IAQ Details



Tips from the ENERGY STAR Indoor Air Package Specifications Guide (& Program Update)





2007 RESNET Building Performance Conference
Sheraton San Diego, CA
Wednesday, February 21st, 2007

OUTLINE



- What's so important about IAQ?
- What's in the Indoor Air Package?
- Program Status Update
- Tools
 - Spec Guide
 - Training
 - Sales





How have homes changed since grandpa started the business?



- They're better insulated
- They're tighter
- They're Air-Conditioned
- Attached garages are now standard
- Pets now live inside with us
- We're building on less desirable sites

And the list goes on ...

Should builders be concerned about Indoor Air Quality (IAQ)?



- Asthma epidemic (20 million Americans have it) & almost 2 million ER visits per year.
- Radon causes >20,000 lung cancer deaths per year.
- Indoor dampness increases risk of respiratory problems and indoor dampness is widespread (e.g. wet basements and visible mold are commonplace).
- EPA estimates indoor air typically has 2-5 times more chemical pollutants than outdoor air.

Now consider this:

 People spend >90% of their time indoors, and >60% in their homes!

What IAQ pollutants <u>should</u> homebuyers & builders be concerned about?



- Biological pollutants
 - Mold & Mildew
 - Dust Mites & Pests
- Combustion products
 - CO, NO2, smoke
- Radon & Soil gases
- Formaldehyde
- Other chemicals
- Airborne Particles
 - Dust, pollen











These indoor pollutants have been linked to health problems ranging from minor respiratory irritation to death, depending on exposure and sensitivity

More IAQ Info available at: http://www.epa.gov/iaq/ia-intro.html
Or call 1-800-438-4318

House design and construction can reduce exposure risk for indoor air pollutants! Ask how...

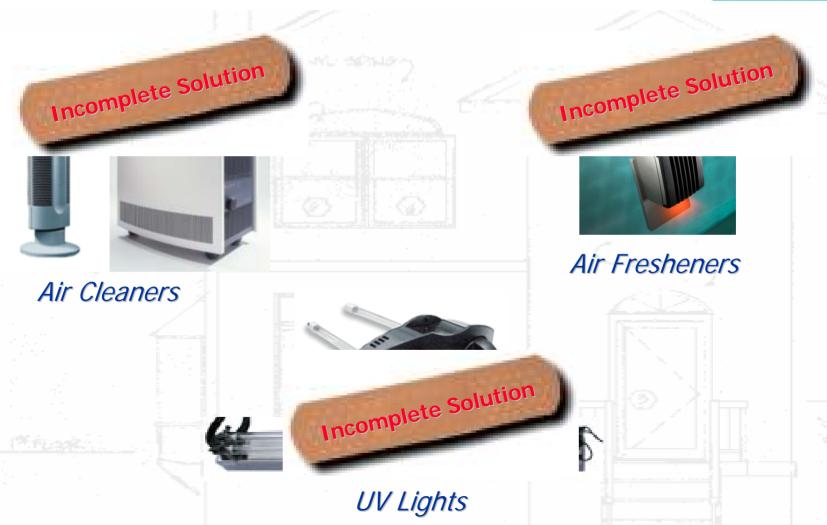
Do homebuyers care about IAQ?



- Moisture and mold litigation Up [~9,000 moisture and mold court cases American Banker, 1/03]
- Home moisture problem inquiries High [30%, double the next closest subject NAHB Research Center]
- Asthma prevalence High
 [19% of US households have at least 1 person with asthma EPA]
- Air cleaner product sales Up [\$1.2 Billion annual sales Levin, 2005]
- Radon mitigation sales Up
 [300% increase in home radon mitigations since 1990 EPA]

But, Millions of consumers turn to "IAQ products" for solutions ...





So, what should be done to improve Indoor Air Quality?



IAQ Risk Reduction Principles:

- Source Control eliminate, substitute, or remove pollutant sources
- 2. Ventilation dilute unavoidable pollutants
- Air Cleaning/Filtration capture targeted pollutants, only after source control & ventilation

Builders can improve home IAQ ...

Introducing the ENERGY STAR Indoor Air Package!





OUTLINE



- What's so important about IAQ?
- What's in the Indoor Air Package?
- Program Status Update
- Tools





What is the ENERGY STAR Indoor Air Package?



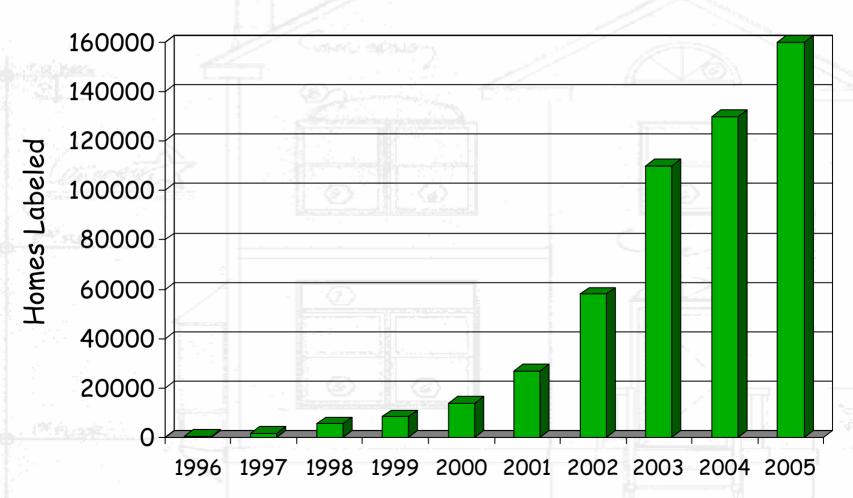
- Comprehensive set of IAQ specifications
- Verified performance
- Government Label to help buyers easily identify the Indoor Air Quality features



And it's based on the successful ENERGY STAR for Homes program ...

ENERGY STAR for Homes BACKGROUND Building on Success





A few program statistics ...



- 700,000+ Labeled Homes Cum.
- ~20-60+% Market Penetration
- >60% of the Top 100 Builders
- >70% consumer recognition of the ENERGY STAR brand

What's Next for ENERGY STAR?



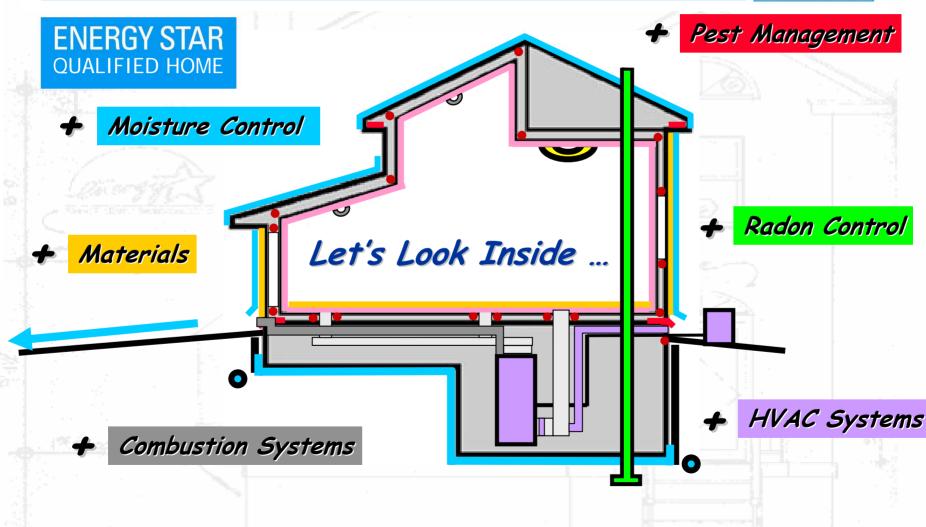
"We already do ENERGY STAR. What's next?"

- Reduce Health Risks for homebuyers & their families
- Improve Quality for ENERGY STAR home builders
- Reduce Business Risk for ENERGY STAR home builders
- More Differentiation for ENERGY STAR home builders



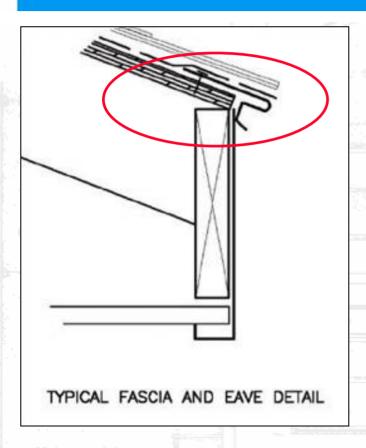
What's in the ... ENERGY STAR Indoor Air Package?





MOISTURE CONTROL HIGHLIGHTS: Water Managed Roofs





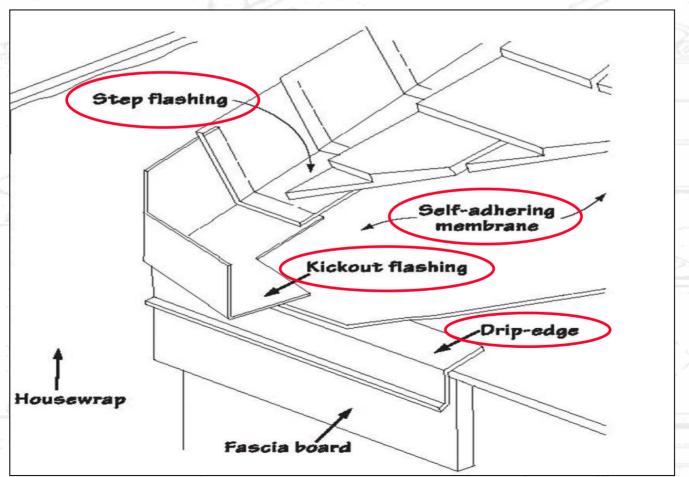
BITUMINOUS MEMBRANE AT VALLEYS



MOISTURE CONTROL HIGHLIGHTS: Water Managed Roofs (cont'd)

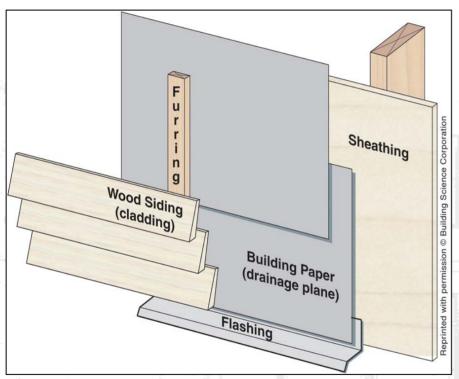


MORE ROOF FLASHING DETAILS ...



MOISTURE CONTROL HIGHLIGHTS: Water Managed Walls





DRAINAGE PLANE DESIGN

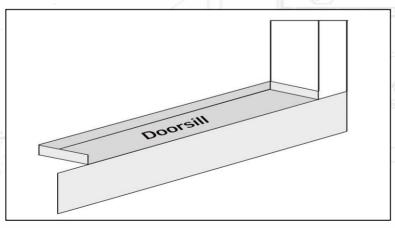


MOISTURE CONTROL HIGHLIGHTS: Door/Window Flashing

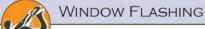




PAN FLASHING



BEST PRACTICE INSTALLION





Building Tips

Example of window flashing details for home with housewrap and plywood or OSB wall sheathing.

STEP 1- IF HOUSEWRAP HAS NOT BEEN INSTALLED STEP 1- IF HOUSEWRAP HAS BEEN INSTALLED



- Apply at least a 12" flap, or apron, of building paper or housewrap just below the windows sill.
- O If the window sill is close to the sill plate, the apron can extend all the way to the sill plate.
- ◆ The apron should extend at least 10" past the sides of the window opening, or to the first stud in open wall construction
- Attach only the apron's top edge with cap nails.



- Cut the housewrap covering the rough opening in the shape of a modified "Y".
- O Fold the side and bottom flaps into the window opening and secure.
- Above the window opening, cut a head flap and flip up to expose sheathing, and loosely tape in place out of the way.



- Install self-adhesive flashing to the sill, ensuring that flashing extends up jambs at least 6".
- One commercial product comes with two removable strips over the adhesive. Remove the first strip to expose half the adhesive and apply this area to the sill. Begin pressing in the middle of the sill and work towards the sides. Remove the second strip to expose the adhesive that will be used to apply the flashing below the window to the outside wall.
- Tape down the bottom corners of the flashing



- Caulk the outside edges of the head and side jambs
- O Do not caulk across the sill
- Install the window using corrosion-resistant nails and following manufacturer's specifications.

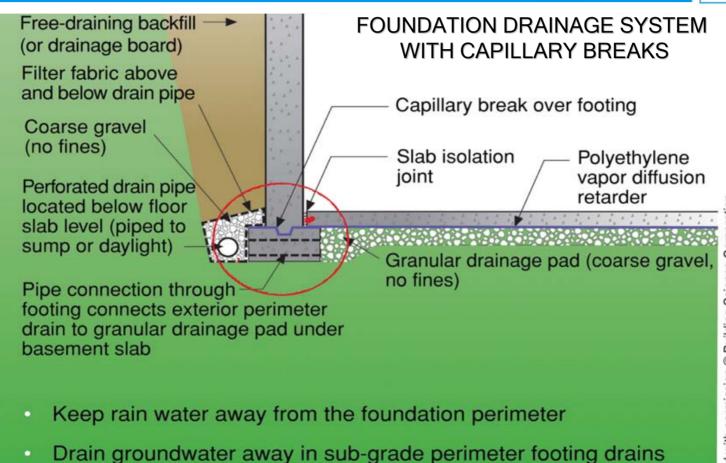
Building America Best Practices Series: Volume 2 - Builders and Buyers Handbook for Improving New Home Efficiency, Comfort, and Durability in the Hot-Dry and Mixed-Dry Climates

Version 2, 5/2005 • TRD-4

MOISTURE CONTROL HIGHLIGHTS: Water Managed Foundations

before it gets to the foundation wall





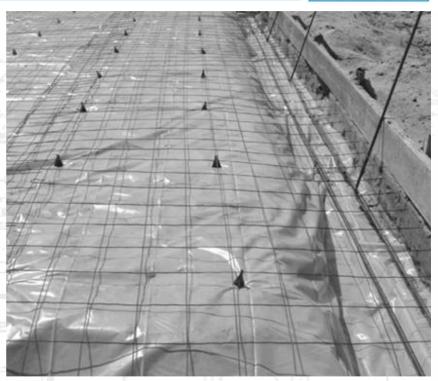
Reprinted with permission © Building Science Cor

MOISTURE/RADON CONTROL HIGHLIGHTS: Foundation Vapor/Radon Barrier



CRAWLSPACE



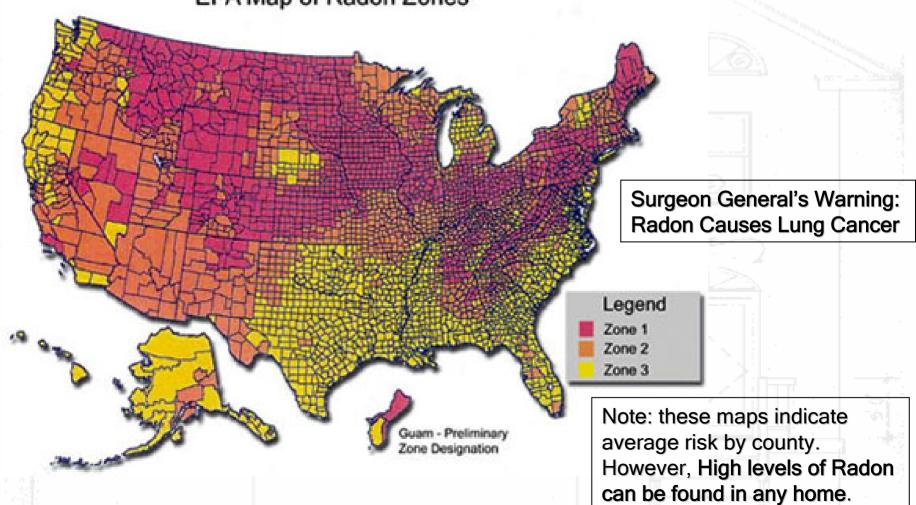


UNDER SLAB

RADON CONTROL HIGHLIGHTS: Radon Resistant Construction







RADON CONTROL HIGHLIGHTS: Radon Resistant Construction



A. Gas Permeable Layer (4" clean gravel)

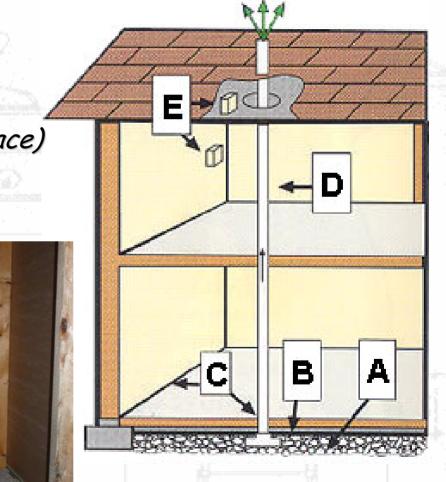
B. Plastic Sheeting (under slab or over crawl space)

C. Sealing and Caulking

(all openings in concrete floor)

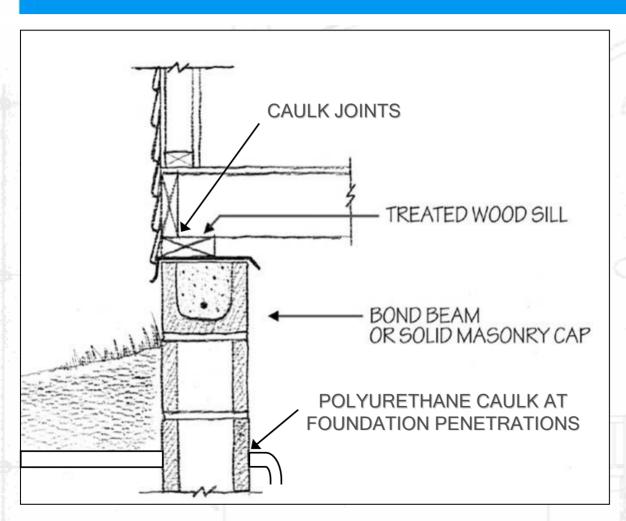
D. Vent Pipe (3 or 4 inch PVC pipe)

E. Junction Box (if fan needed later)



PEST MANAGEMENT HIGHLIGHTS: PEST BARRIERS



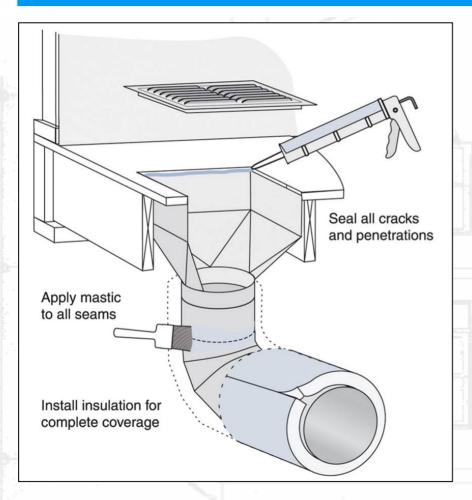


Pest Management:

- 1. Block Pest Entry
- 2. Moisture Control
- 3. Reduce Pest Food

HVAC SYSTEM HIGHLIGHTS: Ductwork Air Sealing







DUCT BOOTS & SEAMS SEALED WITH MASTIC

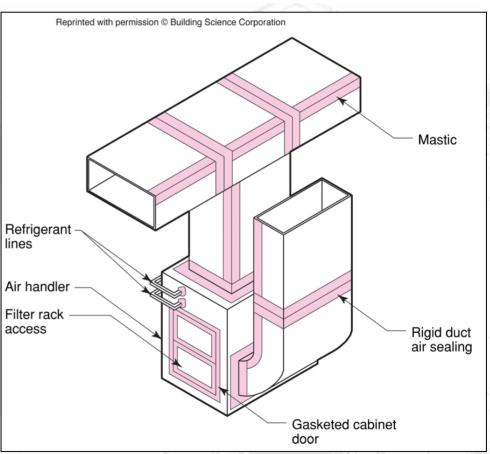
HVAC SYSTEM HIGHLIGHTS: HVAC System/Plenum Air Sealing





SEALING PLENUM WITH MASTIC

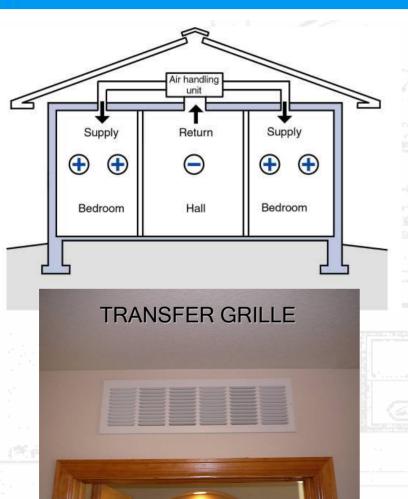




GASKETED DOORS & SEALED SEAMS

HVAC SYSTEM HIGHLIGHTS: Pressure Balancing







JUMP DUCT

HVAC SYSTEM HIGHLIGHTS: Duct Boots Covered During Construction







HVAC SYSTEM HIGHLIGHTS: Mechanical Whole-House Ventilation



CONTINUOUS EXHAUST





BALANCED VENTILATION & HRV/ERV's



FRESH AIR DAMPER





DUCTED FRESH AIR SUPPLY

HVAC SYSTEM HIGHLIGHTS: MERV 8 Filter





COMBUSTION SYSTEM HIGHLIGHTS: Power Venting & Direct Venting





POWER VENTED WATER HEATER

DIRECT VENTED FURNACE

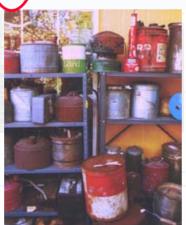


PEST CONTROL HIGHLIGHTS: Garage Pollution Isolation & Removal









EXHAUST FAN



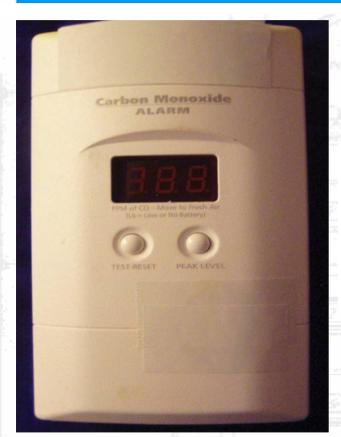






COMBUSTION SYSTEM HIGHLIGHTS: CO Alarms









COMBINED CO & SMOKE ALARM

CO ALARM

Low-emitting Materials





Certified "Green" Carpeting

MDF & Particleboard

Sample Industrial Board Bundle Tag For Particleboard Certified to 0.20 PPM Standard. Tag Size 4"x5"

Designates Standard Reference In Building

CONFORMS TO PARTICLEBOARD

FORMALDEHYDE EMISSION REQUIREMENTS

OF BOTH ANSI A208.1-1999, TABLE B

AND HUD 24 CFR 3280

C P A CERTIFIED

Grademark of Certification MILL 000

Mill Number

COMPANY

PRODUCTION DATE/SHIFT



A-C GROUP 1

EXTERIOR

. 000 .

PS 1-95

Plywood

HARDWOOD PLYWOOD & VENEER ASSOCIATION

FORMALDEHYDE EMISSION 0.30 PPM CONFORMS TO HUD REQUIREMENTS INDUSTRIAL PLYWOOD

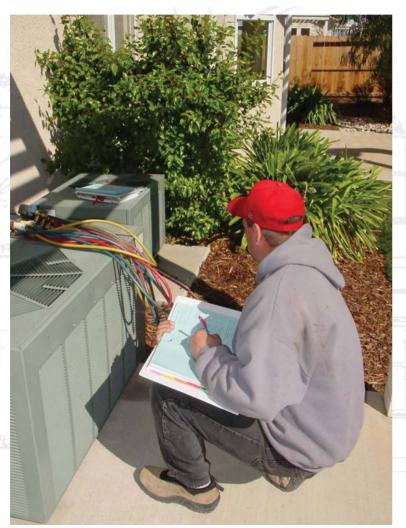


GLUE BOND TYPE II ANSI/HPVA HP-1-2004

MILL 000

HOME COMMISSIONING HIGHLIGHTS: Final Preparation







REFRIGERANT CHARGE TEST

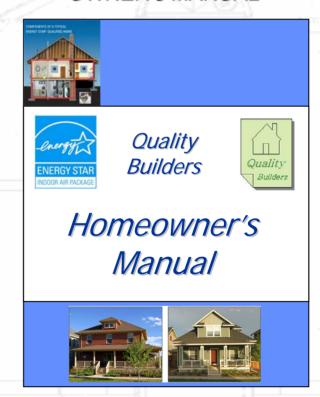
HOME COMMISSIONING HIGHLIGHTS: Owner's Manual & Checklist



Indoor Air Package Verification Checklist

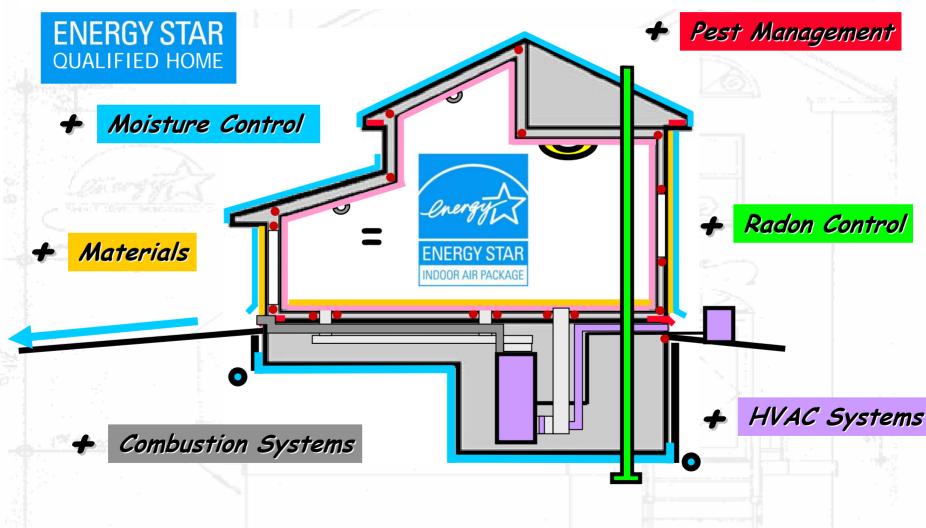
4.3	No ductwork in garage	Inspect
4.4	Duct leakage test (max. 3 cfm/sf)	Test
4.5	No building cavities used in distribution system	Inspect
4.6	Transfer ducts/grilles in rooms w/o return	Inspect
4.7	Duct boots covered during construction	
Heatina	& Cooling Equipment	
4.8	Design loads calculated to Manual J & system sized to Manual S	Review design docs & Inspec
4.9	Propoer drain pan design and installation	Inspect
4.10	Air handler cabinet & adjacent plenum sealed, door gasketed	Inspect
4.11	Cooling equipment max SHR of 0.7 (hot humid climates)	Review design docs & Inspec
4.12	No air handler in garage	Inspect
4.13	Outdoor & indoor coils matched per manfacturer requirements	Review design docs & Inspec
4.14	Only operate HVAC system during construction if specified filter installed	
4.15	No equipment that intentionally produces ozone	Inspect
Ventilat	ion	
4.16	Mechanical whole house ventilation per ASHRAE Std 62.2-2004	Review design docs & Inspec
4.17	Mechanical spot ventilation per ASHRAE Std 62.2-2004 & ENERGY STAR labeled vent fans	Inspect & Verify E* qualified fans
4.18	Clothes dryers vented outdoors	Inspect
4.19	Outdoor air intakes at least 10 ft. from exhaust vents & vehicles	Inspect
Air Filtr	ration	
4.20	HVAC filters at least MERV 8	Review design docs & Inspec
4.21	No filter by-passes	Inspect
4.22	Central vac vented to outdoors	Inspect

OWNER's MANUAL



The ENERGY STAR Indoor Air Package





What Does All This Cost?



It Depends ...

Remember to look at the Bottom Line:

Sales Revenue (Top Line)

- Business Costs

= Profit (Bottom Line)

What is the Value for Homebuyers?



Added Protection:

- · wet basements
- · mold and mildew problems
- · radon exposure
- · pests and termites
- · harmful chemicals
- · dust and pollen
- · combustion gases

All this for <\$1 a Day!

Plus Fresh Filtered Air

· engineered ventilation systems

Plus More Quality Assurance

- · third party verified
- · government backed-label

What's the Bottom Line for Builders?



• Improved Reputation

- Quality Builder
- Innovation Leader

Top Line



Reduced Business Risk

- Mold Litigation
- Comfort Complaints
- Fixing Trades Mistakes
- Catching up to Competition

Costs



What's it worth to your Bottom Line?

OUTLINE



- What's so important about IAQ?
- What's in the Indoor Air Package?
- Program Status Update
- Tools





Program Status



Specifications Denver Pilot Pilot Expansion Development (nationally) Official **Program** Launch 2008 2007 2005 2006

Pilot Expansion Phase



- Revised Specifications NOW (available nationally)
- Finalizing Marketing Materials soon (add-on to ENERGY STAR Sales Toolkit)
- Develop Training 2007
 (with EEBA & others)
- Finalize Specification Guide 2007

How does IAP work?



Builder designs & builds homes with additional features

(just like ENERGY STAR)

- Third party verification & label (just like ENERGY STAR)
- Builder markets & sells qualified homes, with help

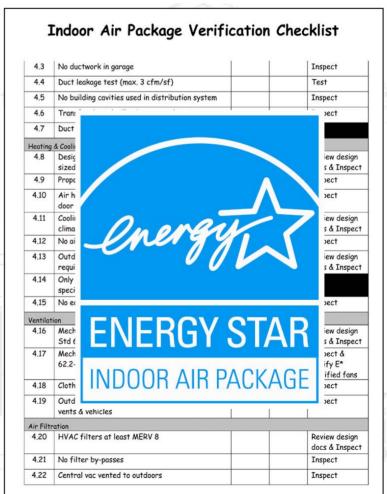
(just like ENERGY STAR)

Verification Process



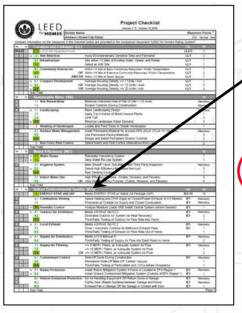
Process is designed to be seamlessly added to ENERGY STAR:

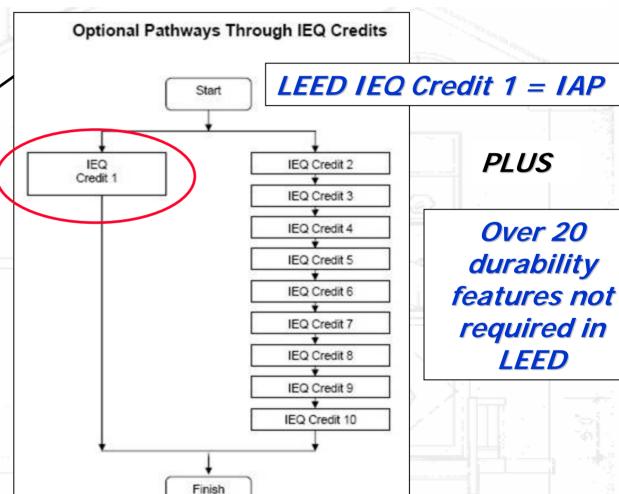
- Based on 2 Inspections
- Rater uses IAP verification checklist
- Qualified homes get the Label



How does EPA's Indoor Air Package fit in with LEED for Homes?







ENERGY STAR, Indoor Air Package, & Green Building



Green Home Staircase

Energy Efficiency

- · Envelope
- · Distribution
- · Equipment
- · Lighting
- · Appliances

IAQ and Durability

- · Moisture/Mold
- · Soil-gas Control
- · Pest Mgt.
- ·HVAC
- · Combust. Safety
- · Materials
- · Commissioning

Resource Efficiency

- · Site Planning
- · Water
- · Materials
- · Waste Mgt.
- ·Renewables



ENERGY STAR

w/Indoor Air Package

Green Buildings

OUTLINE



- What's so important about IAQ?
- What is the Indoor Air Package?
- Program Status Update
- Tools:
 - Spec Guide
 - Training
 - Sales





Guide to Technical Specifications





- Print & Online Format
- For each specification:
 - Why: health risk explained
 - What: building science principles
 - How: graphical examples
 - Where to go for more info ...

Guide to Technical Specifications (cont'd)



- Organized for Trades:
 - Foundation
 - Framing
 - Roofing
 - Mechanical
 - Plumbing
 - etc.
- Status: Dave's working on it ...
 - Due out sometime this year
 - DRAFT sections available on request:
 call Dave at 202-343-9447



IAQ Training



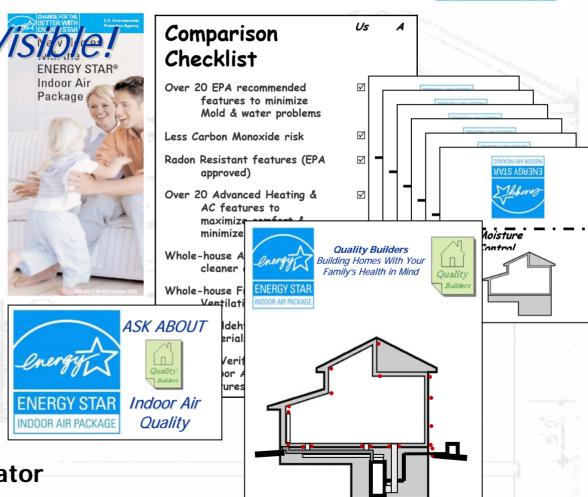
- EEBA Houses That Work IAQ
- LEED Homes Orientations
- State Radon Training
- You!

How Do You Sell Quality?



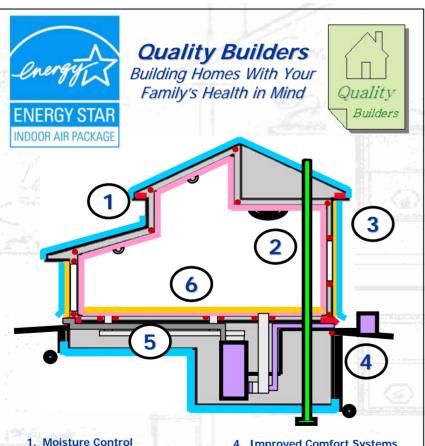
By Making it Visione

- Brochures
- Sales Toolkit:
 - *IAQ House Map
 - *Benefits Labels
 - *Tag Line Labels
 - *Sales Checklists
 - *Fact Sheets
 - Owner's Manual
- Internet:
 - *EPA's Partner locator IAQ info



Making Quality Visible: IAQ HOUSE MAP





- 2. Radon & Soil Gas Control
- 3. Pest Management with less need for Pesticides
- 4. Improved Comfort Systems
- 5. Combustion Safety
- 6. Less Harmful Chemicals in building materials

Back Page

Description of IAQ Risks and Features in IAP that address them



Quality Builders Building Homes With Your Family's Health in Mind

Indoor Air Package:

You should feel safe and secure in your home. So it's important to understand how to guard against the health risks of poor Indoor Air Quality. That's why <Ken's Homes> builds houses designed to earn the Indoor Air Package label, a special label awarded by the U.S. EPA for ENERGY STAR qualified homes that include a comprehensive set of additional specifications designed to reduce IAQ risks.



An invisible gas found in 1 out of every 15 houses, radon is the leading cause of lung cancer among non-smokers - causing over 20,000 deaths per year. ENERGY STAR with Indoor Air Package homes built in areas with the highest risks include radon-resistant

Asthma:

Over 20 million people in the U.S. – including over 6 million kids – have asthma. Symptoms can be triggered by both indoor and outdoor pollution. Controlling indoor "asthma triggers" requires occupants to keep homes clean, dry and smoke free. But how your home is designed and built makes a difference too. ENERGY STAR with Indoor Air Package homes reduce asthma triggers through more effective ventilation systems, moisture control and other features

Mold and Moisture:

Living in damp buildings can damage your health. Mold and excessive moisture can cause health problems ranging from coughing and irritation to allergies and asthma.

ENERGY STAR with Indoor Air Package homes include many moisture control features to

Carbon Monoxide:

This colorless, odorless gas kills over 400 Americans a year. Carbon monoxide and other dangerous gases can enter your home through heaters, stoves, fireplaces and other combustion appliances if they are not properly designed and vented. ENERGY STAR with Indoor Air Package homes include combustion safety features and carbon monoxide alarms to guard against this threat.

Other Pollutants:

This colorless, odorless gas kills over 400 Americans a year. Carbon monoxide and other dangerous gases can enter your home through heaters, stoves, fireplaces and other combustion appliances if they are not properly designed and vented. ENERGY STAR with Indoor Air Package homes include combustion safety features and carbon monoxide alarms to guard against this threat.













Making Quality Visible: BENEFITS LABELS



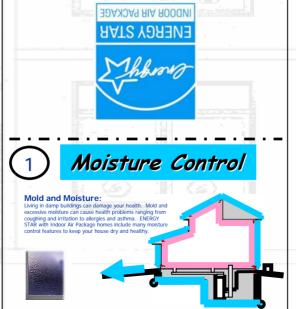


One Benefit Label for each item on the House Map

OR

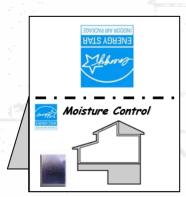
· Two formats for each





Wall mounted





Making Quality Visible: TAGLINE LABELS



General IAP Labels for use in labeling model homes:

Tents for tabletops



Framed & Signs





Making Quality Visible: FEATURES CHECKLISTS



ENERGY STAR INDOOR AIR PACKAGE Compare Value	Our Homes	Other Builders	
Over 20 EPA recommended features to minimize Mold & water problems	V		
Less Carbon Monoxide risk	\checkmark		
Radon Resistant features (EPA approved)	V		
Over 20 Advanced Heating & AC features to maximize comfort & minimize problems	V		
Whole-house Air Filtration for cleaner air	V		
Whole-house Fresh Air Ventilation system	V		
Low-Formaldehyde building materials	V		

Making Quality Visible: FACT SHEETS



One detailed Fact Sheet for each IAP Benefit on the House Map:





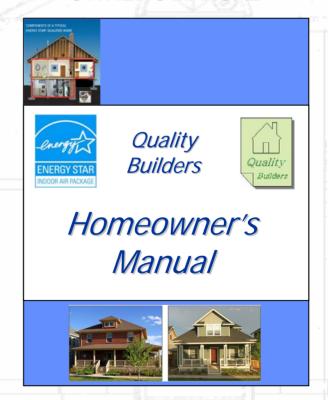
Making Quality Visible: OWNER's MANUAL & VERIF. CHECKLIST



Indoor Air Package Verification Checklist

4.3	No ductwork in garage	Inspect		
4.4	Duct leakage test (max. 3 cfm/sf)	Test		
4.5	No building cavities used in distribution system	Inspect		
4.6	Transfer ducts/grilles in rooms w/o return	Inspect		
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Heating	& Cooling Equipment			
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4.20	HVAC filters at least MERV 8 Review of docs & In			
4.21	No filter by-passes	Inspect		
4 22	Central vac vented to outdoors	Inspect		

OWNER's MANUAL



Making Quality Visible: PARTNER LOCATOR



New Homes Partner Results in Colorado

Printable:

Results 1 - 50 | All Results

The home builders and developers displayed are builders or developers of traditionally built and/or systems-built (modular, SIPs, ICFs) homes that have partnered with ENERGY STAR and have built an ENERGY STAR qualified new home in the last 12 months. Builders or developers that have recently joined and have not yet qualified an ENERGY STAR qualified new home are listed as 'new partners.' The partner's main phone number is displayed where a service area-specific phone number is not available.

Denotes home builders or developers who have made a commitment to building 100% of their homes to ENERGY STAR performance guidelines and have built at least two ENERGY STAR qualified new homes.

Denotes home builders or developers offering an optional ENERGY STAR Advanced Lighting Package (ALP)

<u>IAO</u> penotes home builders or developers who have built homes that qualify for the ENERGY

Incentives Available in Colorado

STAR Indoor Air package (IAP)

Select another partner type:

Select another location:

Site-Built Home Builders and Developers

Colorado

Go

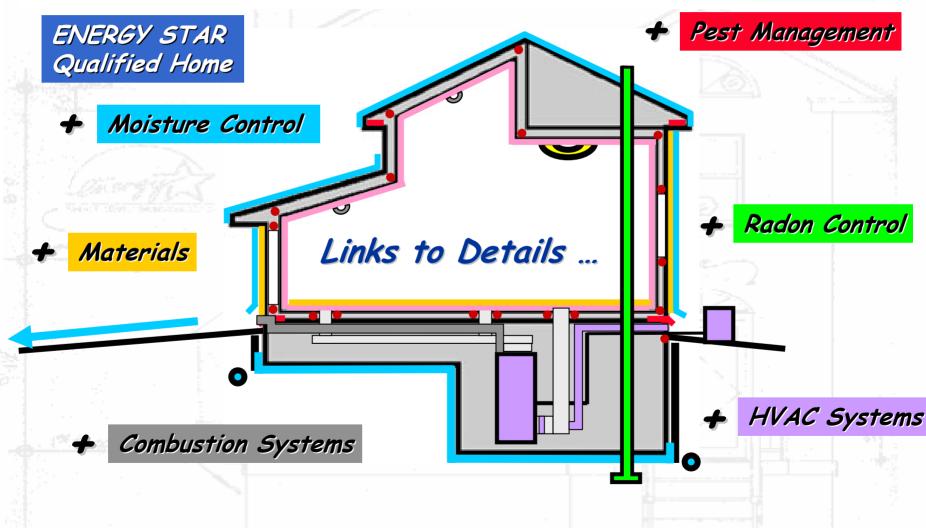
Results 1 - 50 of 86 Next

AII # ABCDEFGHIJKLMNOPQRSTUVWXYZ

Name ▼	Service Area/Phone		Partner Since	Homes Labeled (Jul 2005-Jun 2006)*	Homes Labeled (Grand Total)*
21st Century Homes, LLC (Denver)	Denver, CO	(303) 345-1751	2005	New Partner	New Partner
All Concrete Exterior Homes (dba A.C.E. Construction, LLC)	со	719-372-6460	2006	New Partner	New Partner
☆100% Archer Homes, Inc.	со	970-227-7588	2006	2	2
☆100% Aspen Homes of Colorado, Inc. EXIT Ф	Loveland, CO	(970) 461-9696	2002	118	476

Making Quality Visible: WEB BASED TUTORIAL





How to Use the Marketing Tools ...



- Advertise with the IAP Logo
- Distribute IAP Brochures
- Use Sales Toolkit to create custom materials:
 - Home Shopper Packet:
 - *Company information
 - *IAQ House Map
 - *Sales Checklists
 - *IAQ Fact Sheets
 - Model Home Displays:
 - *Benefit Labels
 - *Tag Line Labels
- Link to EPA Website:



Making Quality Visible, cont'd!



- What's your story?
 - "Our Homes are Healthier and Save Money!"
- How do you get prospects to listen to your story (or read it)?
 - 1. Commit to telling it!
 - 2. Listen to your customers
- How do you show the invisible stuff?
- 1. KISSes (Use a credible label), and
 - 2. "Eye Candy" (Benefits Labels) A few examples ...

Making it Visible: VENTILATION messaging



Involvement Questions:

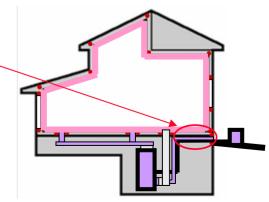
- "Does your house ever feel stuffy?"
- "Did you realize that typical home HVAC systems don't include Fresh Air Ventilation?"

How to Demonstrate Value:

- "All our homes are equipped with high efficiency whole-house fresh air ventilation."
- "Plus we include over a dozen." advanced heating and cooling system features to improve comfort and system effectiveness."
- Leave a features comparison checklist.
- Benefits label(s) in utility room.







Making it Visible: GARAGE ISOLATION messaging



Involvement Questions:

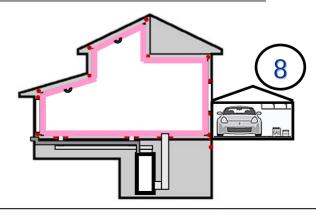
- "Ever had garage smells in your house (car exhaust, paint, pesticides)?"
- "That's because toxic chemicals, including Carbon Monoxide from car exhaust, can leak into typical houses, because of ineffective air sealing."

How to Demonstrate Value:

- "We take extra precautions to protect your family from garage pollutants, with air sealing and an EPA recommended exhaust fan."
- Leave a features comparison checklist.
- Benefits label near garage.







We're Looking for a Few Good Builders





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