PREP + INSULATION

DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust Existing Homes Specifications.

HOME ENERGY UPGRADES

SUCCESS WITH HOME ENERGY UPGRADES

What every contractor needs to know.

Prep + Insulation Contents

Air sealing is a challenging and important job. Done right it can bring increased comfort, safety and health to the home's occupant while saving them money on their heating and cooling bills. The purpose of this guide is to assist you, the air sealing professional, with getting the job done right the first time – every time. Below is a list of provided materials in this section:

Additional Job Aids

Prep + Insulation Contents

Prep + Insulation Contents

Health + Safety Information Sheet

Health + Safety: Introduction

The introduction to this manual introduced EPA's Healthy Indoor Environment Protocols for Home Energy Upgrades. The document is a useful tool for finding solutions for common issues that arise when completing home energy upgrades. This page will highlight some important details in the document in relation to safety when duct sealing.

Health + Safety: Worker Safety

As mentioned in the introduction, it is required for all contractors to follow OSHA regulations. By law, employers and supervisors are required to ensure that all workers have the correct personal protective equipment. These items include, but aren't limited to:

- Gloves
- Protective clothing
- Knee pads
- Eye protection
- Respirators: Different types of respirators are required for different jobs. Use the Healthy Indoor Environment Protocols for Home Energy Upgrades to verify that your current respirator is compliant with the job.
- Non-contact voltage detectors

Tip: It is important to keep your PPE in good condition. Having a bag that stores all of your PPE and supplies for cleaning the items will save you time and keep you safe.

Health + Safety: Health Hazards

It is important to look for hazards and create a mitigation plan before beginning work. The list below highlights the most important items to identify and mitigate for all duct repair jobs:

- Sewer gases, fuel oil, chemicals and other pollutants in crawl spaces or attics
- Mold-like growth in attics and crawl spaces
- Presence of pest/rodents in crawl spaces or attics
- Lack of CO alarm in all houses with combustion appliances and attached garages
- Unvented combustion appliances
- Combustion air intakes
- Knob and tube wiring
- Vermiculite insulation
- Pipe insulations that are likely to contain asbestos
- Deteriorated interior finishes that may contain asbestos in a friable condition

If any of these conditions exist, follow action items listed in the Healthy Indoor Environment Protocols for Home Energy Upgrades before beginning work.

CHECKLIST:
ROOF DECK INSULATION

✓	N/A	PREP
☐	☐	1. Complete a combustion safety test and record the results.
☐	☐	2. Verify that a ventilation plan is established.
☐	☐	3. Put on all personal protection equipment (PPE).
☐	☐	4. Identify all worker and occupant safety hazards.
☐	☐	5. Identify all potential durability issues.
☐	☐	6. Address all combustion safety, worker safety, occupant safety and durability issues prior to starting work and notify the occupant. **Do not complete work if a life safety hazard is identified.**

✓	N/A	WORK
☐	☐	7. Identify how vapor will flow through the roof. Do not install an insulation material that will create a moisture issue.
☐	☐	8. Remove all existing insulation that touches the interior ceiling from the attic.
☐	☐	9. Address all combustion safety, worker safety, occupant safety and durability issues uncovered by insulation removal prior to starting work and notify the occupant. **Do not complete work if a life safety hazard is identified.**
☐	☐	10. Identify roof deck areas where insulation must not be installed.
☐	☐	11. Ensure all ventilation fans are ducted to the outside and seal all holes between the attic and the outside.
☐	☐	12. Install insulation according to the manufacturer's specifications. Verify that all insulation has no gaps, voids, compression or misalignment.

✓	N/A	CLOSE OUT
☐	☐	13. Clean the work area.
☐	☐	14. Complete a combustion safety test and record the results.
☐	☐	15. Educate occupants on the work completed.

JOB INFORMATION

Name	Initials
Address	Date

CHECKLIST:
ATTIC INSULATION

✓	N/A	PREP
☐	☐	1. Complete a combustion safety test and record the results.
☐	☐	2. Verify that a ventilation plan is established.
☐	☐	3. Put on all personal protection equipment (PPE).
☐	☐	4. Identify all worker and occupant safety hazards.
☐	☐	5. Identify all potential durability issues.
☐	☐	6. Address all combustion safety, worker safety, occupant safety and durability issues prior to starting work and notify the occupant. **Do not complete work if a life safety hazard is identified.**

✓	N/A	WORK
☐	☐	7. Identify areas where insulation will not be installed.
☐	☐	8. Seal all holes between the interior of the house and the attic.
☐	☐	9. For homes with vented exterior soffits, install protective baffling.
☐	☐	10. Install insulation dams.
☐	☐	11. Install insulation according to the manufacturer's specifications. Verify that all insulation has no gaps, voids, compression or misalignment.

✓	N/A	CLOSE OUT
☐	☐	12. Clean the work area.
☐	☐	13. Complete a combustion safety test and record the results.
☐	☐	14. Educate occupants on the work completed.

JOB INFORMATION	
Name	Initials
Address	Date

CHECKLIST:

CRAWLSPACE AND/OR BASEMENT INSULATION

✓	N/A	PREP
☐	☐	1. Complete a combustion safety test and record the results.
☐	☐	2. Verify that a ventilation plan is established.
☐	☐	3. Put on all personal protection equipment (PPE)
☐	☐	4. Identify all worker and occupant safety hazards.
☐	☐	5. Identify all potential durability issues.
☐	☐	6. Address all combustion safety, worker safety, occupant safety and durability issues prior to starting work and notify the occupant. **Do not complete work if a life safety hazard is identified.**

✓	N/A	WORK
☐	☐	7. Remove existing damaged insulation from the crawlspace and/or basement.
☐	☐	8. Address all combustion safety, worker safety, occupant safety and durability issues uncovered by insulation removal prior to starting work and notify the occupant. **Do not complete work if a life safety hazard is identified.**
☐	☐	9. Identify areas where insulation must not be installed.
☐	☐	10. Seal all holes between the crawlspace and/or basement and the interior and exterior of the house.
☐	☐	11. Install insulation according to the manufacturer's specifications. Verify that all insulation has no gaps, voids, compression or misalignment.

✓	N/A	CLOSE OUT
☐	☐	12. Clean the work area.
☐	☐	13. Complete a combustion safety test and record the results.
☐	☐	14. Educate occupants on the work completed.

JOB INFORMATION	
Name	Initials
Address	Date

CHECKLIST:
OPEN WALL CAVITY INSULATION

✓	N/A	PREP
☐	☐	1. Complete a combustion safety test and record the results.
☐	☐	2. Verify that a ventilation plan is established.
☐	☐	3. Put on all personal protection equipment (PPE)
☐	☐	4. Identify all worker and occupant safety hazards.
☐	☐	5. Identify all potential durability issues.
☐	☐	6. Address all combustion safety, worker safety, occupant safety and durability issues prior to starting work and notify the occupant. **Do not complete work if a life safety hazard is identified.**

✓	N/A	WORK
☐	☐	7. Remove existing damaged insulation. Address all combustion safety, worker safety, occupant safety and durability issues uncovered by insulation removal prior to starting work and notify the occupant. **Do not complete work if a life safety hazard is identified.**
☐	☐	8. Identify wall cavities without top and bottom plates and install blocking.
☐	☐	9. Seal all holes in the wall.
☐	☐	10. Install insulation according to the manufacturer's specifications. Verify that all insulation has no gaps, voids, compression or misalignment.
☐	☐	11. Install a backing material to enclose insulation.
☐	☐	12. Seal all holes in the backing material.

✓	N/A	CLOSE OUT
☐	☐	13. Clean the work area.
☐	☐	14. Complete a combustion safety test and record the results.
☐	☐	15. Educate occupants on the work completed.

JOB INFORMATION

Name	Initials
Address	Date

ENCLOSED WALL CAVITY INSULATION (DENSE PACK)

✓	N/A	PREP
☐	☐	1. Complete a combustion safety test and record the results.
☐	☐	2. Verify that a ventilation plan is established.
☐	☐	3. Put on all personal protection equipment (PPE)
☐	☐	4. Identify all worker and occupant safety hazards.
☐	☐	5. Identify all potential durability issues.
☐	☐	6. Address all combustion safety, worker safety, occupant safety and durability issues prior to starting work and notify the occupant. **Do not complete work if a life safety hazard is identified.**

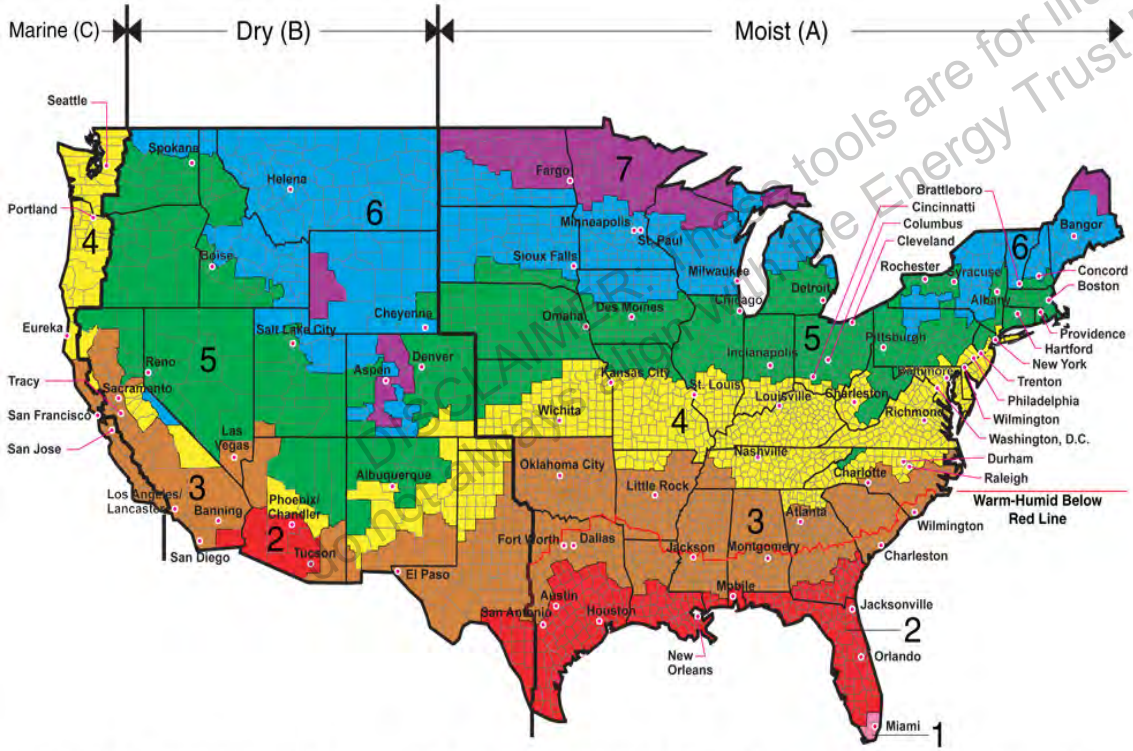
✓	N/A	WORK
☐	☐	7. Gain access to all wall cavities and probe for obstructions and/or hazards.
☐	☐	8. Install insulation according to the manufacturer's specifications.
☐	☐	9. View completed sections using an IR camera with a blower door operating. Drill and repack any voids or low density areas.
☐	☐	10. Seal access points of all wall cavities. Patch exterior holes with a weather barrier. Patch and coat holes to match original interior surface.
☐	☐	11. Repair the visible surface of access locations.

✓	N/A	CLOSE OUT
☐	☐	12. Clean the work area.
☐	☐	13. Complete a combustion safety test and record the results.
☐	☐	14. Educate occupants on the work completed.

JOB INFORMATION	
Name	Initials
Address	Date

2009 IECC INSULATION LEVELS

CLIMATE ZONE	CEILING	FRAME WALL	MASS WALL[c]	FLOOR	BASEMENT WALL[e]	CRAWL SPACE WALL[e]	SLAB[g,h]
Zone 1	R-30	R-13	R-3	R-13	R-0	R-0	0
Zone 2	R-30	R-13	R-4	R-13	R-0	R-0	0
Zone 3	R-30	R-13	R-5	R-19	R-5/13[f]	R-5/13	0
Zone 4	R-38	R-13	R-5	R-19	R-10/13	R-10/13	10, 2 ft.
Zone 5	R-38	R-20 or R-13+R-5[b]	R-13	R-30[d]	R-10/13	R-10/13	10, 2 ft.
Zone 6	R-49	R-20 or R-13+R-5[b]	R-15	R-30[d]	R-15/19	R-10/13	10, 4 ft.
Zone 7	R-49	R-21	R-19	R-38[d]	R-15/19	R-10/13	10, 4 ft.



All of Alaska in Zone 7 except for the following Boroughs in Zone 8: Bethel, Dellingham, Fairbanks, N. Star, Nome North Slope, Northwest Arctic, Southeast Fairbanks, Wade Hampton, and Yukon-Koyukuk

Zone 1 includes: Hawaii, Guam, Puerto Rico, and the Virgin Islands

a. R-Values are minimums.
b. "R-13+R-5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulated sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of the exterior, structural sheathing shall be supplemented with insulation sheathing of at least R-2.
c. The second R-value applies when more than half of the insulation is on the interior of the mass wall.
d. Sufficient insulation to fill the cavity, R-19 minimum.
e. "R-15/19" means R-15 continuous insulation sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "R-10/13" means R-10 continuous insulated sheathing or R-10 cavity insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
f. Basement wall insulation is not required in warm-humid locations defined by Figure 301.1 and Table 301.1 of the IECC.
g. R-values are minimums.
h. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or two feet, whichever is less in Climate Zones 1-3 for heated slabs.

Interactive Map:
http://energycode.pnl.gov/EnergyCodeReqs/

Insulation Information Sheet

WHAT TYPE OF INSULATION?

It is more important that the insulation is properly installed rather than the specific type being used. Avoid these five flaws when installing insulation to achieve a Grade I installation:

- Gaps
- Voids
- Misalignment
- Compression
- Wind Intrusion

Grade I Insulation Installation

It is important to install all ceiling, wall, floor and slab insulation to achieve RESNET-defined Grade I installation or Grade II for surfaces with insulated sheathing. By installing the insulation to meet these standards, you can ensure that it will work properly. According to the RESNET Mortgage Industry National HERS Standards:

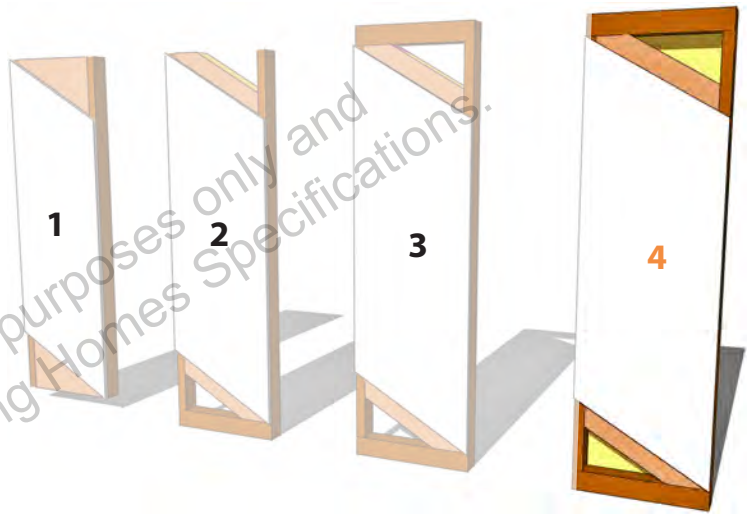
"Grade I" installation requires that the insulation material uniformly fills each cavity side-to-side and top-to-bottom, without substantial gaps or voids around obstructions (such as blocking or bridging), and is split, installed and/or fitted tightly around wiring and other services in the cavity.

To attain a rating of "Grade I", wall insulation shall be enclosed on all six sides, and shall be in substantial contact with the sheathing material on at least one side (interior or exterior) of the cavity.

Exception: The interior sheathing/enclosure material is optional in climate zones 1-3, provided insulation is adequately supported and meets all other requirements.

Proper Installation: Framing

Properly installed insulation consists of insulation framed on all six sides, including top and bottom plates, rigid backing and sheathing. Ensure that framing is correctly installed prior to the start of insulation. By verifying that the framer has created six-sided wall cavities, insulators will save time and money through preventive measures. The images to the right illustrate how framing must be installed for insulation to meet the required Grade I installation.



Improper Framing - Insulation will not meet Grade I

1. No top or bottom plate and no backing
2. Bottom plate, but no top plate and no backing
3. Top and bottom plate, but no backing

Proper Framing - Insulation will meet Grade I

4. Top and bottom plate, includes backing (best design)

Proper Installation: Insulation

Once the framing has been verified as properly installed, it is more important that the insulation is properly installed. It is not important which type of insulation is used, but it is important to train installers. Training on how to properly install the type of insulation to avoid flaws will create a Grade I installation as well as a more comfortable and durable home.

Insulation Information Sheet

Train installers on these five flaws and how to avoid them:

- **Gaps:** Ensure the insulation fills the entire exterior wall, ceiling or floor cavity
- **Voids:** Verify all exterior wall, ceiling and floor cavities have insulation
- **Misalignment:** Ensure all insulation is touching the air barrier
- **Compression:** Verify that insulation is installed without compression
- **Wind Intrusion:** Ensure there is a physical separation (such as wind baffles) between insulation in the attic and weather conditions

To better understand what improper and proper installation looks like for each of these five flaws, refer to the images and text on the Tech Tips in this section.

INSTALLING INSULATION

Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.

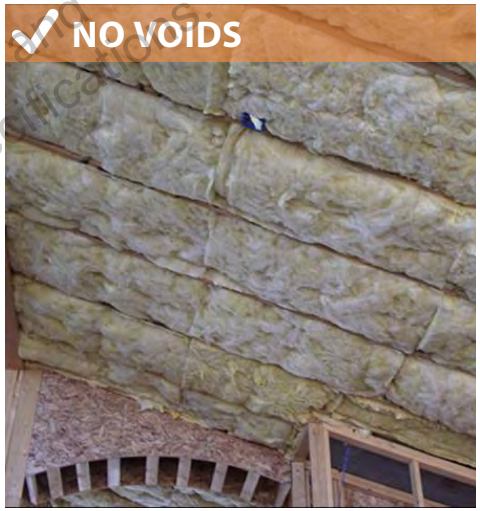
GAPS

NO GAPS

Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.

VOIDS

NO VOIDS



Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.

MISALIGNMENT

NO MISALIGNMENT

Install insulation to fill the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.

COMPRESSION

NO COMPRESSION

INSTALLING INSULATION

Cut and split insulation around blocking, plumbing, HVAC and electrical components.

✗ COMPRESSION

✓ NO COMPRESSION

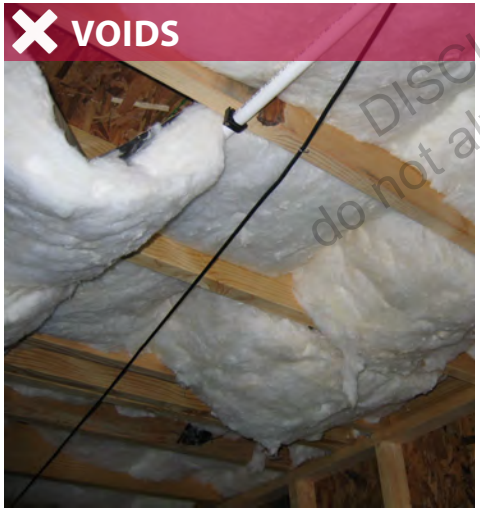
Cut and split insulation around blocking, plumbing, HVAC and electrical components.

✗ MISALIGNMENT

✓ NO MISALIGNMENT

Install insulation to completely fill floor and/or cantilever framing or to maintain permanent contact with the subfloor.

✗ VOIDS



✓ NO VOIDS

Install insulation to completely fill floor and/or cantilever framing or to maintain permanent contact with the subfloor.

✗ GAPS

✓ NO GAPS

CRITICAL DETAIL:

REPLACING KNOB + TUBE WIRING

DESIRED OUTCOME: Insulation kept away from contact with live wiring

House visually inspected to identify knob and tube wiring.

Documented inspection.

MATERIALS

Non-contact voltage tester see note†

TOOLS

BEFORE

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

†NOTICE: Use a non-contact voltage tester (clamp style or surface style).

Option: If wiring must remain, install insulation dams around the wiring to prevent contact.

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

REPLACING KNOB + TUBE WIRING

Visually inspect to identify knob and tube wiring.

Use non-contact testing method to identify live wiring.

Replace knob and tube wiring with new appropriate wiring by a licensed electrician per local codes.

1 INSPECT WIRING

2 TEST WIRING

3 REPLACE WIRING

Notes:

ENCLOSING UNINSULATED (NON-IC RATED) RECESSED LIGHTS

DESIRED OUTCOME: Sealed light boxes safely prevent air leakage and moisture movement between the attic and conditioned space.

MATERIALS

Dam material needs to be a fire-rated air barrier system

TOOLS

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Dropped ceiling open to the attic having uninsulated recessed lights.

Air tight enclosure above finished insulation.

BEFORE

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

ENCLOSING UNINSULATED (NON-IC RATED) RECESSED LIGHTS

Dropped ceiling open to the attic having uninsulated non-IC rated light.

1 LOCATE LIGHTS

Clear area around fixture of insulation at a minimum of 3".

2 CLEAR AREA

Construct enclosure with a height above insulation and with a R-value no greater than 0.5.

3 BUILD ENCLOSURE

Air seal enclosure.

4 SEAL ENCLOSURE

Finished air tight enclosure. No insulation on top.

5 ENCLOSURE

Notes:

INSTALLING DAMS AROUND CHIMNEYS + FLUES

DESIRED OUTCOME: Combustible materials kept away from combustion sources

MATERIALS

Dam material needs to be a fire-rated air barrier system

TOOLS

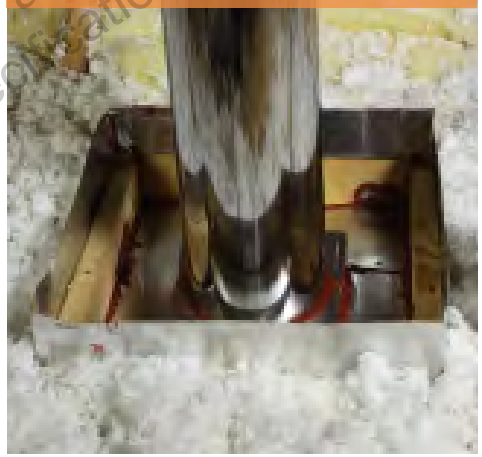
** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Fireplace chimney without a dam.

BEFORE

Fireplace chimney with properly installed dams and insulation in place.

AFTER



SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

INSTALLING DAMS AROUND CHIMNEYS + FLUES

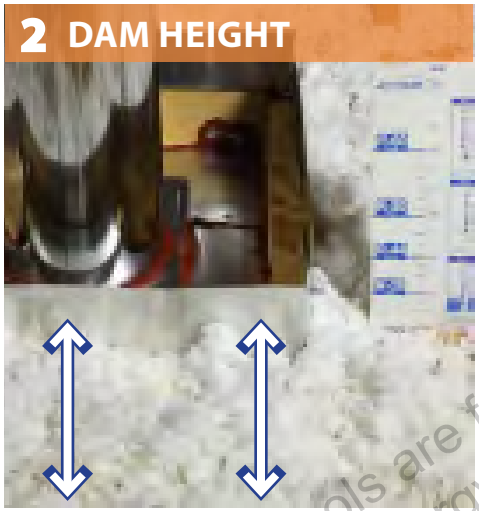
Dam constructed to ensure a 3-inch clearance between chimney and dam.

Dams constructed to have a height greater than the insulation.

Do not allow insulation between chimney and dam.

1 DAM WIDTH

2 DAM HEIGHT



3 ATTENTION

Notes:

INSTALLING VENTILATION BAFFLES

DESIRED OUTCOME: Attic ventilation meets code requirements and insulation protected from wind washing

MATERIALS

Cardboard baffles

TOOLS

Hammer stapler

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Insulation at eave with no baffle installed.

BEFORE

Baffle installed properly.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

INSTALLING VENTILATION BAFFLES

Baffles will be installed to maintain a minimum 1-inch clearance between roof deck and baffle.

1 CLEARANCE

Baffles stapled in place to block wind entry into insulation and prevent insulation from blowing back into the attic.

2 STAPLE

Baffle installed to the exterior side of the top plate to allow for the highest possible R-value.

3 TOP PLATE

Notes:

INSTALLING RADIANT BARRIERS

DESIRED OUTCOME: Radiant heat flow reduced

MATERIALS

TOOLS

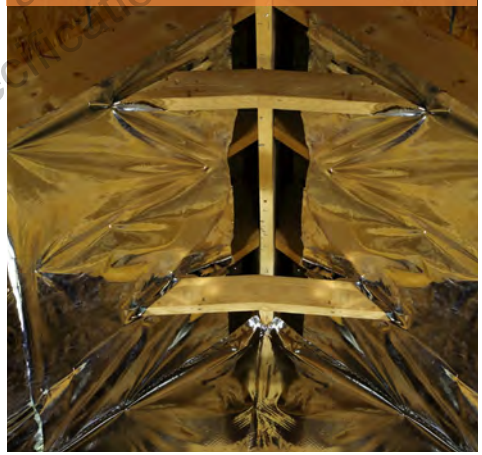
** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Roof deck with no radiant barrier.

Radiant barrier installed only at the roof deck.

BEFORE

AFTER



SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

Reference these standards ASTM C1158; C1313

INSTALLING RADIANT BARRIERS

Install radiant barrier material per manufacturers' specifications.

1 INSTALL BARRIER

Apply radiant barrier to gable walls while maintaining ¾-inch air space. Radiant barrier should not block gable vents.

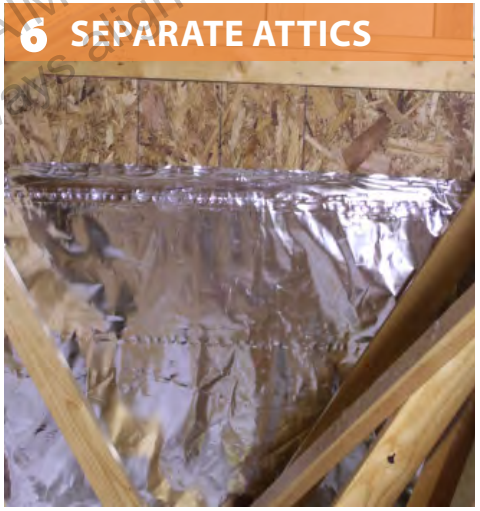
5 GABLE VENTS

Maintain air space no less than ¾-inch between barrier and bottom of the roof deck.

2 AIR SPACE

Install radiant barrier to separate attic above conditioned space from adjacent attics. Should be installed to withstand local wind loads.

6 SEPARATE ATTICS



Maintain minimum of 3-inch clearance from ridge vents.

3 RIDGE VENTS

NOTICE: Radiant barrier should not be installed until any issues with electrical system are resolved.

7 SAFETY HAZARDS

Maintain minimum of 3-inch clearance from soffit vents.

4 SOFFIT VENTS

NOTICE: Radiant barrier should not cover any wiring.

8 ELECTRICAL WIRING

INSTALLING RADIANT BARRIERS

NOTICE: Radiant barrier should not be installed on the attic floor/ insulation.

9 NOTICE: ATTIC FLOOR

Notes:

INSULATING ATTIC ACCESS HATCHES

DESIRED OUTCOME: Attic access door or hatches properly sealed and insulated to minimize heat loss or gain

MATERIALS

Dam materials see note†

TOOLS

Attic hatches that are uninsulated and undammed.

BEFORE

Attic hatch insulated, dammed and weatherstripped.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

† Dam materials must be constructed to allow repeated access without compromising the dam durability (e.g., 2X, OSB, plywood)

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

INSULATING ATTIC ACCESS HATCHES

Insulate attic hatch with rigid insulation to same R-value as adjoining insulated assembly.

Install dams to prevent insulation from falling out of attic.

Install and weatherstrip access hatch or trim. Verify seal.

Air seal trim in place.

1 INSULATE HATCH

2 INSTALL DAMS

3 WEATHERSTRIP

4 SEAL TRIM

Notes:

INSULATING ATTIC PULL-DOWN STAIRS

DESIRED OUTCOME: Attic access door or hatches properly sealed and insulated to minimize heat loss or gain

MATERIALS

Dam materials see note†

TOOLS

Attic pull-down stairs that are improperly insulated and undammed.

BEFORE

Attic pull-down stair insulated, dammed and weatherstripped.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

† Dam materials must be constructed to allow repeated access without compromising the dam durability (e.g., 2X, OSB, plywood)

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

INSULATING ATTIC PULL-DOWN STAIRS

Insulate attic pull-down stairs with rigid insulation to specified R-value.

1 INSULATE STAIRS

Install dams to prevent insulation from falling out of attic.

2 INSTALL DAMS

Air seal between attic pull-down stairs framing and drywall.

3 SEAL FRAMING

Install and weatherstrip stair or trim. Verify seal.

4 WEATHERSTRIP

Air seal trim in place.

5 SEAL TRIM

Notes:

CRITICAL DETAIL:

INSULATING ACCESS DOORS

DESIRED OUTCOME: Attic access door or hatches properly sealed and insulated to minimize heat loss or gain

MATERIALS	TOOLS

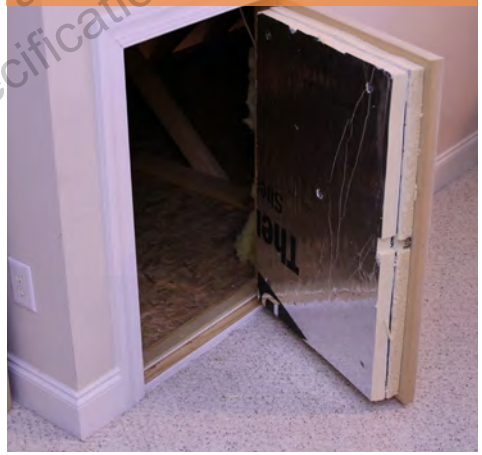
** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Attic doors that are uninsulated.

BEFORE

Attic doors that are insulated and weatherstripped.

AFTER



SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

INSULATING ACCESS DOORS

Insulate attic door stairs with rigid insulation to specified R-value.

Air seal between attic door stairs framing and drywall.

Install and weatherstrip stair or trim. Verify seal.

Air seal trim in place.

1 PREPARE

2 SEAL FRAMING

3 WEATHERSTRIP

4 RIGID SHEATHING

Notes:

TREATING SOFFIT PERIMETERS

DESIRED OUTCOME: Chase capped to prevent air leakage and moisture movement between the attic and conditioned space.

MATERIALS

TOOLS

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Wall cavities within the SOFFIT/ DROPPED CEILING are open to the attic.

Wall cavities capped and air-sealed.

BEFORE

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

Any evidence of roof leak must be fixed prior to air sealing.

TREATING SOFFIT PERIMETERS

Prepare work area and remove debris.

If insulation is on exterior wall, cut at ceiling level.

Install blocking in each wall cavity.

Air seal all gaps, holes and seams.

1 PREPARE

2 CUT INSULATION

3 INSTALL BLOCKING

4 SEAL

Notes:

TREATING STAIRWELL PERIMETERS

DESIRED OUTCOME: Stairwells sealed to prevent air leakage and moisture movement between the attic and conditioned space

MATERIALS

- Blocking

TOOLS

BEFORE

Wall cavities within the stairwell open to the attic.

AFTER

Wall cavities insulated and air sealed.

SAFETY + NOTES

- Gloves, appropriate respirator, safety glasses
- If interior surface covering in stairwell is not appropriately fire rated, the rigid material used must be appropriately fire rated.

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

TREATING STAIRWELL PERIMETERS

Prepare work area.

1 INSULATE STAIRS

Fasten rigid material to ensure batt insulation stays in place and seal all seams.

5 INSTALL MATERIAL

Install blocking in each wall cavity.

2 INSTALL DAMS

Seal all gaps, holes and seams in adjacent framing at top of stairwell.

6 SEAL

Air seal all gaps, holes and seams.

3 SEAL FRAMING

Reinstall batt insulation in full contact with all sides of cavities without gaps, voids, compressions, misalignments or wind intrusions.

4 INSULATE

Notes:

ENCLOSING KNEE WALLS WITH RIGID BACKING

DESIRED OUTCOME: Consistent, uniform thermal boundary between the conditioned space and unconditioned space to prescribed R-value

MATERIALS

TOOLS

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Prepped wall.

BEFORE

Insulation backed with rigid material.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

If interior surface covering of knee wall is not appropriately fire rated, the rigid material used must be appropriately fire rated.

ENCLOSING KNEE WALLS WITH RIGID BACKING

Install batt insulation in full contact with all sides of existing cavities without gaps, voids, compressions, misalignments or wind intrusions.

Fasten rigid material to ensure batt insulation stays in place.

1 INSULATE

2 FASTEN BACKING

Notes:

ENCLOSING KNEE WALLS WITH FLEXIBLE BACKING

DESIRED OUTCOME: Consistent, uniform thermal boundary between the conditioned space and unconditioned space to prescribed R-value

Prepped wall.

Insulation backed with non-rigid material.

MATERIALS

Non-rigid material see note†

TOOLS

Electric Stapler

BEFORE

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

† Non-rigid material should have a perm rating of no less than 40 (CLASS III vapor retarder).

If interior surface covering in stairwell is not appropriately fire rated, the rigid material used must be appropriately fire rated.

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

ENCLOSING KNEE WALLS WITH FLEXIBLE BACKING

Install batt insulation in full contact with all sides of existing cavities without gaps, voids, compressions, misalignments or wind intrusions.

1 INSULATE

Fasten non-rigid material to ensure batt insulation stays in place.

2 FASTEN BACKING

Notes:

ENCLOSING KNEE WALLS WITH STRAPPING

DESIRED OUTCOME: Consistent, uniform thermal boundary between the conditioned space and unconditioned space to prescribed R-value

MATERIALS

TOOLS

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Prepped wall.

BEFORE

Insulation strapped in place.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

ENCLOSING KNEE WALLS WITH STRAPPING

Install batt insulation in full contact with all sides of existing cavities without gaps, voids, compressions, misalignments or wind intrusions.

Fasten strapping material to ensure batt insulation stays in place.

1 INSTALL INSULATION

2 FASTEN STRAPPING

Notes:

INSULATING MANUFACTURED KNEE WALLS

DESIRED OUTCOME: Consistent, uniform thermal boundary between the conditioned space and unconditioned space to prescribed R-value

MATERIALS

TOOLS

Manufactured truss knee wall does not have cavities that can be air sealed or insulated.

BEFORE

Knee wall fully air sealed and insulated.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

INSULATING MANUFACTURED KNEE WALLS

Air seal existing holes and penetrations.

Fasten fire-rated foam sheathing, covering 100% of the knee wall, to prescribed R-value.

Air seal all seams, gaps or holes in, or adjacent to, foam sheathing. Provide infill as needed.

1 SEAL PENETRATIONS

2 INSTALL INSULATION

3 SEAL

Notes:

ENCLOSING KNEE WALLS WITH RIGID BACKING AND BLOWING INSULATION

DESIRED OUTCOME: Consistent, uniform thermal boundary between the conditioned space and unconditioned space to prescribed R-value

MATERIALS

TOOLS

Prepped wall.

BEFORE

Insulation backed with rigid backing.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

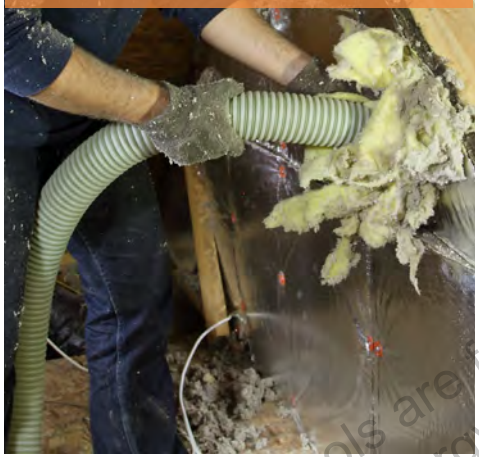
ENCLOSING KNEE WALLS WITH RIGID BACKING AND BLOWING INSULATION

Fasten rigid material to ensure blown insulation stays in place.

Blown insulation installed to manufacturers' specified density.

1 FASTEN BACKING

2 BLOW INSULATION



Notes:

ENCLOSING KNEE WALLS WITH FLEXIBLE BACKING AND BLOWING INSULATION

DESIRED OUTCOME: Consistent, uniform thermal boundary between the conditioned space and unconditioned space to prescribed R-value

MATERIALS

TOOLS

Prepped wall.

Insulation backed with non-rigid material.

BEFORE

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

ENCLOSING KNEE WALLS WITH FLEXIBLE BACKING AND BLOWING INSULATION

Fasten non-rigid material to ensure blown insulation stays in place.

Reinforce non-rigid backing at every stud with wood strips.

Blown insulation installed to manufacturers' specified density.

1 FASTEN BACKING

2 REINFORCE BACKING

3 BLOW INSULATION

Notes:

CRITICAL DETAIL:

ENCLOSING SKYLIGHT SHAFTS

DESIRED OUTCOME: Consistent, uniform thermal boundary between the conditioned space and unconditioned space to prescribed R-value

MATERIALS	TOOLS

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

Skylight shaft not air sealed or insulated.

BEFORE

Skylight fully air sealed and insulated.

AFTER

SAFETY + NOTES

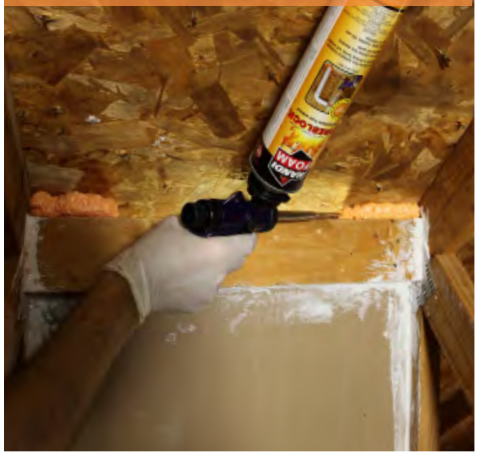
Gloves, appropriate respirator, safety glasses

Any evidence of roof leak must be fixed prior to air sealing.

ENCLOSING SKYLIGHT SHAFTS

Air seal holes and penetrations.

1 SEAL HOLES



Fasten insulation around entire skylight with fire rated foam sheathing covering 100% of the surface area to prescribed R-value.

2 FASTEN INSULATION

Air seal all seams, gaps or holes as well as roof deck and ceiling connections.

3 SEAL

Notes:

INSULATING ATTIC PLATFORMS

DESIRED OUTCOME: Reduce heat flow beneath floored portions of attic

MATERIALS

TOOLS

Attic platform with little to no insulation beneath it.

Attic platform cavity fully insulated.

BEFORE

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

INSULATING ATTIC PLATFORMS

Gain access to cavities beneath platform.

1 GAIN ACCESS

Inspect along and beneath platform for possible safety hazards (e.g., flue pipes, uncovered junction boxes, etc.).

2 INSPECT

NOTICE: Do not insulate cavity until safety hazards are corrected (e.g., flue pipes, uncovered junction boxes, etc.).

3 SAFETY HAZARDS

NOTICE: If attic has existing blow-in insulation, block ends of platform cavities before installing insulation.

4 BLOW-IN INSULATION

Insulate cavities.

5 INSULATE

Replace or restore insulation along sides of platform.

6 RESTORE INSULATION

Notes:

INSULATING FLOOR CAVITIES ABOVE GARAGES WITH DENSE PACK INSULATION

DESIRED OUTCOME: Consistent thermal and pressure boundary between conditioned and unconditioned space

MATERIALS

TOOLS

Cavity between garage and bonus room floor is uninsulated.

BEFORE

Floor system densely packed to the extent that insulation and material is an air barrier that will not bend, sag or move after installation.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

INSULATING FLOOR CAVITIES ABOVE GARAGES WITH DENSE PACK INSULATION

Inspect along and beneath floor for possible safety hazards (e.g., flue pipes, electrical issues, can lights, etc.).

1 INSPECT

Do not insulate cavity until safety hazards are corrected (e.g., flue pipes, electrical issues, can lights, etc.).

2 SAFETY HAZARDS

Install and seal blocking as needed to contain dense pack insulation.

3 BLOCKING

Fill cavities to recommended density for material.

4 DENSE PACK

Install and seal blocking as needed to maintain dense pack insulation.

5 BLOCKING

Fill out attic insulation card and post in attic near access.

6 INSULATION CARD

Notes:

INSULATING ATTICS WITH BLOW-IN INSULATION

DESIRED OUTCOME: A consistent, thermal boundary between conditioned and unconditioned space

MATERIALS

TOOLS

Attic without insulation

BEFORE

Finished attic adequately marked for insulation depth

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

Do not use loose fill when pitch exceeds 3/12.

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

INSULATING ATTICS WITH BLOW-IN INSULATION

Open electrical junction boxes will have covers installed

1 SAFETY HAZARDS

All electrical junctions will be flagged to be seen above the level of the insulation

2 FLAG JUNCTIONS

Insulation dams and enclosures will be installed as required

3 INSTALL DAMS

Install insulation depth markers beginning at the air barrier (1 every 300 square feet)

4 INSTALL MARKERS

Blow insulation to the depth indicated on the manufacturer coverage chart for desired R-value

5 BLOW INSULATION

Fill out attic insulation card and post in attic near access

6 INSULATION CARD

NOTICE: Do not use loose fill when pitch exceeds 3/12

7 NOTICE: CEILING PITCH

Notes:

INSULATING ATTICS WITH BLOW-IN INSULATION OVER EXISTING BATTS

DESIRED OUTCOME: Insulation controls heat transfer through ceiling

MATERIALS

TOOLS

Poorly installed batts.

BEFORE

Upgraded insulation.

AFTER

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

Do not use loose fill when pitch exceeds 3/12.

** Materials and tools listed are only recommendations and may not include everything needed to complete job.*

INSULATING ATTICS WITH BLOW-IN INSULATION OVER EXISTING BATTS

Option 1: Realign batts with air barrier.

1 OPTION 1: REALIGN

Option 2: Move batts to a homeowner-approved area (e.g., porch attic, garage attic, etc.).

2 OPTION 2: MOVE

Install covers on opened electrical junction boxes.

3 SAFETY HAZARDS

Flag all electrical junctions so they are seen above the level of the insulation.

4 FLAG JUNCTIONS

Install insulation dams and enclosures as required.

5 INSTALL DAMS

Install insulation depth markers beginning at the air barrier (1 every 300 square feet).

6 INSTALL MARKERS

Blow insulation to the depth indicated on the manufacturer coverage chart for desired R-value.

7 BLOW INSULATION

Fill out attic insulation card and post in attic near access.

8 INSULATION CARD

INSULATING ATTICS WITH BLOW-IN INSULATION OVER EXISTING BATTS

NOTICE: Do not use loose fill when ceiling pitch exceeds 3/12.

9 NOTICE: CEILING PITCH

Notes: