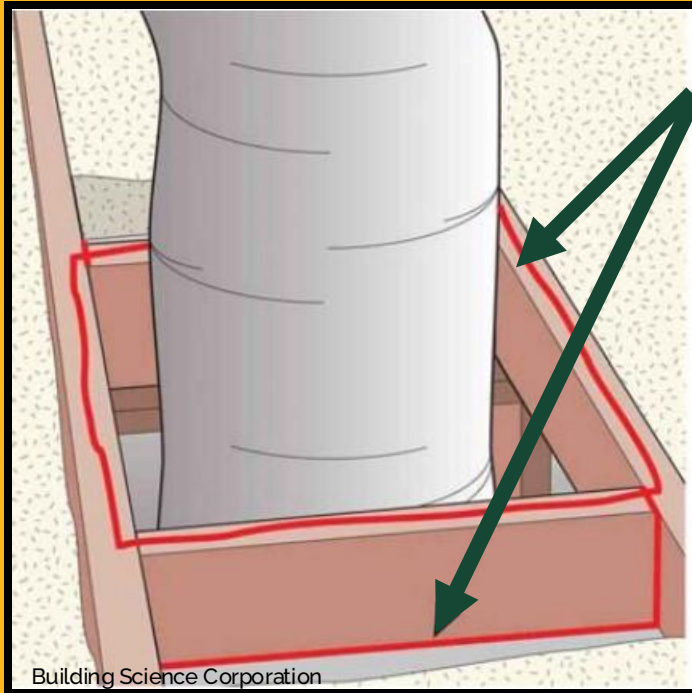
Chase framing; open to below

Add wood blocking

Insulation pulled back
from blocking

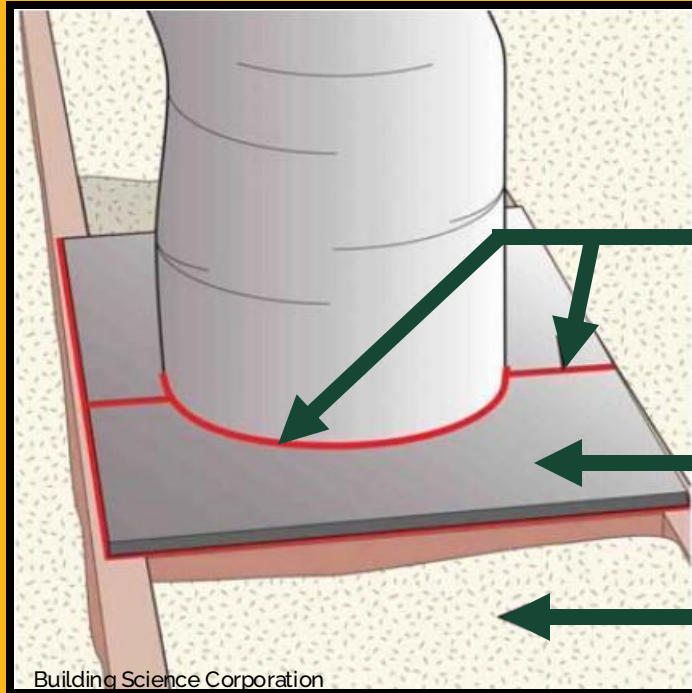
Task – Control air leakage at the duct chase.

Flex Duct & Duct Chase



Continuous bead of sealant

Flex Duct & Duct Chase

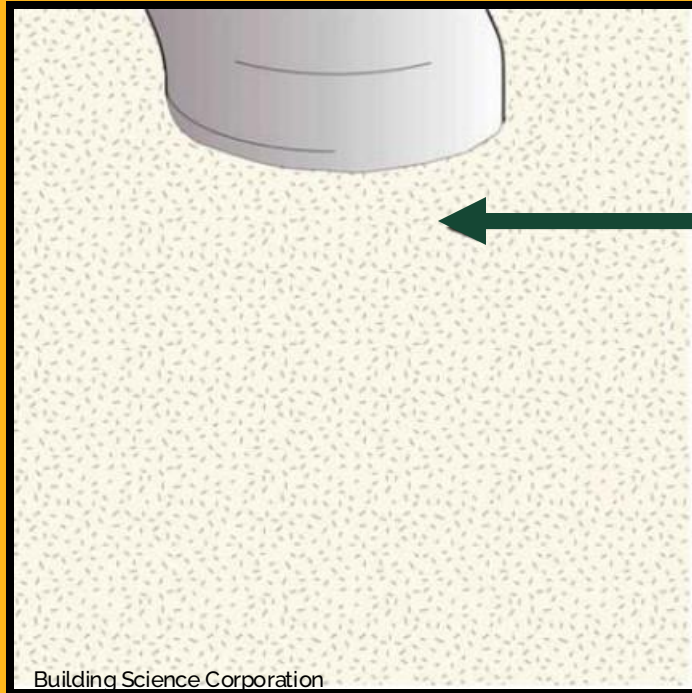


Continuous bead of sealant

Plywood, OSB, gypsum board
or duct board

Replace insulation

Flex Duct & Duct Chase



Additional insulation

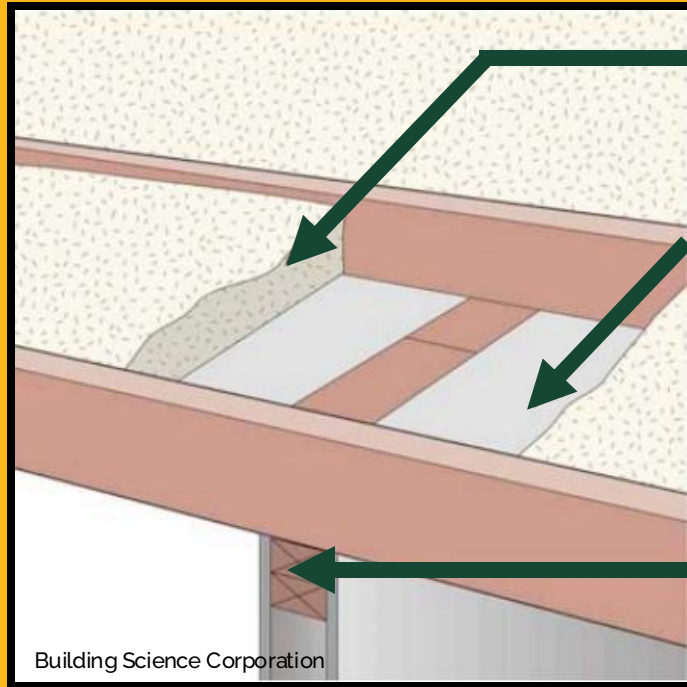
Building Science Corporation

Top Plate Penetrations



- Locate and expose all top plates
- Air seal all joints of drywall to framing and any penetrations with appropriate sealant

Top Plate & Penetrations



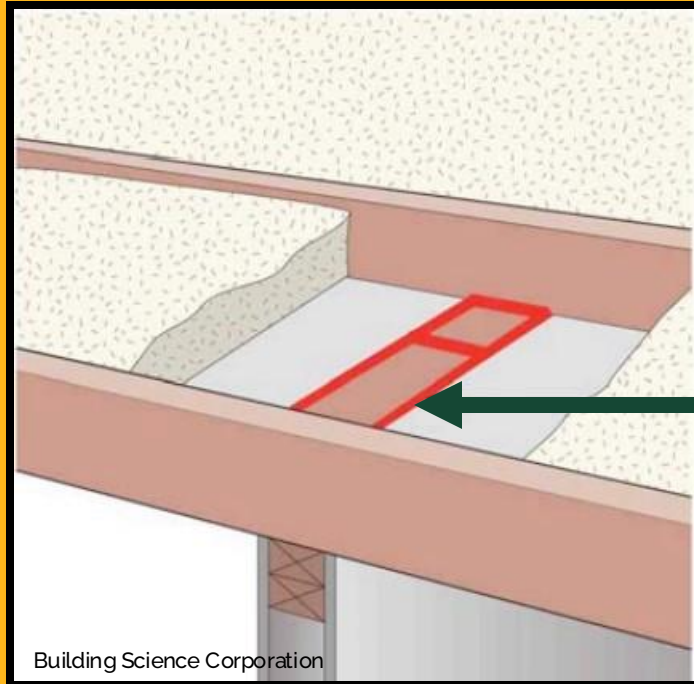
Insulation pulled back
for access

Ceiling gypsum board

Top plate

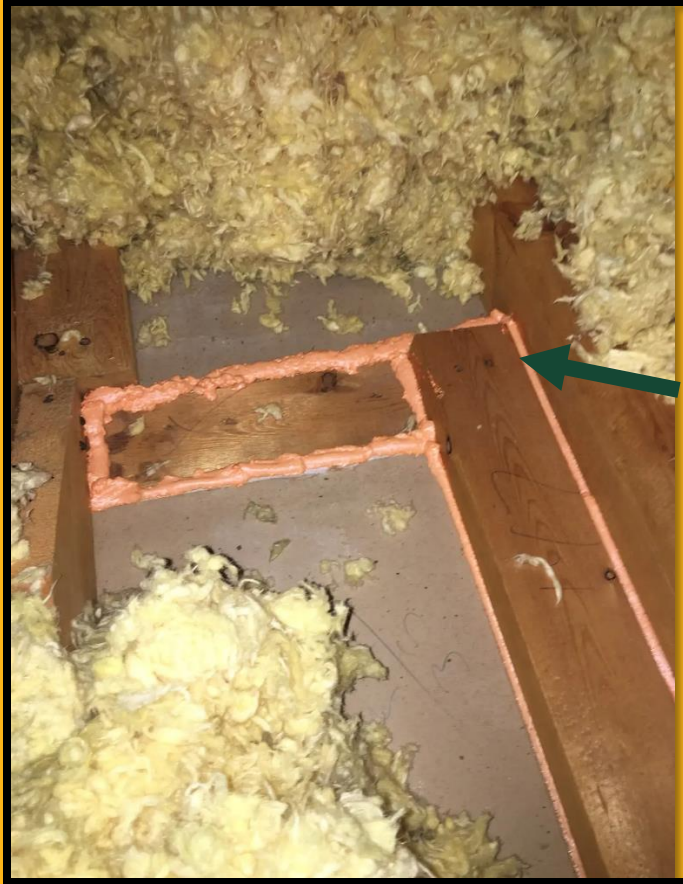
TASK – Control air leakage between top plates and ceiling gypsum board and control leakage at electrical and plumbing penetrations.

Top Plate & Penetrations



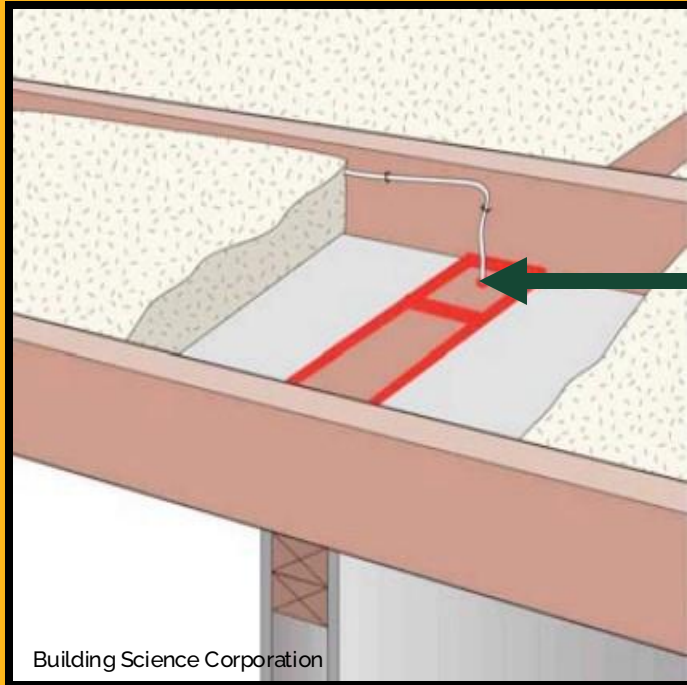
Continuous bead of
sealant

Top Plate & Penetrations



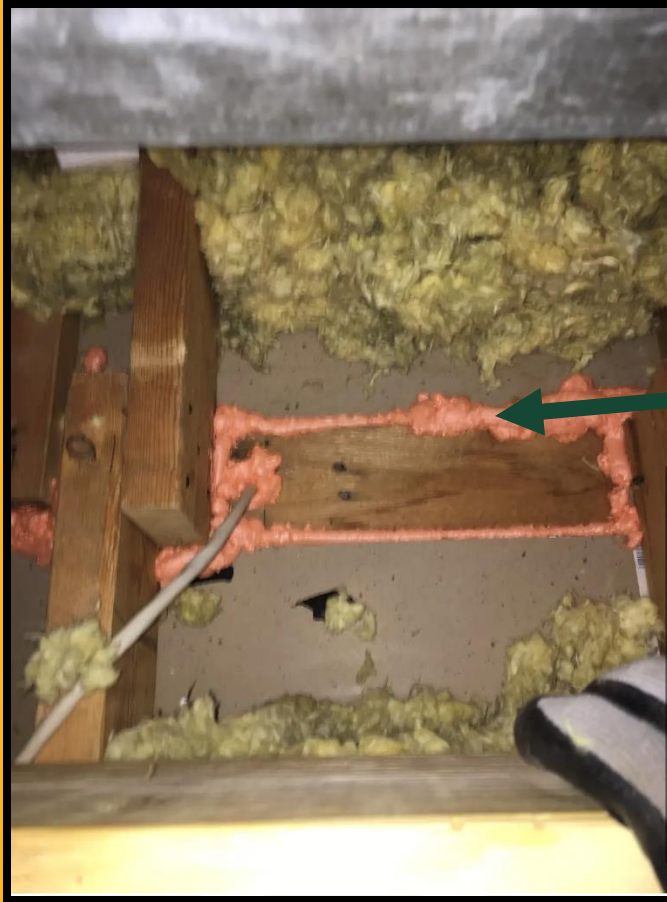
Continuous bead of
sealant

Top Plate & Penetrations



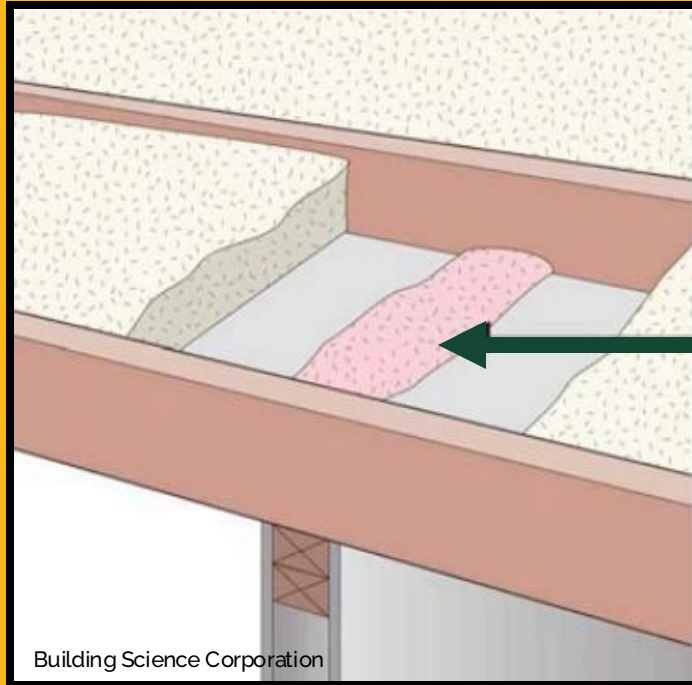
Continuous bead of
sealant

Top Plate & Penetrations



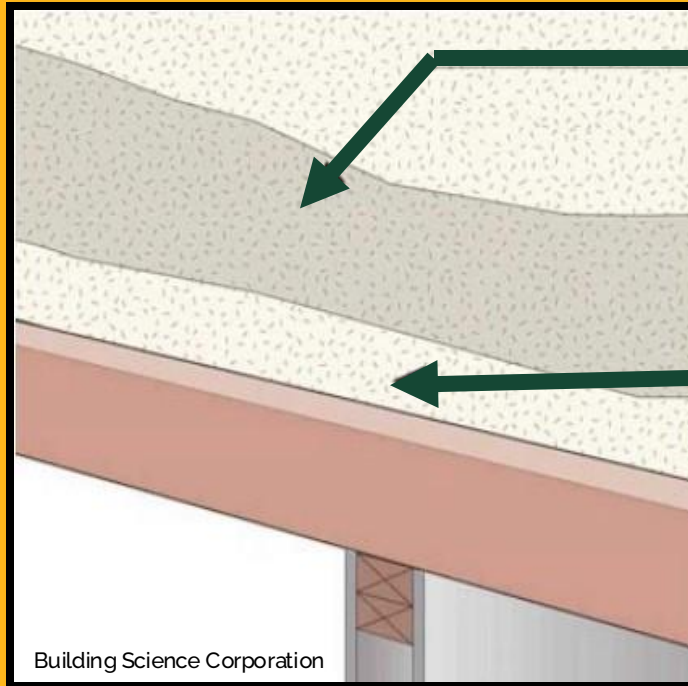
Continuous bead of
sealant

Top Plate & Penetrations



Spray foam over entire
top plate

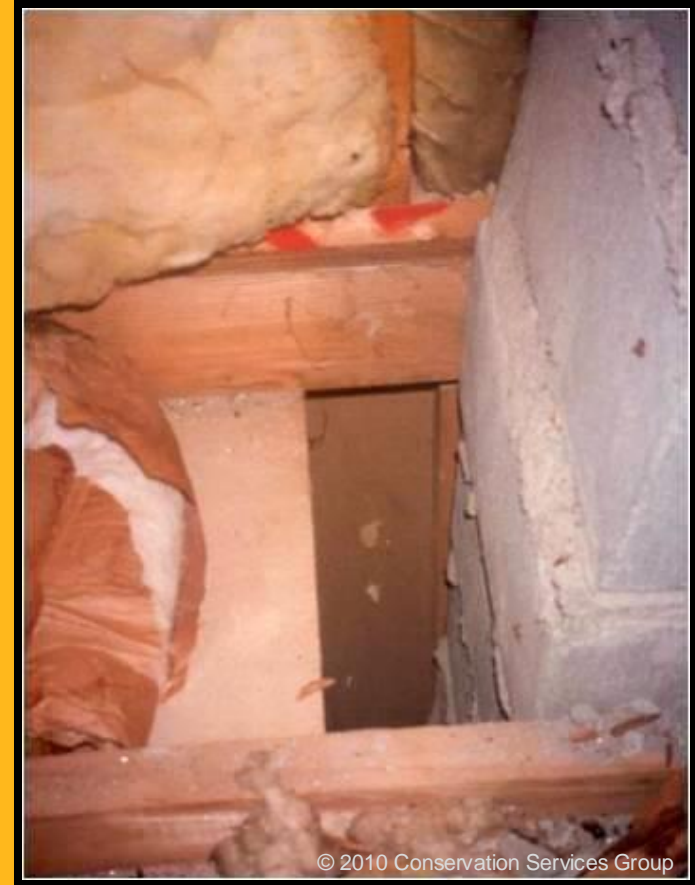
Top Plate & Penetrations



Additional insulation

Replace insulation

Chimneys & Flues



When to Use

Best practice requires non-combustible barrier a minimum 3" away from heat sources:

- Chimneys and flues
- Fireplaces
- Non-IC rated recessed lighting fixtures
- Vents and pipes (gas, range hood, etc.)



Rockwool - Roxul Safe

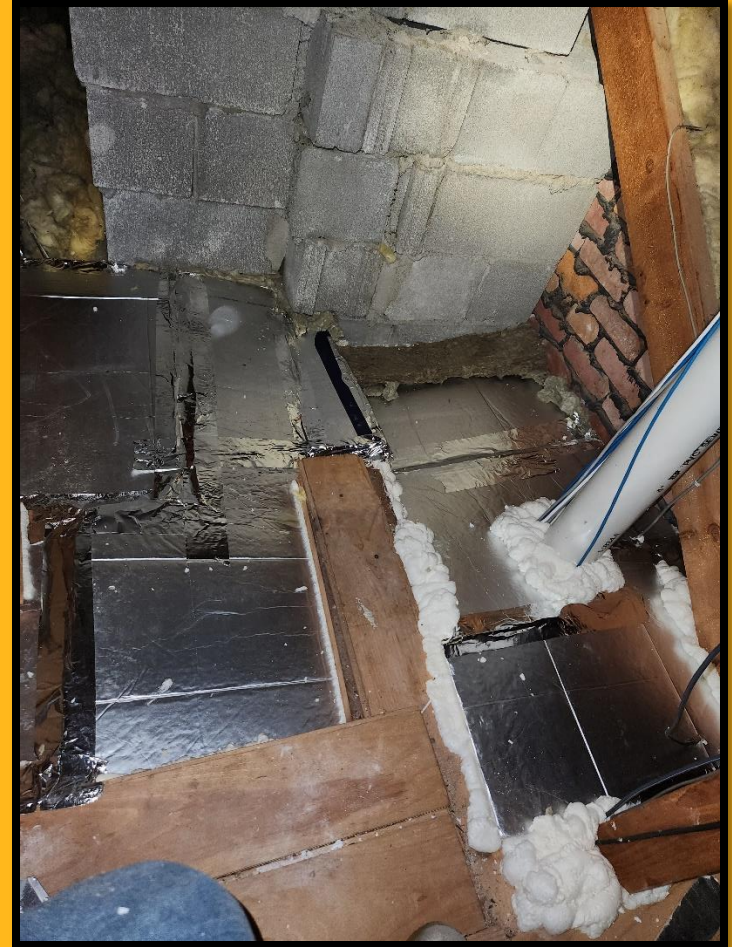
Non-combustible materials used for air sealing around chimneys and flue pipes.



Chimneys and Flues



Chimneys and Flues



Summary



Remember the ABGC's of air sealing:

- A. Attic
- B. Basement
- G. Garage
- C. Conditioned space

Summary



When working in the attic:

- Always wear the appropriate personal protection equipment
- Never put weight on the drywall.
- Limit your time spent in extreme temperatures and always work in teams
- Assess the strength of the attic before and during the work
- Limit your exposure to air pollutants
- Be aware of what is above and below you