

What Resources Are Available to Meet the Energy Code?

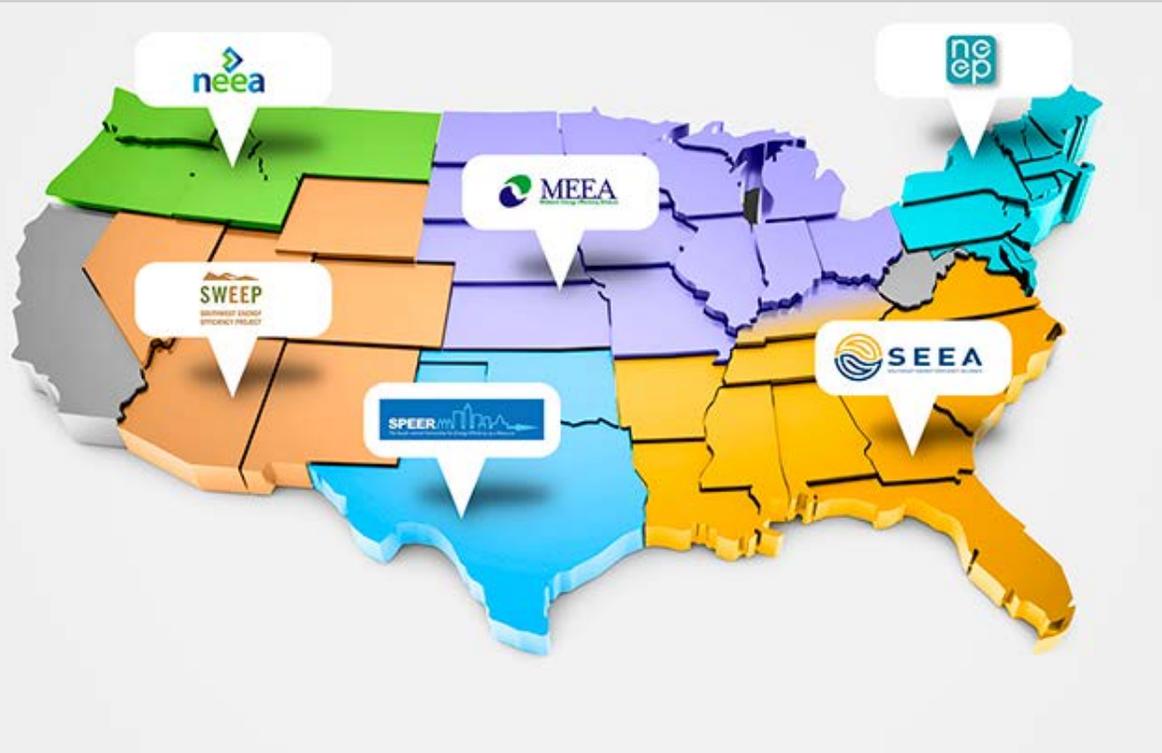
Amy Dzura, Southeast Energy Efficiency Alliance

Ricky Sandlin, Burgess Construction Consultants, Inc

Larry Mahaffey, Kentucky Energy Code Circuit Rider

Shaun Hassel, Advanced Energy

Southeast Energy Efficiency Alliance



- Regional Energy Efficiency Organization (REEOs)
- Their shared goal is to connect key market actors and best practices to leverage the power of energy efficiency for all

Amy Dzura, adzura@seealliance.org

- **Come to our reception tonight!!**

Southeast Energy Efficiency Alliance

- Regional resource for energy codes adoption, implementation and compliance through technical assistance, policy work, and collaboration
- Success with Energy Codes training manuals
- Building America Solutions Center

U.S. DEPARTMENT OF ENERGY Energy Efficiency & Renewable Energy

Building America Solution Center

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Duct Leakage to Outdoors

Scope Description Success Climate Training CAD Compliance Existing Homes More Sales

Training

Right and Wrong Images



Presentations
None Available

Videos

 [Duct Leakage to Outdoors \(1\)](#)
Publication Date: July, 2015
Courtesy Of: [BNI](#)
Video describing how to test for duct leakage to the outdoors.

 [Duct Leakage to Outdoors \(2\)](#)
Publication Date: July, 2015
Courtesy Of: [BNI](#)
Video describing how to test for duct leakage to the outdoors.

Last Updated: 08/15/2013

Session on Energy Code & Resources:

- Learn about common code challenges and how to avoid them
- Gain a perspective from documented accounts of the current energy code compliance and building methods
- Identify training strategies, activities and resources that have been used in other jurisdictions to increase levels of compliance

Ricky Sandlin

Burgess Construction Inc.

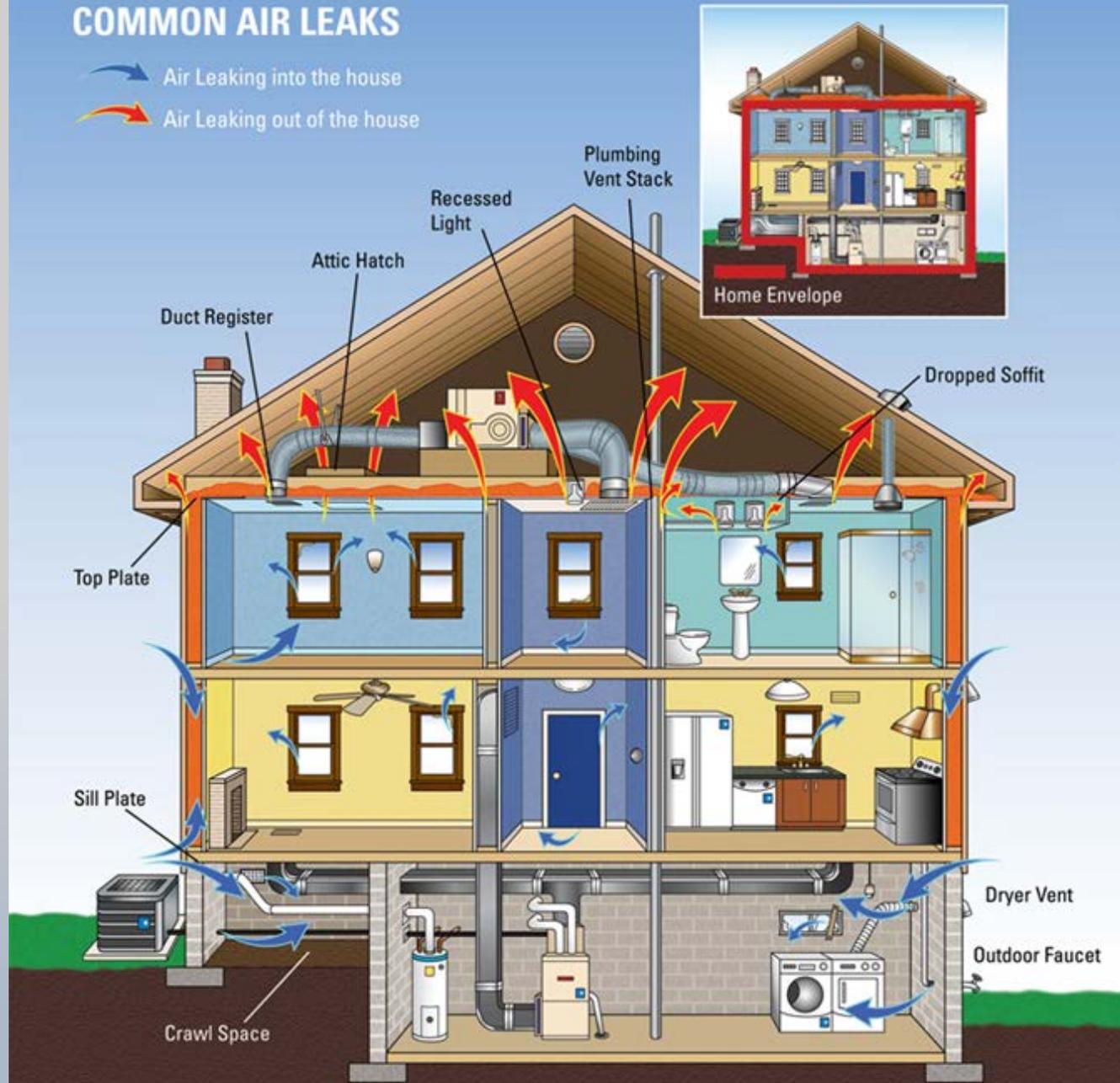
Texas Ambassador Program

2009 IECC

- Building Thermal Envelope shall be durably sealed to limit infiltration.

COMMON AIR LEAKS

-  Air Leaking into the house
-  Air Leaking out of the house



2009 IECC

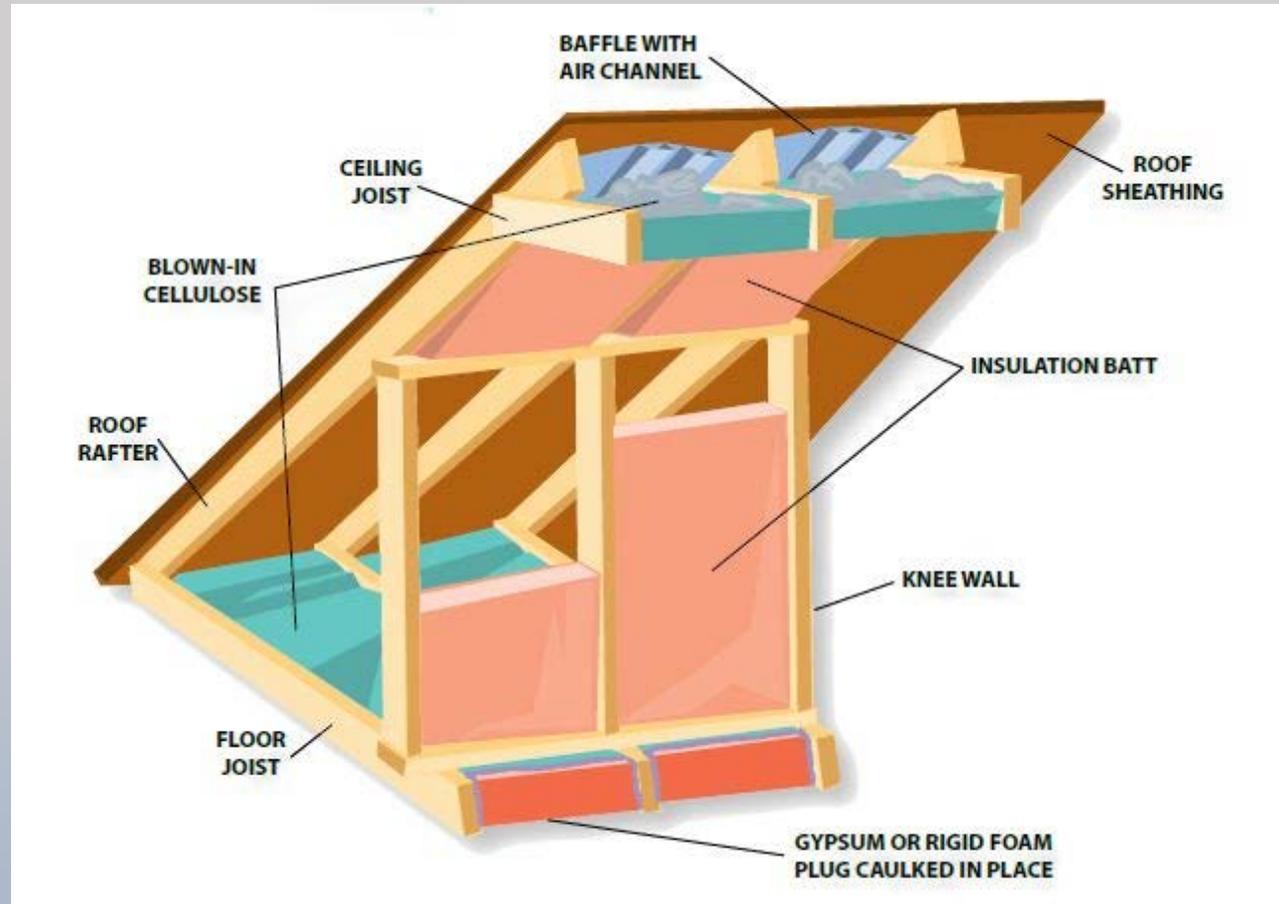
- The following shall be caulked, gasketed, weather-stripped or otherwise sealed with an air barrier material, suitable film or solid material

1. All joints, seams and penetrations	7. Walls and ceilings separating a garage from conditioned space
2. Site Built windows, door and skylights	8. Behind tubs and showers on exterior walls
3. Openings between windows and doors	9. Common walls between dwelling units
4. Utility penetrations	10. Attic access openings
5. Dropped ceilings or chases adjacent to thermal envelope	11. Rim Joist Junction
6. Kneewalls	12. Other sources of infiltration

2009 IECC

- Building envelope tightness shall be demonstrated by either a visual inspection using table 402.4.2 or a Blower door test of ≤ 7 ACH50

Knee walls and/or Attic Walls



Air Barrier

- T-ply







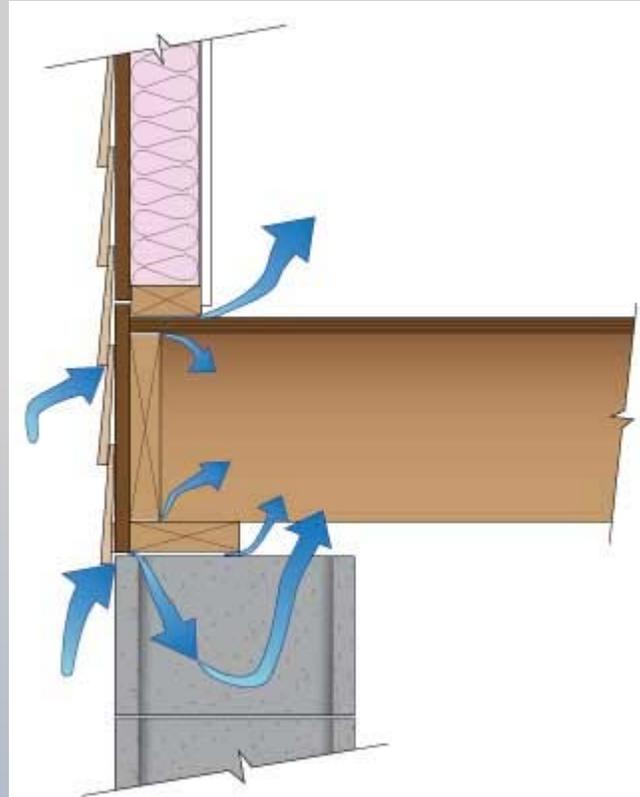
Air Barrier

- OSB

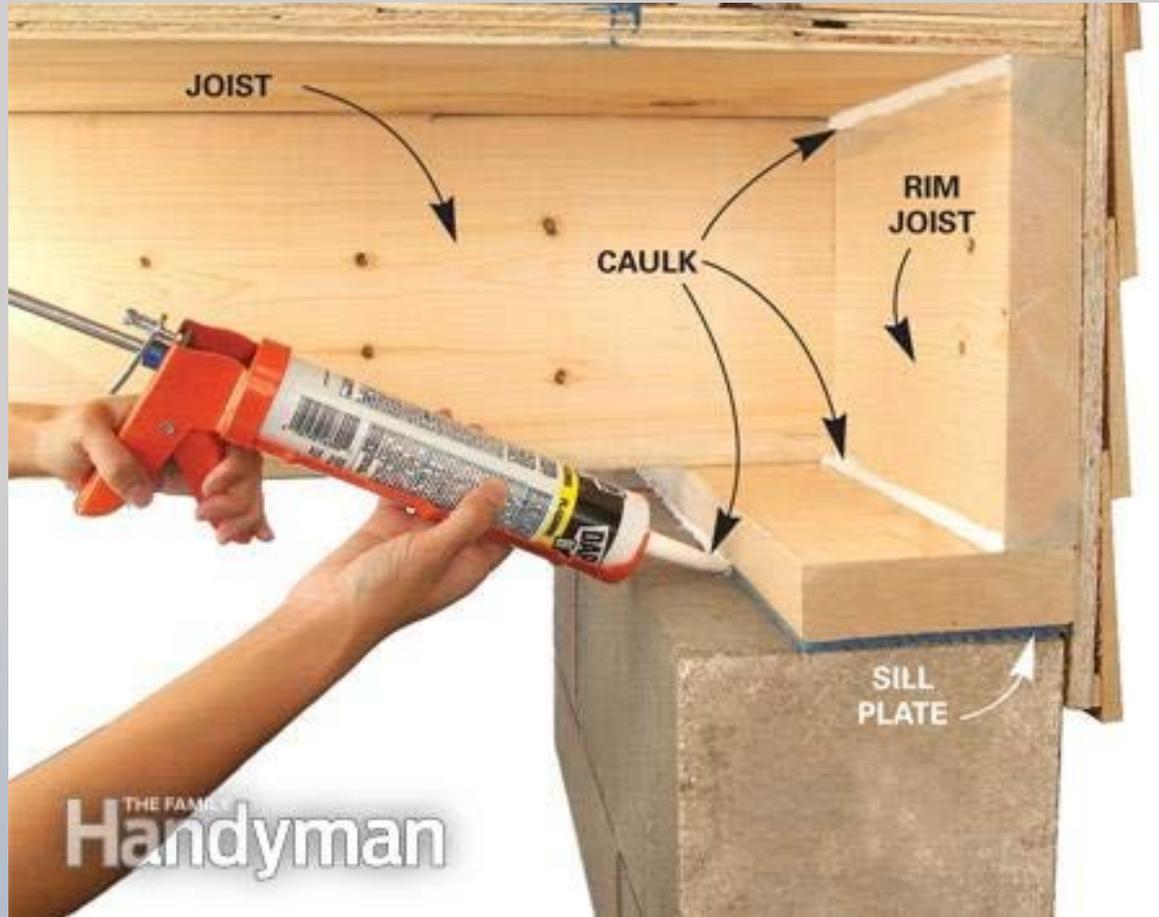




Rim Joists







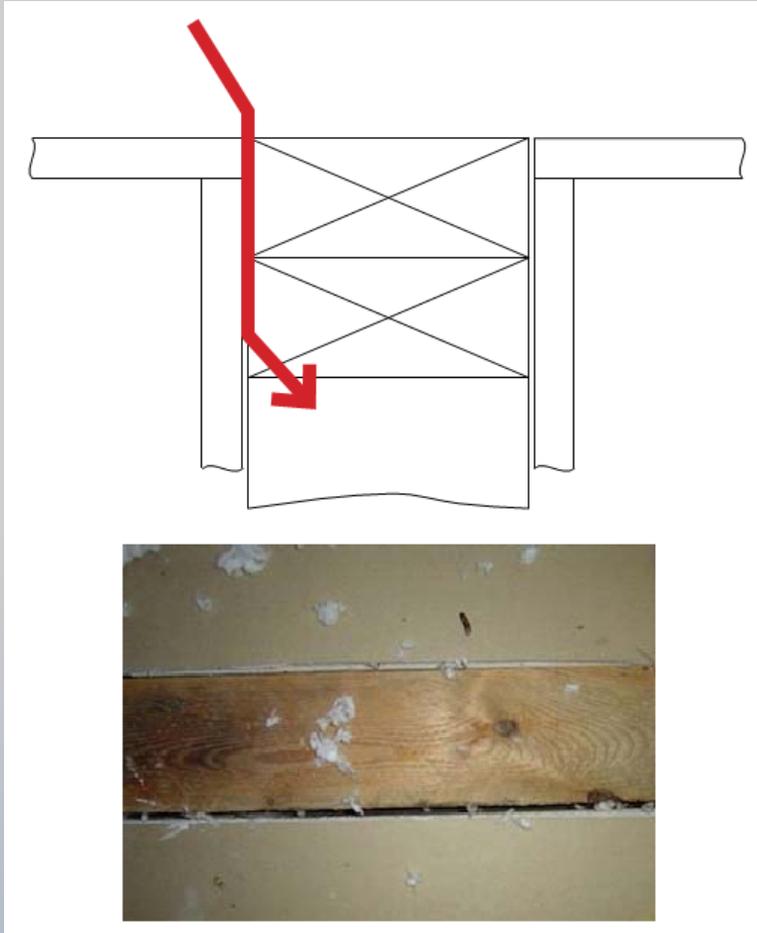
THE FAMILY
Handyman

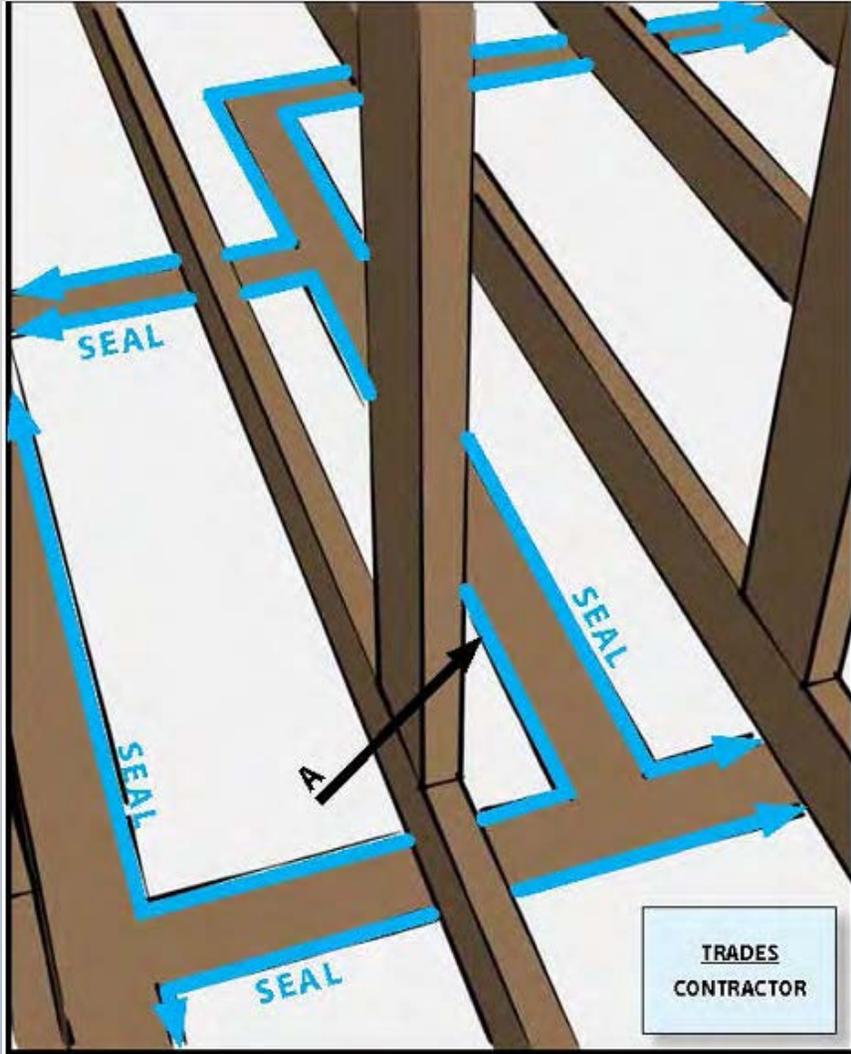
2012 IECC

- Blower Door Test and inspecting to the Air Barrier and Insulation table required.
- Blower door test –
 - Climate Zone 1-2 5 ACH50
 - Climate Zone 3-8 3 ACH50

Air Barrier checklist

- The junction of the top plate and top of exterior walls shall be sealed











Kentucky Energy Code Field Study

Circuit Rider Program

**Larry Mahaffey
Circuit Rider
March 22, 2016**

Introduction

- Biography
 - 9 years with DHBC as state building inspector
 - 40 years experience in construction field as carpenter, contractor, homebuilder, construction superintendent and building Inspector
- Circuit Rider Position
 - Started work on August 1, 2015
 - Provide individual assistance to code officials, builders and other energy code stakeholders
 - Pro-actively reach out to stakeholders on a regular basis
 - Establish a trusted energy code advisor relationship

Circuit Rider Outreach

Meetings/Contacts Conducted

- 53 Meetings to Date: 15 with homebuilders, 30 with inspection departments, 3 with HVAC contractors, 2 with Insulation contractors, 1 with home designer, 1 with a local fire chief / city clerk and 1 with a building supply business owner
- Meeting typically last from 30 – 120 minutes with 1 to 4 attendees
- Builders, contractors and code officials have generally been open to meetings and often willingly provide referrals
- Started conducting follow-up visits with previous contacts to determine program results, 9 follow-up visits to date.

Circuit Rider Outreach

Topics Discussed with Homebuilders

- Provide information on the Kentucky Energy Code Improvement Study, resources available, contact information and upcoming training opportunities.
- Discuss Prescriptive requirements of the 2009 IECC
- Air sealing; windows and doors, building seams & penetrations
- Equipment sizing and duct sealing
- Insulation installation; floors, walls, ceilings, basements, floor slabs and crawl spaces
- The use of insulation contractors and HERS raters
- The effects of positive and negative building pressure
- The use of the permanent certificate

Circuit Rider Outreach

Topics Discussed With Building Officials

- Application and compliance issues with the 2009 IECC during plan review and inspection
- Prescriptive requirements of the 2009 IECC for residential construction
- Insulation installation and air sealing the envelope
- Basement, slab and crawl space insulation requirements
- Inspecting energy code requirements during routine inspections
- Checking energy certificate for correct information
- Providing code books, energy compliance handouts, soon to be released learning modules, future training opportunities and hotline information









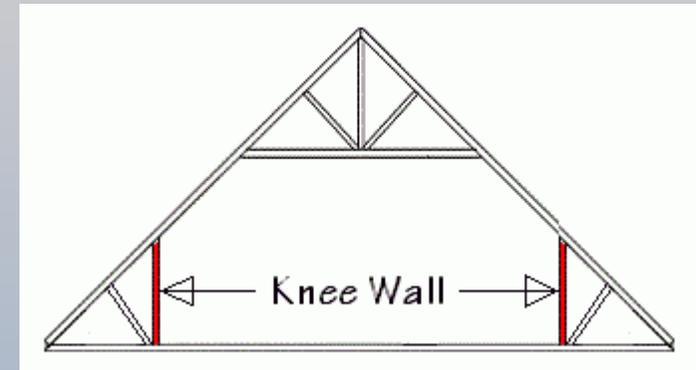
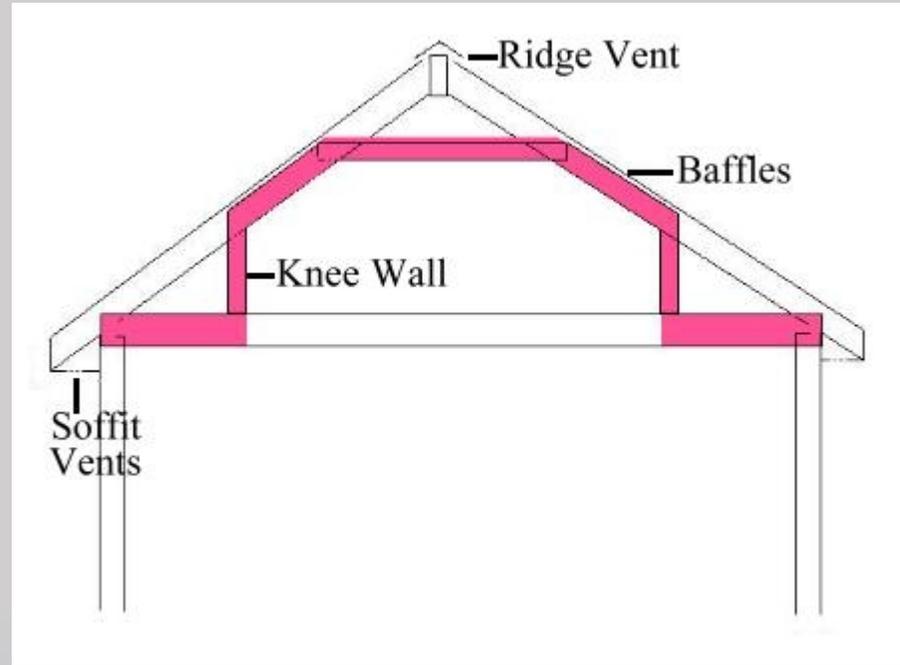




Bill Ferriot









Shaun Hassel

Trainer and Consultant

503-477-0469

shassel@advancedenergy.org

About Advanced Energy

- **Providing Market-Based Energy Solutions for:**
 - Buildings
 - Industrial
 - Motors and Drives
 - Renewables
 - Transportation
- **Services include:**
 - Program Design and Implementation
 - Consulting
 - Training
 - Testing
 - Research
- **Headquartered in Raleigh, N.C.**



People + Purpose + Process = SUCCESS

PEOPLE

PROCESS

PURPOSE



Internal & External

Respect:

- Employees
- Customers
- Funders
- Trade Partners
- Suppliers

Effective & Efficient

Execution:

- Easy to work with
- Effective
- Efficient
- Economical

ROI

Result:

- Return on investment
- Cost competitive
- Trusted resource

Guidebooks for Builders, Trades & Code Officials



Includes:

- Information Sheets
- Checklists
- Tech Tips
- Critical Details

HVAC Tools for Installers and Designers



SystemVision Homes
by Advanced Energy

Office Use: Plan
Review Control Number

Load Calculation Input Form (to be completed by HVAC contractor)

PLEASE SEND TO:
Advanced Energy Corporation, Attention: Maria Mauceri
909 Capability Drive Suite 2100, Raleigh, NC 27606
PH: 919-857-9000 FX: 919-832-2696 E-Mail: svsystemvision@advancedenergy.com

LOAD CALCULATION REVIEW
Right-sized HVAC equipment is an integral part of the SystemVision program. For each plan submitted, Advanced Energy reviews an ACCA Manual J room-by-room load calculation for compliance with the program standards. Complete and submit this form along with the load calculation. Loads may be sent via e-mail as pdf files or via fax or mail.

HVAC CONTRACTOR: _____ CONTACT: _____
PHONE: _____ FAX: _____
E-MAIL ADDRESS: _____
NON-PROFIT DEVELOPER: _____ PLAN NAME: _____

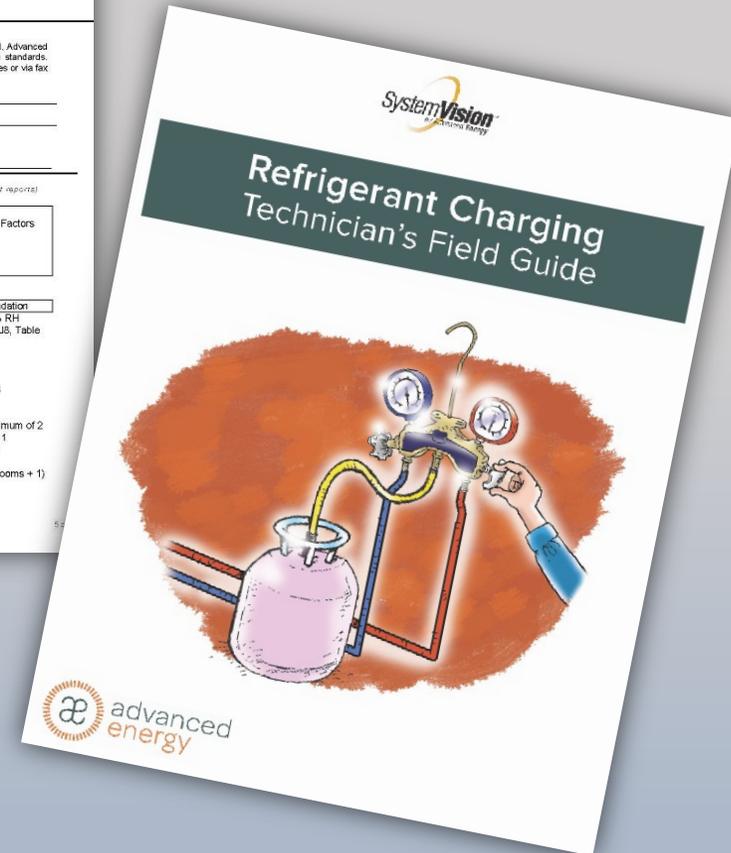
ATTACHED REPORTS MUST INCLUDE: (for other software, please submit equivalent reports)

Wright-Soft	Elite RHVAC
<input type="checkbox"/> Load Short Form	<input type="checkbox"/> Project Report
<input type="checkbox"/> Building Analysis	<input type="checkbox"/> Miscellaneous Report w/ Duct Load Factors
<input type="checkbox"/> Component Constructions	<input type="checkbox"/> Load Preview Report
<input type="checkbox"/> Project Summary	<input type="checkbox"/> Total Building Summary Loads
<input type="checkbox"/> Worksheet	<input type="checkbox"/> Detailed Room Loads
<input type="checkbox"/> Drawings	

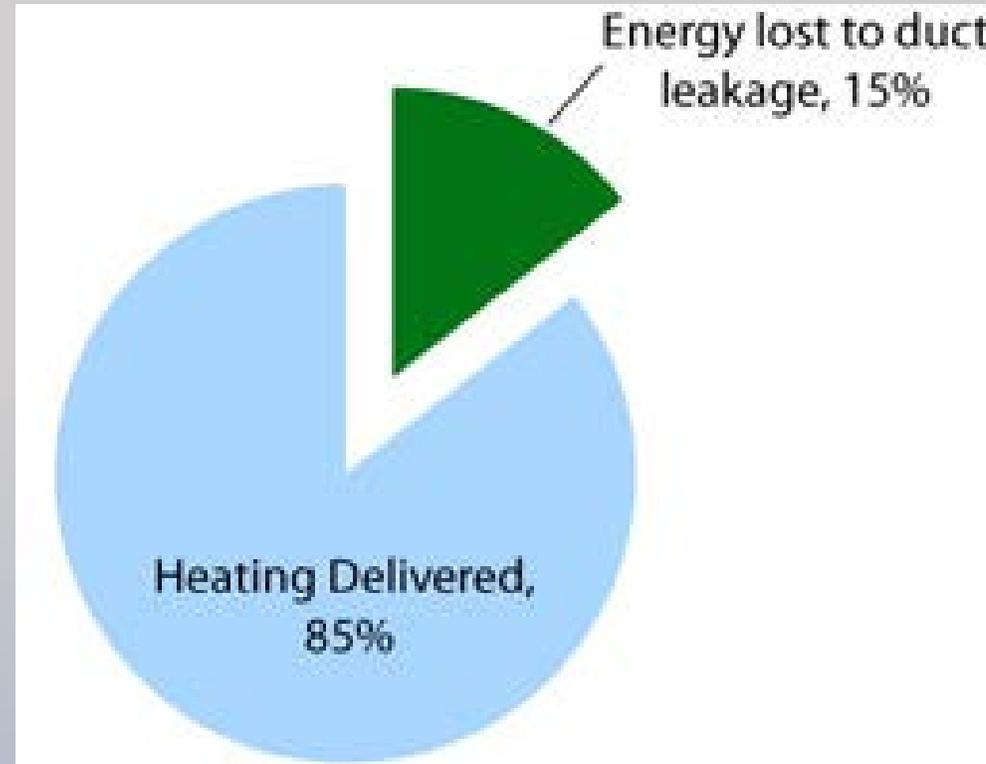
DESIGN SELF-REVIEW:

Input	Modeled Value	Standards/ACCA Recommendation
Indoor Design Temperature		70 Heating/75 Cooling/50% RH
Outdoor Design Temperature		99% Heating/1% Cooling per MJ8, Table 1A
Window U-Value		≤ .35
Window SHGC		≤ .30
Wall R-Value		Consult builder
Floor R-Value		Consult builder, ≥ R-38
Attic R-Value		Consult builder
Insulation		Tight or equivalent
Seals		1 appliance recommended; maximum of 2
Lightness/Sealing		Total = # of bedrooms + 1
Insulation		Extreme or equivalent
		Consult builder
		Total = (.01 x ft ²) + 7.5 (# of bedrooms + 1)

December 22, 2015



Duct Leakage & Furnace Performance



DUCT LEAKAGE TESTING REQUIREMENTS

*If ALL ductwork and equipment are inside the thermal envelope duct testing is not required

	2009 IECC	2012 IECC
*Rough-in Total Duct Leakage	$\leq 6 \text{ CFM}/100 \text{ ft}^2 @ 25 \text{ Pa}$ (w/ air handler in place)	$\leq 4 \text{ CFM}/100 \text{ ft}^2 @ 25 \text{ Pa}$ (w/ air handler in place)
*Finished Total Duct Leakage	$\leq 12 \text{ CFM}/100 \text{ ft}^2 @ 25 \text{ Pa}$	$\leq 4 \text{ CFM}/100 \text{ ft}^2 @ 25 \text{ Pa}$





2003 3 12

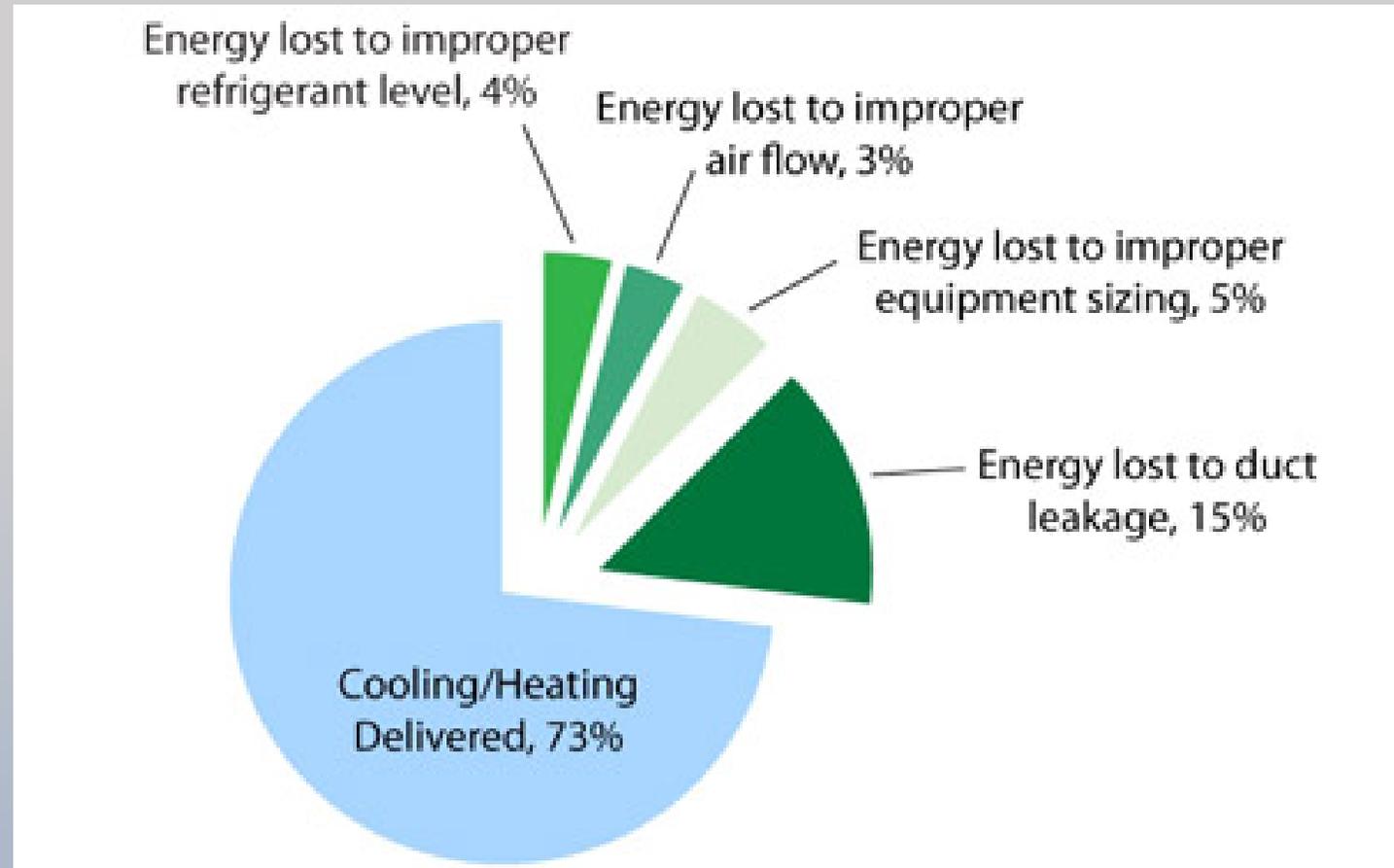


Critical
Concept:
Seal Everything



Critical
Concept:
Thick as a
nickel

Installation Issues & Air Conditioner Performance



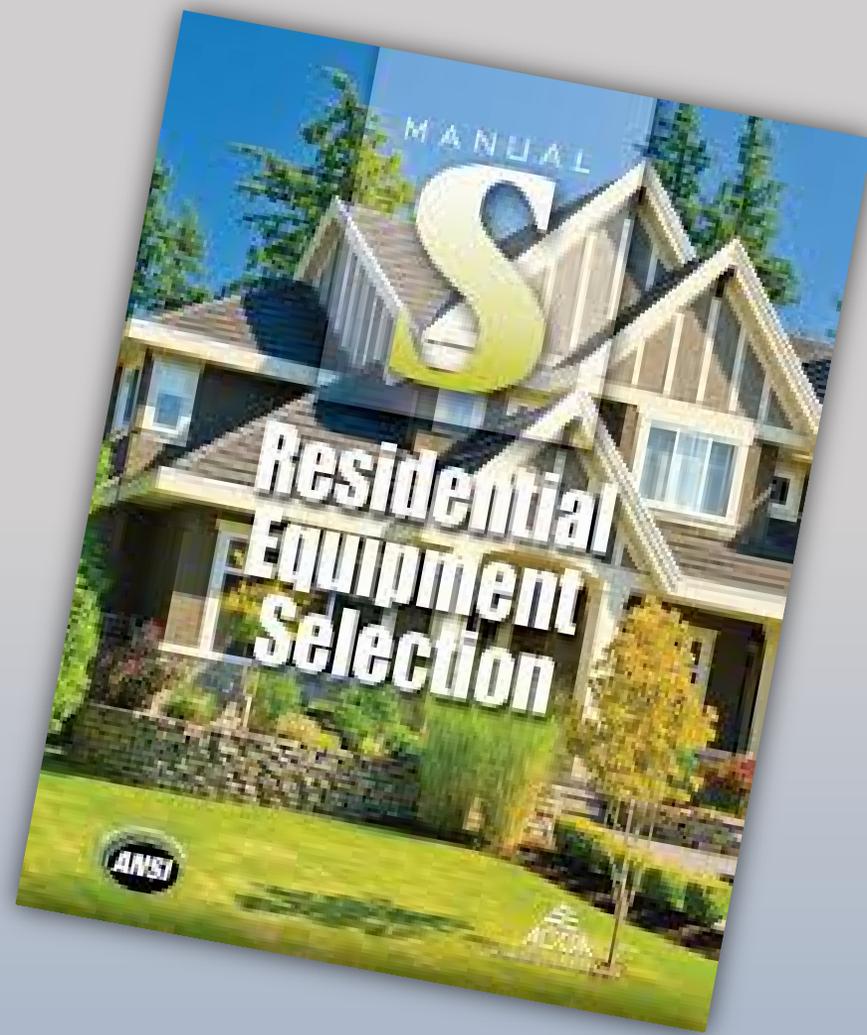
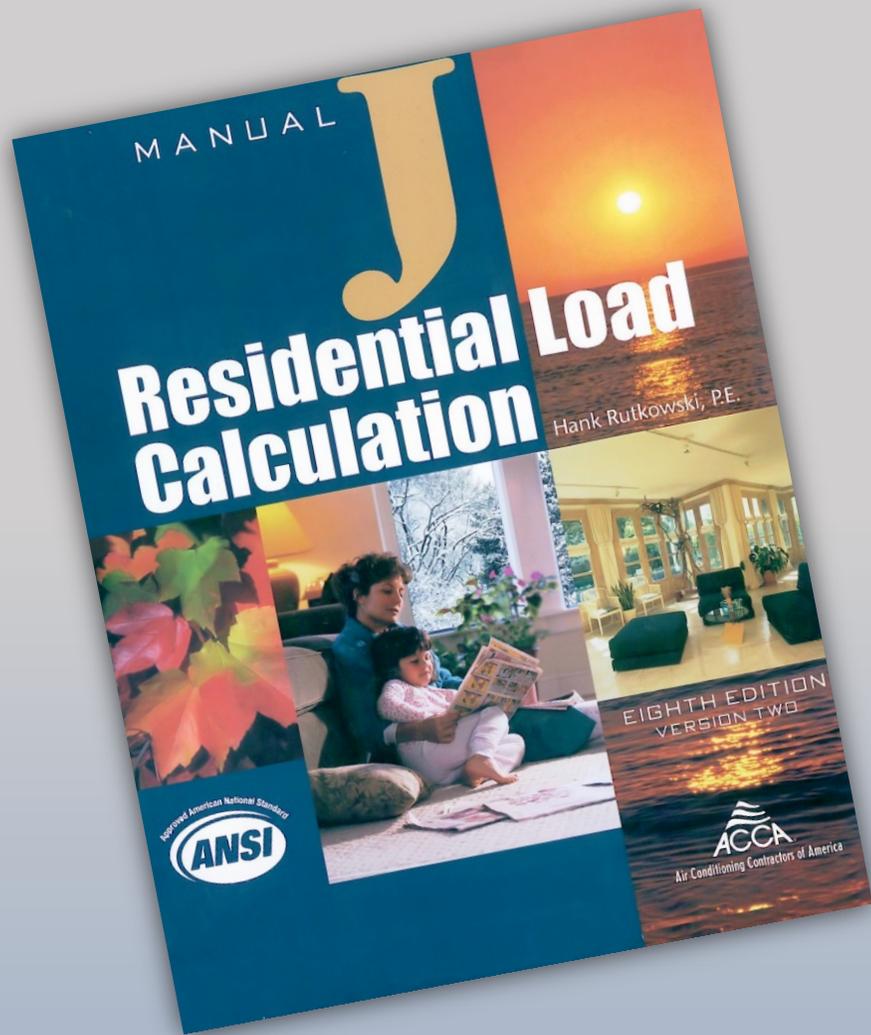
Heating & Cooling Equipment Sizing

2009 IECC

403.6 Equipment sizing (Mandatory). Heating and cooling equipment shall be sized in accordance with Section M1401.3 of the International Residential Code.

2012 IECC

R403.6 Equipment Sizing (Mandatory). Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies.



Instructions

1. Print this page.
2. Carefully cut out the holes.
3. Stand on curb across the street and hold page 1 foot from your face.
4. Find the hole that's the closest match.
5. Size HVAC accordingly

HVAC Sizing Chart



1 1/2 TO 2 TON



2 1/2 TO 3 1/2 TON



4 TO 5 TON

Plan Review Input Form

PLEASE SEND WITH HOUSE PLAN AND LOAD CALC. TO:

Advanced Energy Corporation, Attention: Maria Mauceri
909 Capability Drive Suite 2100, Raleigh, NC 27606
PH: 919-857-9000 FX: 919-832-2696 E-Mail: systemvision@advancedenergy.org

PLAN REVIEW AND ENERGY RATING

A Plan Review will be generated as a result of the building plans and information submitted to Advanced Energy. The Plan Review will include a heating and cooling energy-use projection based on recommended improvements to achieve the program standards. If you proceed with the SystemVision Home Program, the charge for the plan review is included in the per-house fee which is covered by the HFA grant. The turnaround time for the Plan Review is approximately three-weeks. Please provide us with all relevant information on this form.

NONPROFIT DEVELOPER: _____ CONTACT: _____
MAILING ADDRESS: _____
CITY/STATE/ZIP: _____
PHONE: _____ FAX: _____
E-MAIL ADDRESS: _____

CONSTRUCTION MANAGER/BUILDER

LOCATION

CONTACT: _____ SUBDIVISION: _____
COMPANY: _____ PLAN NAME/NUMBER: _____
ADDRESS: _____ ADDRESS: _____
CITY/STATE/ZIP: _____ CITY/STATE: _____
PHONE: _____ ZIP CODE: _____
FAX: _____
MODULAR HOME
MODEL NAME#: _____

MECHANICAL CONTRACTOR

Company: _____ Phone: _____
Contact Person: _____ Fax: _____

Load Calculation Input Form (to be completed by HVAC contractor)

PLEASE SEND TO:

Advanced Energy Corporation, Attention: Maria Mauceri
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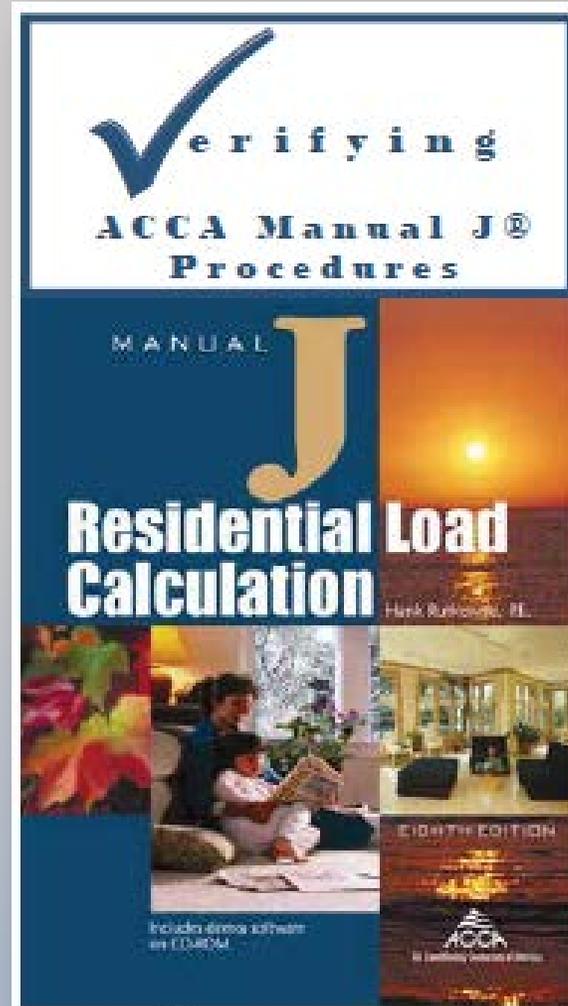
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Wright-Soft Elite RHVAC

- | | |
|--|--|
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| <input type="checkbox"/> Building Analysis | <input type="checkbox"/> Miscellaneous Report w/ Duct Load Factors |
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| <input type="checkbox"/> Drawings | |

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Wall R-Value		Consult builder
Ceiling R-Value		Consult builder, ≥ R-38
Floor R-Value		Consult builder
Infiltration		Tight or equivalent
Appliances		1 appliance recommended; maximum of 2
Occupants		Total = # of bedrooms + 1
Duct Tightness/Sealing		Extreme or equivalent
Duct Location		Consult builder
Ventilation		Total = (.01 x ft ²) + 7.5 (# of bedrooms + 1)

Quality Assurance



ITEMS TO VERIFY

The key load elements, grouped in roughly decreasing levels of impact on the overall contribution to the loads, are:

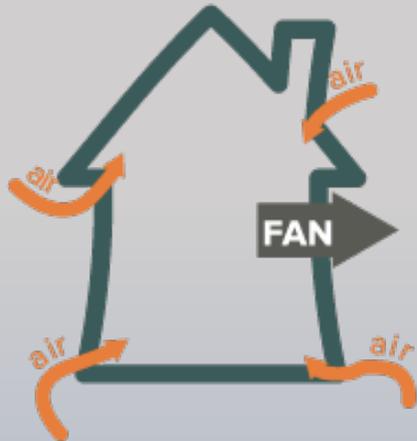
H I G H	<ul style="list-style-type: none">✓ Design Temperatures (Indoor and Outdoor)✓ Windows, Glass Doors and Large Skylights (shading, overhangs, etc.)✓ Ducts (location, leakage and duct wall R-values)✓ Ceilings under an attic (R-values, roof material, roof color)
M E D I U M	<ul style="list-style-type: none">✓ Small Skylights✓ Infiltration✓ Ventilation
L O W	<ul style="list-style-type: none">✓ Appropriately Insulated Floors✓ Appropriately Insulated Walls✓ Internal Gains

It is also worth noting some unusual items that also contribute to the load. These include:

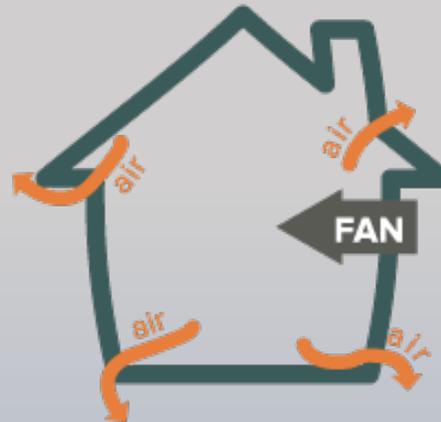
- Hot Tubs
- Whirlpool Tubs
- Three-season Porches

How will you provide fresh air?

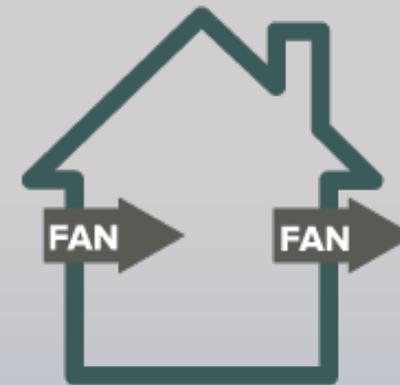
Exhaust



Supply



Balanced







“Fresh”
Air Intake



Supply Ventilation Manual Damper



**Fresh air intake with
manual damper
ducted into the
return side**

**Filtered before
reaching air handler**

Supply Ventilation – Electronic Damper



Should we test ventilation?



THANK YOU!