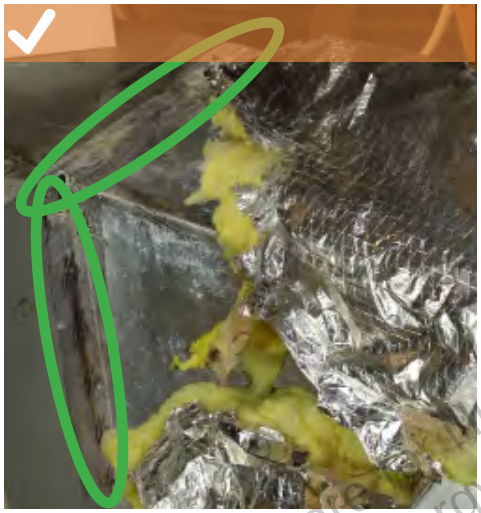
DUCT REPAIR

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

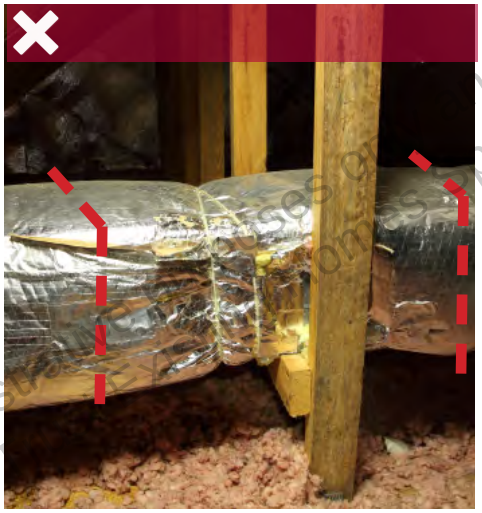
Copyright ©2012 Advanced Energy. All Rights Reserved

ACCESSING DUCT LEAKAGE SITES

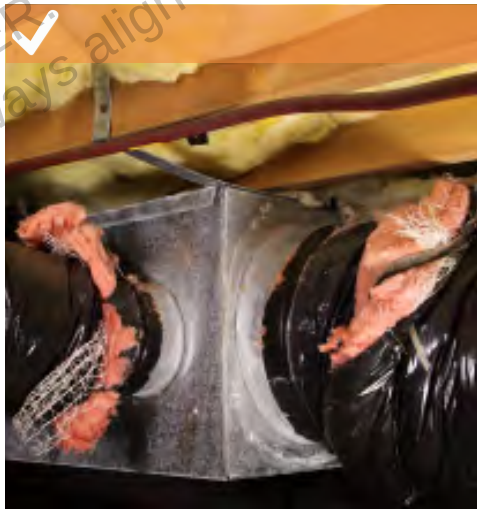
A. Air Handler to Plenum (Externally insulated metal): Gain access to joint by peeling back plenum insulation.



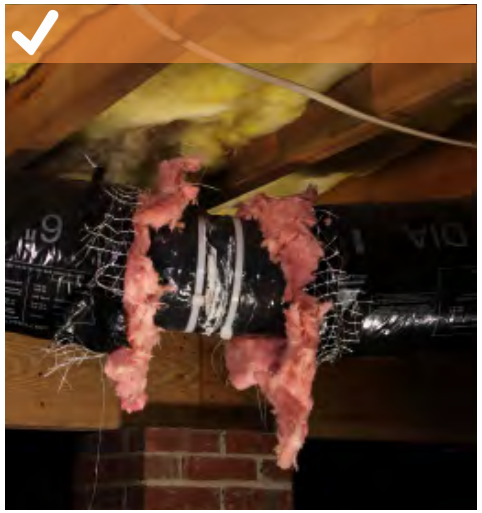
B. S and Drive Connections in Plenum (Externally insulated metal): Gain access to joint by peeling back plenum insulation.



C. Take Off Collar to Plenum: Gain access to joint by removing outer nylon tie band or tape and peeling back insulation.



D. Splices: Gain access to connection by removing outer nylon tie band or tape and peeling back insulation.



DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Star Homes specifications.

Copyright ©2012 Advanced Energy. All Rights Reserved

Accessing Duct Leakage Sites

DUCT LEAKAGE SITES

These tech tips show how to access the areas listed below:

A. Air Handler to Plenum
B. S and Drive Connections
C. Take Off Collar to Plenum
D. Splices
E. Return Platform
F. Metal Plenums
G. Duct Board Plenums
H. Panned Returns
I. Inner Liner to Boot Connections
J. Package Units

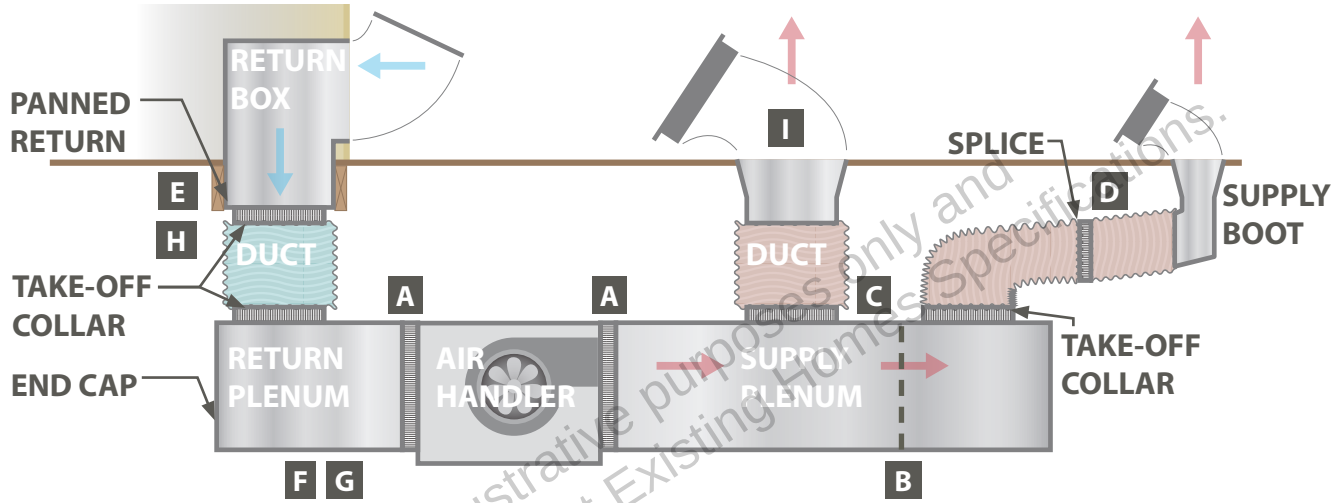
HEALTH + SAFETY

Put on all PPE before beginning any work. Place duct tape over sharp metal edges during work.

TOOLS

Be sure to have, at a minimum, these tools:

- Utility knife or Scissors
- Screwdrivers
- Drill
- Flashlight
- Cutter
- Tin snips



Introduction

One of the first steps to sealing a duct system is gaining access to the leakage site. Reference the following TECH TIPS for before and after illustrations on how and where to gain access at various duct leakage sites. Illustrations are provided for the following sites:

A. Air Handler to Plenum
B. S and Drive Connections
C. Take Off Collar to Plenum
D. Splices
E. Return Platform
F. Metal Plenums
G. Duct Board Plenums
H. Panned Returns
I. Inner Liner to Boot Connections
J. Package Units

Health + Safety

Prior to starting work, make sure to have all the necessary PPE equipment (gloves, appropriate respirator, safety glasses, etc.). While accessing these locations, place duct tape over the sharp metal edges where access holes have been cut can help protect the worker from injury.

Tools

It is important to gather all necessary materials and tools before accessing duct leakage sites. Some necessary tools include utility knives, screwdrivers, a drill, flashlights, sheet metal hole or circle cutter and tin snips.

For more information about how to seal these locations please reference our Sealing Duct Leakage Sites CRITICAL DETAILS.

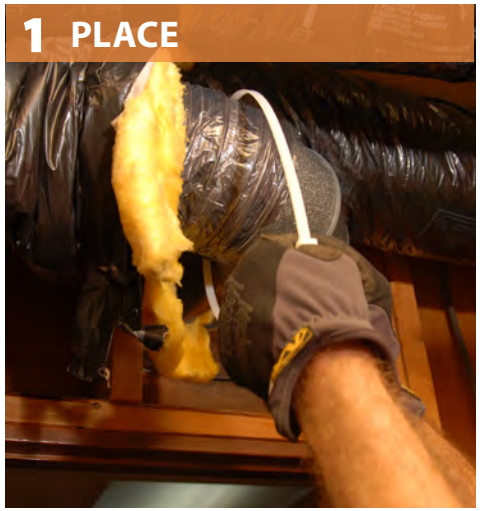
DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust Existing Homes Specifications.

Copyright ©2012 Advanced Energy. All Rights Reserved

CRITICAL DETAIL:

INSTALLING DUCT STRAPS

Place tie ban being used around the connection.



Tighten tie ban using tie band tensioning tool.

Cut off tie ban tail using tie band tensioning tool.

DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust of Oregon specifications.

Notes:

Copyright ©2012 Advanced Energy. All Rights Reserved

CRITICAL DETAIL:

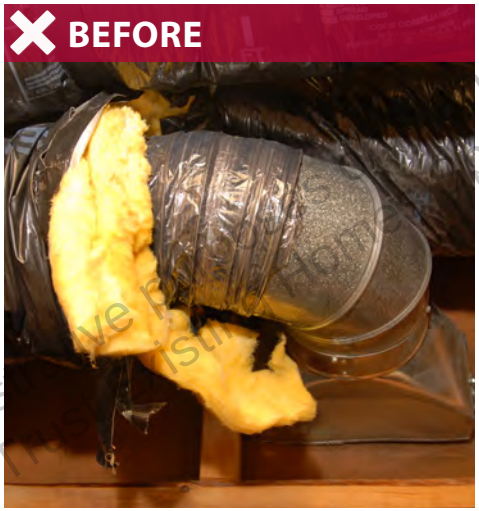
INSTALLING DUCT STRAPS

DESIRED OUTCOME: Ducts and plenums properly fastened to prevent leakage.

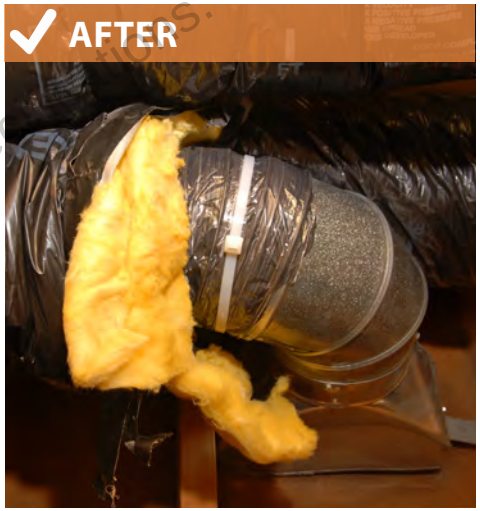
MATERIALS	TOOLS

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

Flex-to-collar connection needing tie ban.



Joints fastened with tie bands using a tie band tensioning tool.



SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust of Oregon's specifications.

Copyright ©2012 Advanced Energy. All Rights Reserved

INSTALLING DUCT SUPPORT FOR FLEX DUCTS

Attach support material to framing (i.e., truss, rafter or joist).

Run support material under flex duct and lift into correct position.

Attach support material to framing (i.e., truss, rafter or joist).

Flex duct supported every 4' having no crimps or interior dimension reduction.

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

Notes:

Copyright ©2012 Advanced Energy. All Rights Reserved

INSTALLING DUCT SUPPORT FOR FLEX DUCTS

DESIRED OUTCOME: Ducts and plenums properly supported.

MATERIALS

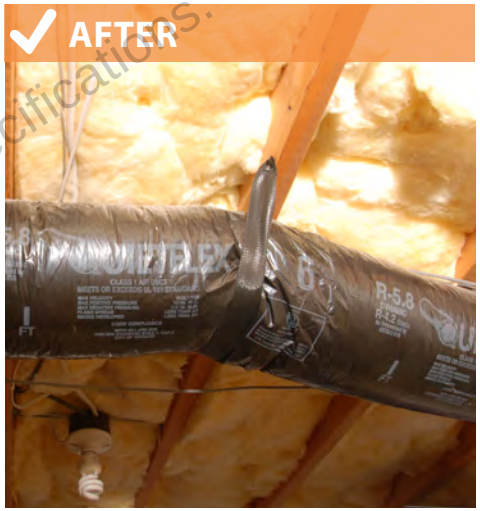
- Screws
- Washers
- 1 1/2" wide support material

TOOLS

- Utility Knife or Scissors
- Flashlight/head lamp

Flex duct needing support straps.

Flex duct supported every 4' using a minimum of 1 1/2" wide material, creating no crimps or interior dimension reduction.



SAFETY + NOTES

- Gloves, appropriate respirator, safety glasses

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

DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust of Oregon's specifications.

Copyright ©2012 Advanced Energy. All Rights Reserved

INSTALLING FLEX DUCTS

Roof termination fittings: use 90º fitting first. Wall termination fittings: use a straight fitting.

1 INSTALL METAL DUCT

If a termination is not installed, follow the exhaust fan termination installation critical detail.

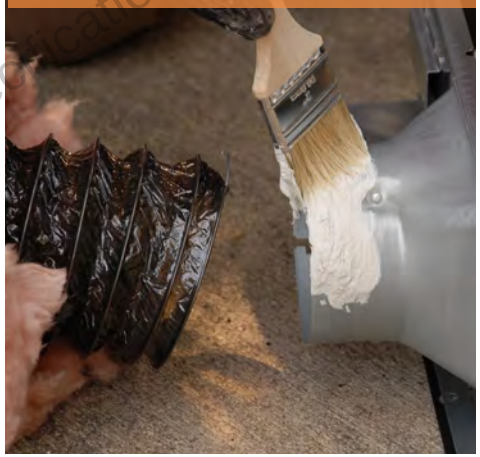
2 INSTALL TERMINATION

Measure and cut f flex duct to run between the termination and the metal fitting attached to the fan.

3 MEASURE + CUT DUCT

Seal the collar of the metal duct and the termination connection with mastic.

4 MASTIC COLLAR



Connect the flex duct at both ends using flex duct ties.

5 INSTALL ZIP TIES

Seal each flex duct connection with mastic.

6 SEAL WITH MASTIC

Pull flex duct insulation into place and seal with mastic.

7 SEAL WITH MASTIC

Support the duct at least every 5 ft.

8 SUPPORT DUCT

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

Copyright ©2012 Advanced Energy. All Rights Reserved

CRITICAL DETAIL:

INSTALLING FLEX DUCTS

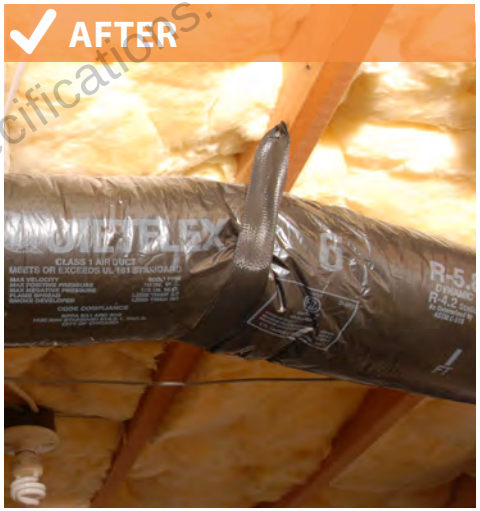
DESIRED OUTCOME: Ducts properly installed and sealed to prevent leakage.

MATERIALS	TOOLS

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

Duct not sealed.

Duct sealed and insulated.



SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

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

Copyright ©2012 Advanced Energy. All Rights Reserved

INSTALLING METAL DUCTS

Roof termination fittings: use 90º fitting first. Wall termination fittings: use a straight fitting.

1 MEASURE + SELECT

If a termination is not installed, follow the exhaust fan termination installation critical detail.

2 INSTALL TERMINATION

Install duct pieces with crimped ends pointed in the direction of air flow. Cut pieces to fit.

3 ASSEMBLE DUCT

For the connection between the duct and the termination, install the termination cap adaptor.

4 INSTALL ADAPTOR

Fasten duct connections with a minimum of three equally spaced screws.

5 INSTALL SCREWS

Seal all seams and joints.

6 SEAL WITH MASTIC

If installing duct in unconditioned space, wrap the duct with insulation and seal the seams.

7 INSTALL INSULATION

Notes:

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

Copyright ©2012 Advanced Energy. All Rights Reserved

CRITICAL DETAIL:

INSTALLING METAL DUCTS

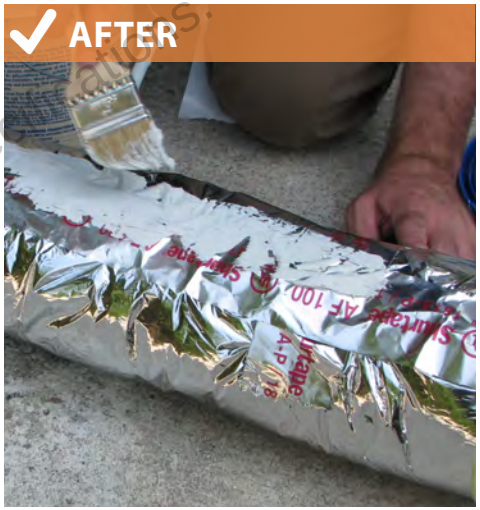
DESIRED OUTCOME: Ducts properly installed and sealed to prevent leakage.

MATERIALS	TOOLS

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

Duct not sealed.

Duct sealed and insulated.



SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

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

Copyright ©2012 Advanced Energy. All Rights Reserved

SEALING DUCTS

Seal plenum with mastic. Choose the appropriate sealing technique based on hole size.

1 SEAL PLENUM

Peel back outer liner and insulation.

2 GAIN ACCESS

Install nylon tie band around inner liner using a tie band tensioning tool.

3 STRAP

Seal inner liner with mastic. Choose the appropriate sealing technique based on hole size.

4 SEAL

Replace outer liner and insulation.

5 REPLACE

Install nylon tie band around inner liner using a tie band tensioning tool.

6 STRAP

Notes:

Copyright ©2012 Advanced Energy. All Rights Reserved

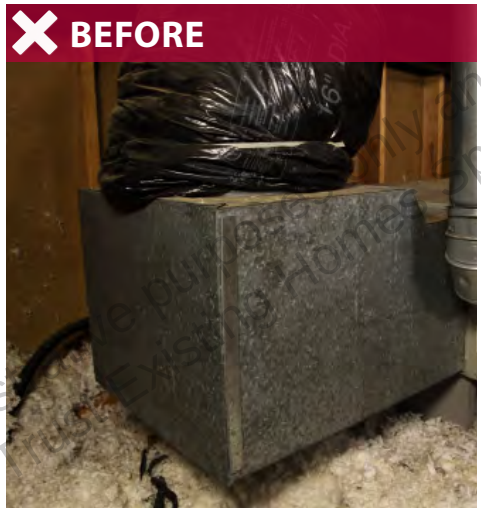
CRITICAL DETAIL:
SEALING DUCTS

DESIRED OUTCOME: Ducts and plenums sealed to prevent leakage.

MATERIALS	TOOLS
Mastic	Utility Knife or Scissors
Fiberglass mesh tape	Mastic brush
Duct tape	Tin Snips
Sheet metal	Flashlight/head lamp
Support material	Drill
Screws	

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

Duct and plenum not sealed.



Duct and plenum sealed.

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

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

Copyright ©2012 Advanced Energy. All Rights Reserved

CHECKLIST: DUCT SEALING

NOTES	
Location (e.g., NW corner of house)	Issue (e.g., disconnect, crimped duct)

DUCT SEALING GUIDELINES

For seams, cracks joints, holes and penetrations that are:

1/4-inch or less (small)

Seal with mastic.

BEFORE

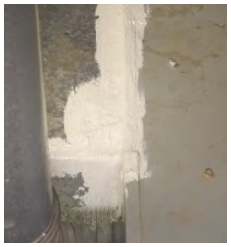
AFTER

1/4-inch to 3/4-inch (medium)

Install temporary tape. Apply a base coat of mastic. Apply fiberglass mesh tape. Apply mastic atop fiberglass mesh tape.

BEFORE

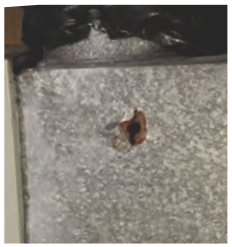
AFTER



3/4-inch or greater (large)

Mechanically fasten rigid support material that is at least 1 in. larger than the hole. Apply base coat of mastic, fiberglass mesh tape and top coat of mastic.

BEFORE



AFTER

DISCLAIMER: These tools are for illustrative purposes and do not always align with the Energy Trust Existing Home specifications.

Copyright ©2012 Advanced Energy. All Rights Reserved

✓	N/A	
❑	❑	12. Seal all gaps between the subfloor or ceiling and the supply boot.
❑	❑	13. Seal all seams of each return box.
❑	❑	14. Seal all gaps between the subfloor, wall or ceiling and the return box.

✓	N/A	OUTSIDE THE LIVING SPACE
❑	❑	15. Tape the air handler cabinet panels and seal all penetrations.
❑	❑	16. Mechanically fasten and seal the connection between the air handler and the plenums.
❑	❑	17. Mechanically fasten and seal all supply plenum seams and end caps.
❑	❑	18. Mechanically fasten and seal the connection between supply take-off collars and plenums.
❑	❑	19. Mechanically fasten and seal inner liner of all supply ducts to supply take-off collars.
❑	❑	20. Inspect all supply ducts for disconnects, tears and/or holes and pay attention to supply lines that were not providing air inside the house. Fix by reconnecting ducts and patching holes. If flex duct, remove section with hole or tear and replace with a sealed spliced collar.
❑	❑	21. Fasten and seal all sectioned metal elbows to supply ducts and take-off collars.
❑	❑	22. Fasten and seal inner liner of all supply ducts to supply boots. Skip this step if sealed from inside the living space.
❑	❑	23. Seal all panned returns.
❑	❑	24. Inspect all return ducts for disconnects, tears and/or holes. Fix by reconnecting, patching or fastening ducts together then sealing the connections. If flex duct, remove section with hole or tear and replace with a sealed spliced collar.
❑	❑	25. Seal the connection between supply take-off collars and plenums.

✓	N/A	CLOSE OUT
❑	❑	26. Clean the work area.
❑	❑	27. Complete a combustion safety test and record the results.
❑	❑	28. Educate occupants on the work completed.

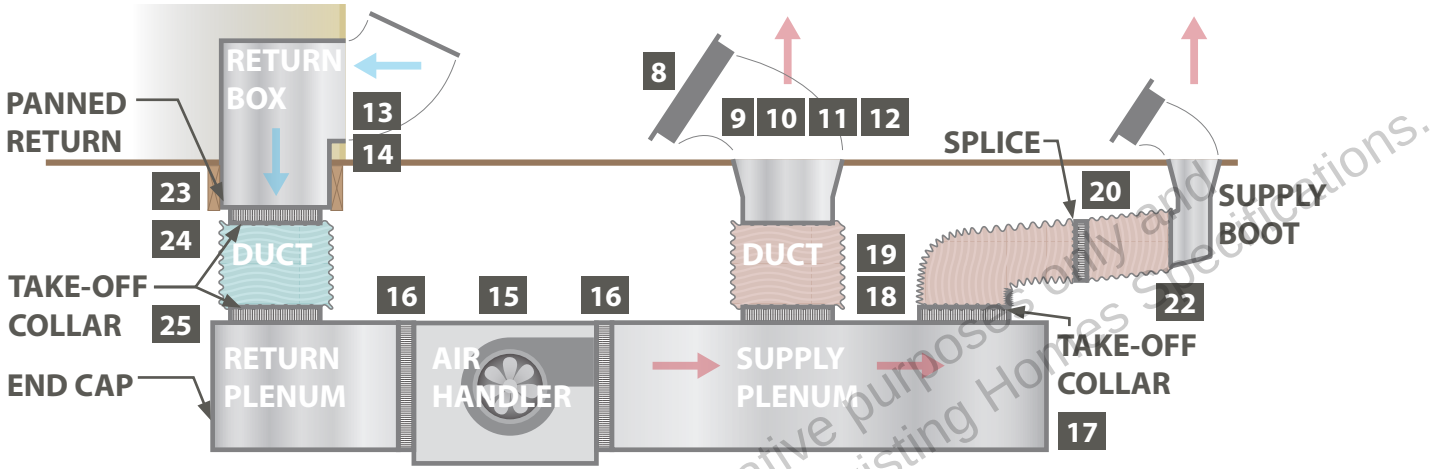
DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust Existing Homes Specifications.

JOB INFORMATION

Name	Initials

Copyright ©2012 Advanced Energy. All Rights Reserved

DUCT SEALING



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

✔	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	INSIDE THE LIVING SPACE
❑	❑	7. Turn the HVAC fan on and feel for air flowing out of each supply with your hand. Note any supply lines not providing air. Turn the fan off.
❑	❑	8. Remove all supply registers and return grilles.
❑	❑	9. Fasten all supply boots to subfloor with screws.
❑	❑	10. Seal all duct inner liners to each supply boot.
❑	❑	11. Seal all seams of each supply boot.

Copyright ©2012 Advanced Energy. All Rights Reserved

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
- Duct tapes and wrappings that are likely to contain asbestos

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

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

Copyright ©2012 Advanced Energy. All Rights Reserved

Duct Repair + Sealing Contents

Duct repair and 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 duct repair and sealing professional, with getting the job done right the first time – every time. Below is a list of provided materials in this section

Health + Safety 17

Duct Sealing Checklist 19

Critical Detail: Sealing Ducts 23

Additional Job Aids

Critical Detail: Installing Metal Ducts 25

Critical Detail: Installing Flex Ducts 27

Critical Detail: Installing Duct Support for Flex Ducts 29

Critical Detail: Installing Duct Straps 31

Information Sheet: Accessing Duct Leakage Sites 33

Tech Tips: Accessing Duct Leakage Sites 34

Critical Detail: Sealing Small, Medium + Large Holes 37

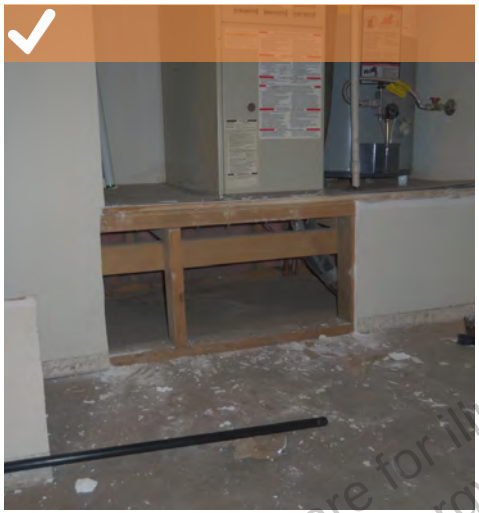
Critical Detail: Installing Bar-faced Return Grilles 45

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

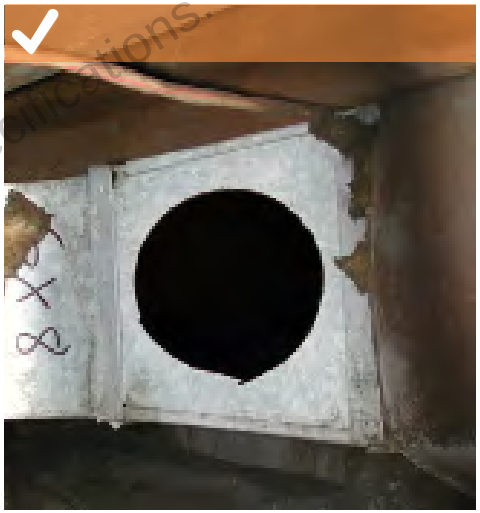
Copyright ©2012 Advanced Energy. All Rights Reserved

ACCESSING DUCT LEAKAGE SITES

E. Return Platform: Create temporary access hole by removing or cutting cladding of return platform.

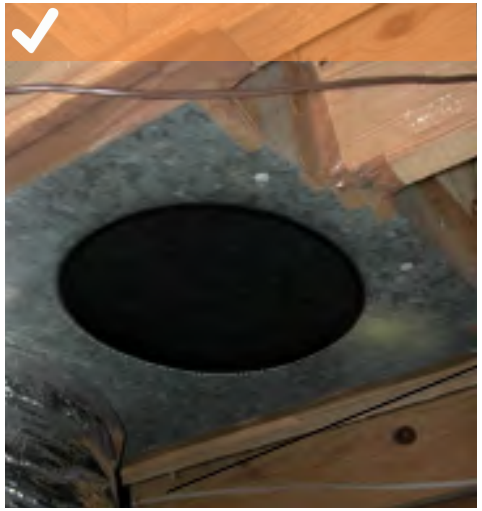


F. Metal Plenums: Create temporary access hole by cutting hole through accessible side of plenum.



G. Duct Board Plenums: Create temporary access hole by cutting hole through accessible side of plenum. Make sure to "pumpkin cut" for ease of patching hole.

H. Panned Returns: Create temporary access hole by cutting hole through accessible area of return.

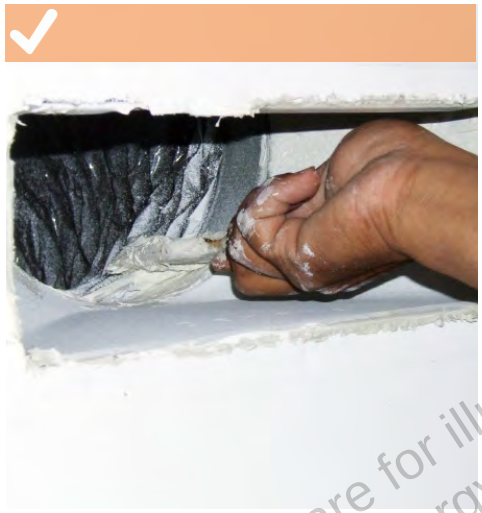


DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Tips: Existing Homes specifications.

Copyright ©2012 Advanced Energy. All Rights Reserved

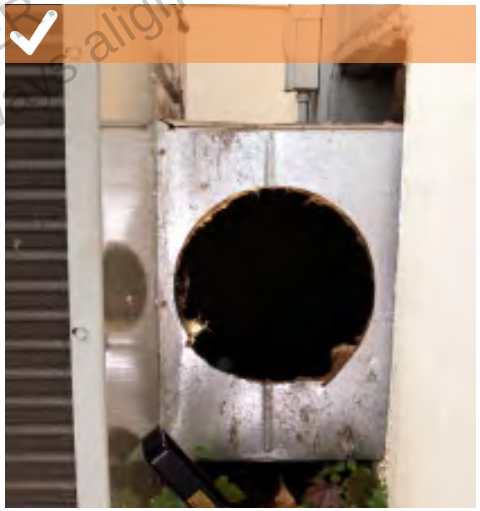
ACCESSING DUCT LEAKAGE SITES

I. Inner Liner to Boot: Gain access to connection from inside home by removing supply grill.



J. Package Units (Ground level): Gain access to connections by removing shroud.

J. Package Units (Ground level): Gain access to connections by removing shroud and cutting holes in supply and return ducts.



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

Notes:

Copyright ©2012 Advanced Energy. All Rights Reserved

SEALING SMALL, MEDIUM + LARGE HOLES

After gaining access to the leakage site, choose the appropriate sealing technique from below. Each of these step-by-step groupings illustrate a specific sealing technique based on the hole size. Please reference the vertical gray text boxes and first step of each series to ensure the correct step-by-step process is being followed. There are 3 sets to choose from:

(SMALL HOLES) - MASTIC ONLY:
Seams, cracks, joints, holes and penetrations that are 1/4-inch or less.

(MEDIUM HOLES) - TEMPORARY TAPE + MASTIC + MESH TAPE:
Seams, cracks joints, holes and penetrations that are 1/4-inch to 3/4-inch.

(LARGE HOLES) - RIGID SUPPORT + MASTIC + MESH TAPE:
Seams, cracks, joints, holes and penetrations that are larger than 3/4-inch.

MATERIALS	TOOLS
Mastic	Utility Knife or Scissors
Fiberglass mesh tape	Mastic brush
Duct tape	Tin Snips
Sheet metal	Flashlight/head lamp
Support material	Drill
Screws	

SAFETY + NOTES
Gloves, appropriate respirator, safety glasses

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

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

Copyright ©2012 Advanced Energy. All Rights Reserved

SEALING SMALL HOLES

Seams, cracks, joints, holes and penetrations that are 1/4-inch or less.

Seal with mastic.

1 SMALL HOLE

2 MASTIC

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

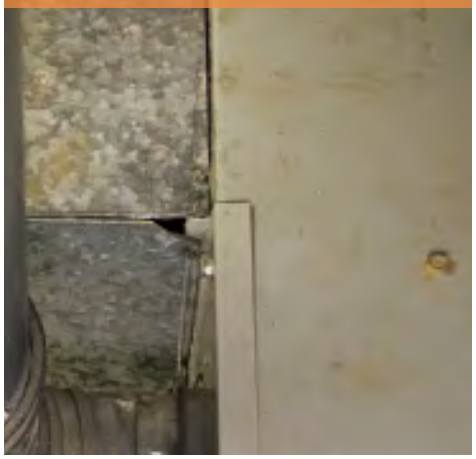
Notes:

Copyright ©2012 Advanced Energy. All Rights Reserved

SEALING MEDIUM HOLES

Seams, cracks, joints, holes and penetrations that are 1/4-inch to 3/4-inch.

1 MEDIUM HOLE



Install temporary tape over seams, cracks, joints, holes and penetrations.

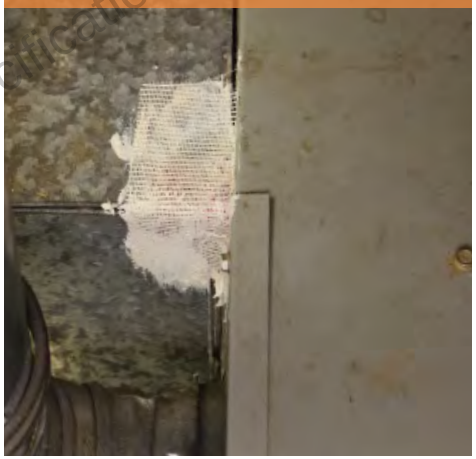
2 TEMPORARY TAPE

Apply a base coat of mastic to completely cover and extend beyond tape.

3 MASTIC

Apply fiberglass mesh tape to completely cover and extend beyond mastic.

4 MESH TAPE



Apply a second coat of mastic atop fiberglass mesh tape to completely cover and extend beyond tape.

5 MASTIC

Notes:

- Temporary tape can be a variety of different types of tape. It is used to prevent mastic from falling into the hole and should only be used if also using mesh tape for reinforcement.

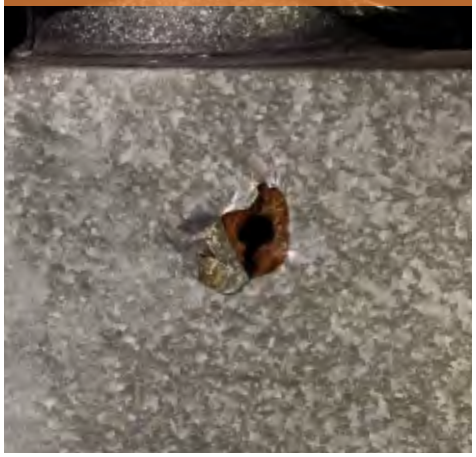
DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust Existing Homes Specifications.

Copyright ©2012 Advanced Energy. All Rights Reserved

SEALING LARGE HOLES

Seams, cracks, joints, holes and penetrations that are larger than 3/4-inch.

1 LARGE HOLE



Install rigid duct support material that is at least 1 inch larger than the hole.

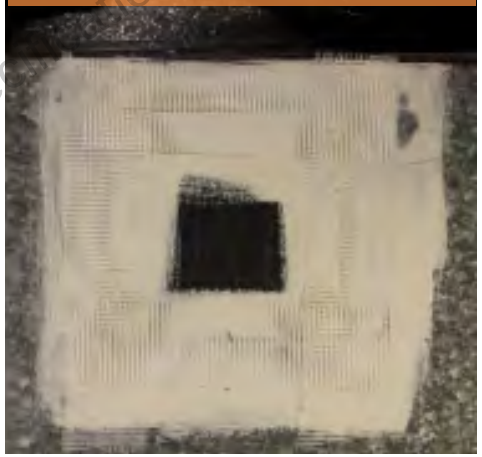
2 SUPPORT MATERIAL

Apply a base coat of mastic to completely cover and extend beyond support material.

3 MASTIC

Apply fiberglass mesh tape to completely cover and extend beyond mastic.

4 MESH TAPE



Apply a second coat of mastic atop fiberglass mesh tape to completely cover and extend beyond tape.

5 MASTIC

Notes:

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

Copyright ©2012 Advanced Energy. All Rights Reserved

SEALING LARGE HOLES

Seams, cracks, joints, holes and penetrations that are larger than 3/4-inch.

1 LARGE HOLE

Install rigid duct support material that is at least 1 inch larger than the hole.

2 SUPPORT MATERIAL

Apply a coat of mastic to completely cover and extend beyond support material.

3 MASTIC

Apply fiberglass mesh tape to completely cover and extend beyond mastic.

4 MESH TAPE

Apply a second coat of mastic atop fiberglass mesh tape to completely cover and extend beyond tape.

5 MASTIC

Notes:

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

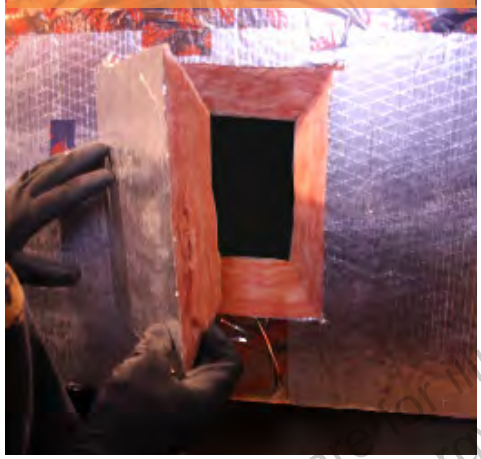
Copyright ©2012 Advanced Energy. All Rights Reserved

Seams, cracks, joints, holes and penetrations that are larger than 3/4-inch.

1 LARGE HOLE

Replace cut out. Make sure to "pumpkin cut" for ease of patching hole.

2 REPLACE CUT OUT



Apply a coat of mastic to completely cover and extend beyond support material.

3 MASTIC

Apply fiberglass mesh tape to completely cover and extend beyond mastic.

4 MESH TAPE

Apply a second coat of mastic atop fiberglass mesh tape to completely cover and extend beyond tape.

5 MASTIC

Notes:

DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust of Oregon's Homes Specialty Plans.

Copyright ©2012 Advanced Energy. All Rights Reserved

SEALING LARGE HOLES

Seams, cracks, joints, holes and penetrations that are larger than 3/4-inch.

1 HOLE SIZE

Install rigid duct support material that is at least 1 inch larger than the hole.

2 BACKING

Apply a base coat of mastic to completely cover and extend beyond support material.

3 MASTIC

Apply fiberglass mesh tape to completely cover and extend beyond mastic.

4 MESH TAPE

Apply a second coat of mastic atop fiberglass mesh tape to completely cover and extend beyond tape.

5 MASTIC

Notes:

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

Copyright ©2012 Advanced Energy. All Rights Reserved

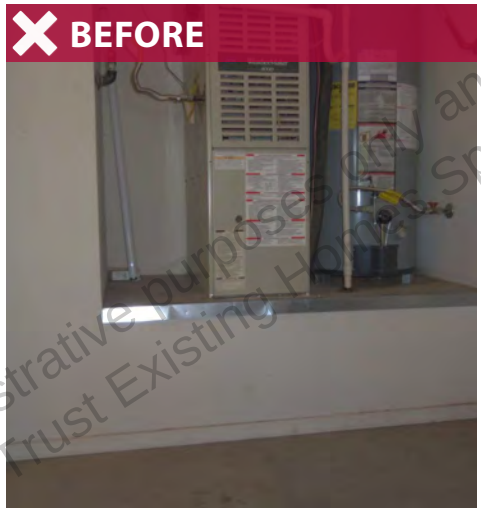
CRITICAL DETAIL:

SEALING FRAMED RETURN PLATFORMS

DESIRED OUTCOME: Return air sealed to minimize air leakage

MATERIALS	TOOLS
Duct board	

Rough frame support platform.



Platform completely lined and air sealed.

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

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

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

Copyright ©2012 Advanced Energy. All Rights Reserved

SEALING FRAMED RETURN PLATFORMS

Remove grillle or cut access hole into framed platform.

1 ACCESS RETURN

Clean out debris and dirt from return platform.

2 PREP RETURN

Line plenum with duct board. Mechanically fasten duct board to framing.

3 INSTALL DUCT BOARD

Seal the inside of the return. Choose the appropriate sealing technique based on hole size.

4 FIBERGLASS

If refrigerant and condensate lines penetrate the platform return, provide infill and seal as needed.

5 SEAL PENETRATIONS

If refrigerant and condensate lines terminate to the outside, install hardware cloth or equivalent rodent barrier.

6 SEAL PENETRATIONS

Notes:

Scrap flashing material can make great washers for use when securing duct board. If using this technique, exercise caution and make sure to wear gloves to protect your hands from the sharp edges.

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

Copyright ©2012 Advanced Energy. All Rights Reserved

CRITICAL DETAIL:

BAR-FACED GRILLE INSTALLATION

DESIRED OUTCOME: Increase air flow through the return grille

MATERIALS	TOOLS

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

Stamp-faced return grille.

Bar-faced return grille.

SAFETY + NOTES

Gloves, appropriate respirator, safety glasses

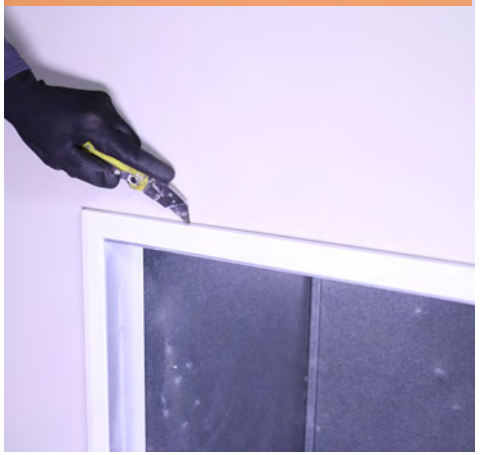
DISCLAIMER: These tools are for illustrative purposes only and do not always align with the Energy Trust Existing Homes Specifications.

Copyright ©2012 Advanced Energy. All Rights Reserved

BAR-FACED GRILLE INSTALLATION

If present, score any caulk or paint sealing between return grille and interior surface.

1 SCORE



Remove filter and grill.

2 REMOVE FILTER

If present, score any mastic or duct tape sealing between return grill flange and return. Remove screws.

3 REMOVE FASTENERS

Remove frame.

4 REMOVE FRAME

Seal return to sheetrock connection.

5 SEAL

Install new grille and filter.

6 INSTALL GRILLE

Notes:

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

Copyright ©2012 Advanced Energy. All Rights Reserved