

# Case Studies in Building Healthier Homes with EPA's Indoor airPLUS

VERSION 1 (REV. 02)



## 2014 EEBA Conference

-Visit [booth 11](#) for more info

September 24, 2014



Indoor Air Quality (IAQ)

# Contents



- **Indoor airPLUS in Context**
- **Building and Selling Indoor airPLUS**
  - The How's and Why's of indoor air quality
  - The importance of HVAC design & installation
- **Indoor airPLUS regional successes**
  - St. Louis
  - Metro DC
- **Recent Awards**
- **New Resources for Builders & Raters**



Indoor Air Quality (IAQ)



# Indoor airPLUS Background



Indoor Air Quality (IAQ)

# ENERGY STAR + Indoor airPLUS



**Indoor airPLUS** is an EPA label that adds health protections to your **ENERGY STAR** value proposition



Indoor Air Quality (IAQ)

# Grow Your Market

What more can I bring to the builder and consumer?

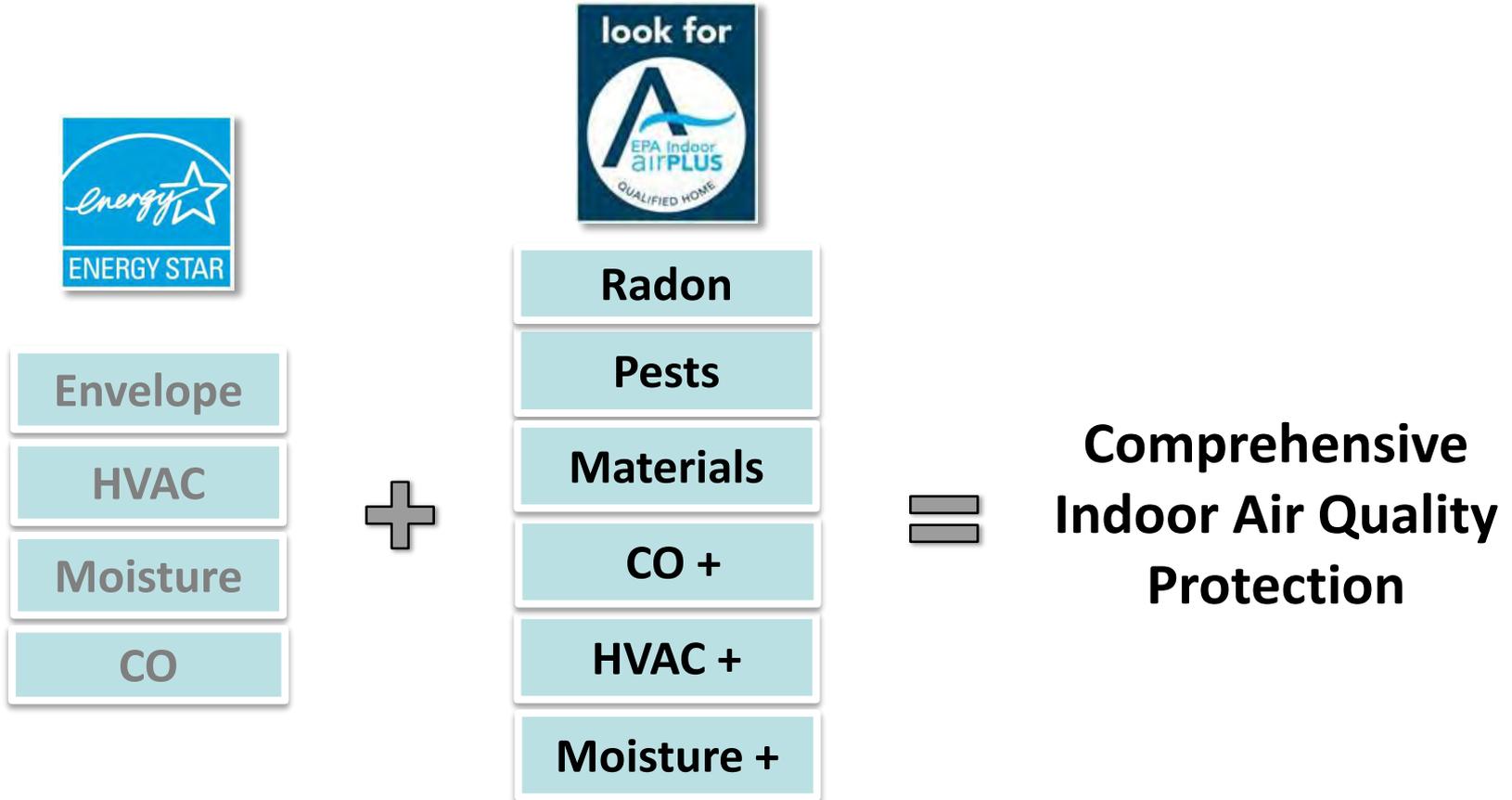


**More than 25 million people, including 7.1 million children, have asthma and there is a 20-50% increased risk of asthma in damp houses.**



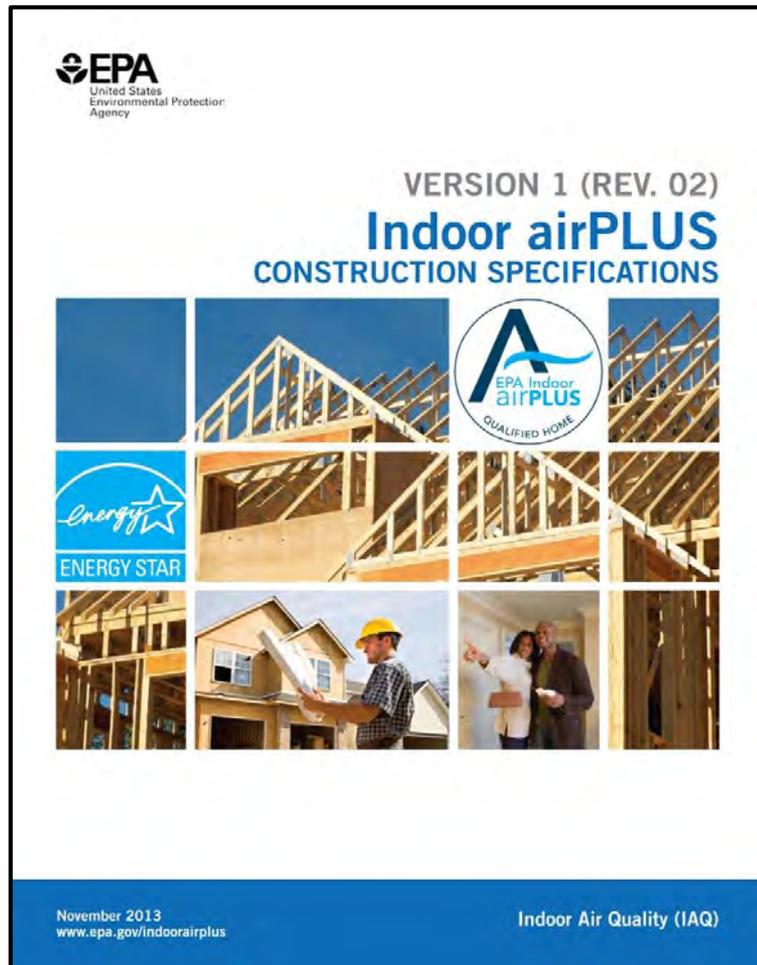
Indoor Air Quality (IAQ)

# ENERGY STAR + Indoor airPLUS



Indoor Air Quality (IAQ)

# Revision 2



- Released November 2013
- Revised requirements for attached garages (garage fan no longer required for most homes)
- New exception from aggregate or sand requirement for slab-on-grade foundations (non-Radon Zone 1 homes only)



Indoor Air Quality (IAQ)

# How to use the Construction Specifications

- **Relevant ENERGY STAR checklist items are summarized and referenced at the beginning of each measure.**
- **Additional Indoor airPLUS requirements are listed separately. These include:**
  - Items that provide additional indoor air quality protections.
  - Requirements that exclude an ENERGY STAR exception.

## 1. Moisture Control

### 1.1 Site and Foundation Drainage

*NOTE: Completion of the [ENERGY STAR checklists](#) now satisfies the following Indoor airPLUS requirements:*

- *Slope patio slabs, walks and driveway; tamp back-fill to prevent settling; AND slope the final grade away from the foundation (WMS 1.1 and 1.2).*
- *Swales or drains designed to carry water away from the foundation are permitted to be provided as an alternative to the slope requirements for any home, and shall be provided for a home where setbacks limit space to less than 10 ft. (WMS 1.1 and 1.2).*
- *Install protected drain tile at the footings of basement and crawlspace walls. Surround each drain tile pipe with washed or clean gravel wrapped with fabric cloth, or install an approved Composite Foundation Drainage System (CFDS) (WMS 1.8).*

#### **Additional Indoor airPLUS Requirements:**

- Install a drain or sump pump in basement and crawlspace floors, discharging to daylight at least 10 ft. outside the foundation or into an approved sewer system.
- **Exceptions:**
  - Slab-on-grade foundations.
  - In areas of free-draining soils — identified as Group 1 (Table R405.1, 2009 IRC) by a certified hydrologist, soil scientist, or engineer through a site visit — installation of a drain or sump pump is not required.
- In EPA Radon Zone 1, if a drain tile discharges to daylight install a check valve at the drain tile outfall (see Specification 2.1).

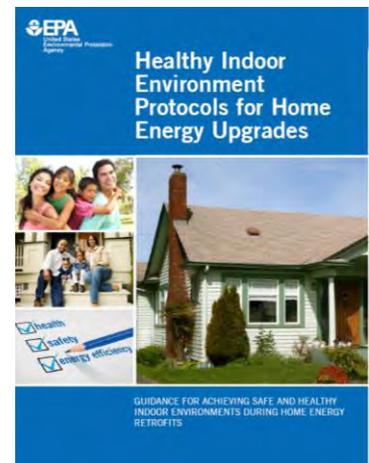


Indoor Air Quality (IAQ)

# What About Existing Homes?

- Indoor airPLUS is not designed for existing homes.
- Under certain conditions, (e.g., gut rehabs) if ENERGY STAR requirements and Indoor airPLUS requirements are met.
- For most renovation and energy upgrade work, see EPA's Healthy Indoor Environment Protocols for Home Energy Upgrades.

<http://www.epa.gov/iaq/homes/retrofits.html>



Indoor Air Quality (IAQ)

# What does Indoor airPLUS cost?

- No fee to participate in the EPA program.
- Raters may charge a verification fee.
- Cost of additional Indoor airPLUS features will vary based on:
  - Local code requirements and typical building practices
  - Climate Zone (e.g., moist versus dry)
  - Radon Zone
  - Availability of suppliers and cost of materials
  - Type of construction (e.g., below grade foundation or slab on grade)
- Cost of additional features could be a few hundred dollars in dry, non-Radon Zone 1 areas or up to a few thousand dollars in moist climates in Radon Zone 1.



Indoor Air Quality (IAQ)



# Building and Selling Indoor airPLUS

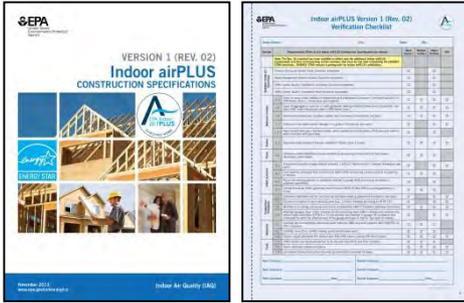
**The How's and Why's of indoor air quality for  
the builder and consumer**



Indoor Air Quality (IAQ)

# Indoor airPLUS

<http://www.youtube.com/watch?v=vKME1djdIUA>



Moisture Control

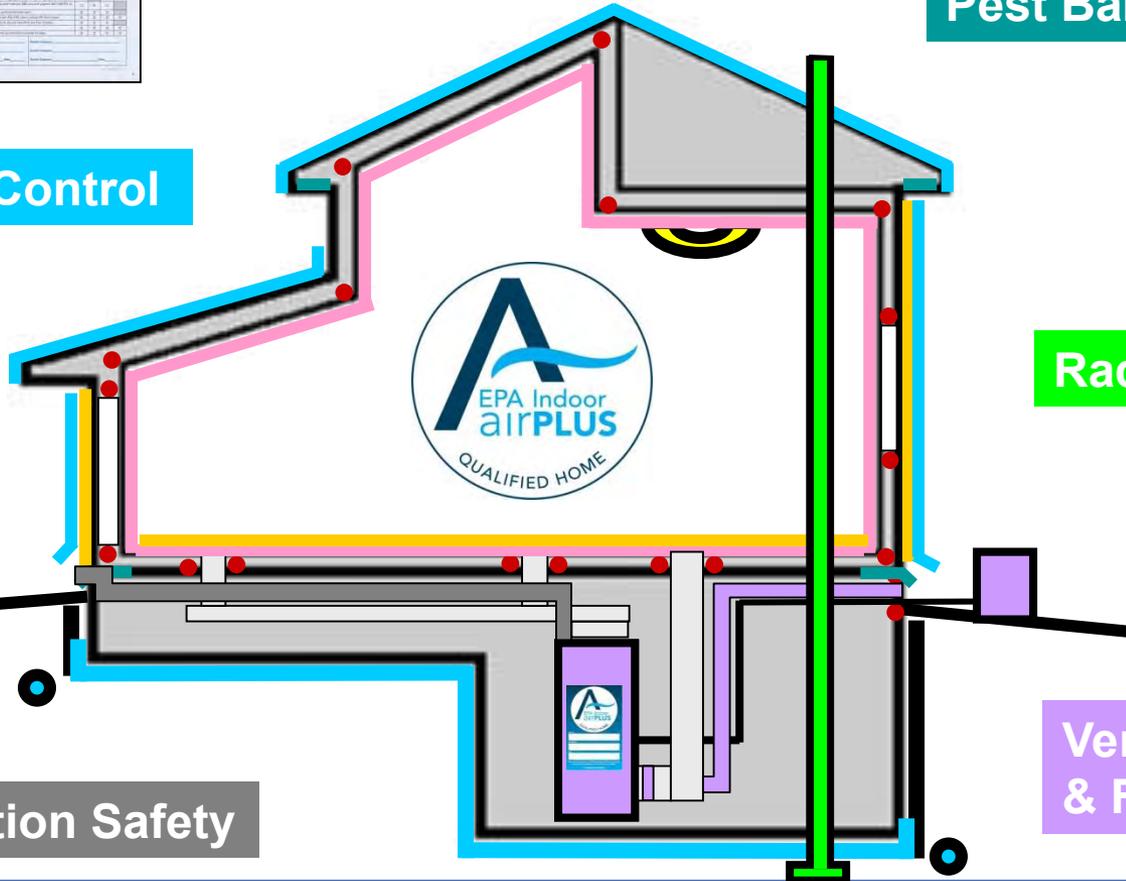
Pest Barriers

Materials

Radon Control

Combustion Safety

Ventilation & Filtration



Indoor Air Quality (IAQ)

# 1. Moisture Control



- Moisture is a leading cause of health, comfort and durability concerns in homes.
- 19% of U.S. households have at least one person with Asthma.
- There is a 20-50% increased risk of asthma in damp houses.
- The economic cost of asthma amounts to more than \$56 billion annually.
- Mold grows where there is moisture.
- Molds produce allergens, irritants, and in some cases, potentially toxic substances.



Indoor Air Quality (IAQ)

# 1.1 Site and Foundation Drainage



- *Slope hard surfaces and final grade away from the foundation.*
- *Install drain tile at the footings of basement and crawlspace walls.*



- **Install a drain or sump in basement and crawlspace floors.**



*\*Exceptions: Slab-on-grade and areas with free draining soils*



# 1.2 Capillary Break Installation



- *Install polyethylene sheeting or extruded polystyrene beneath concrete slabs.*
- *Install a capillary break at all crawlspace floors using polyethylene sheeting.*



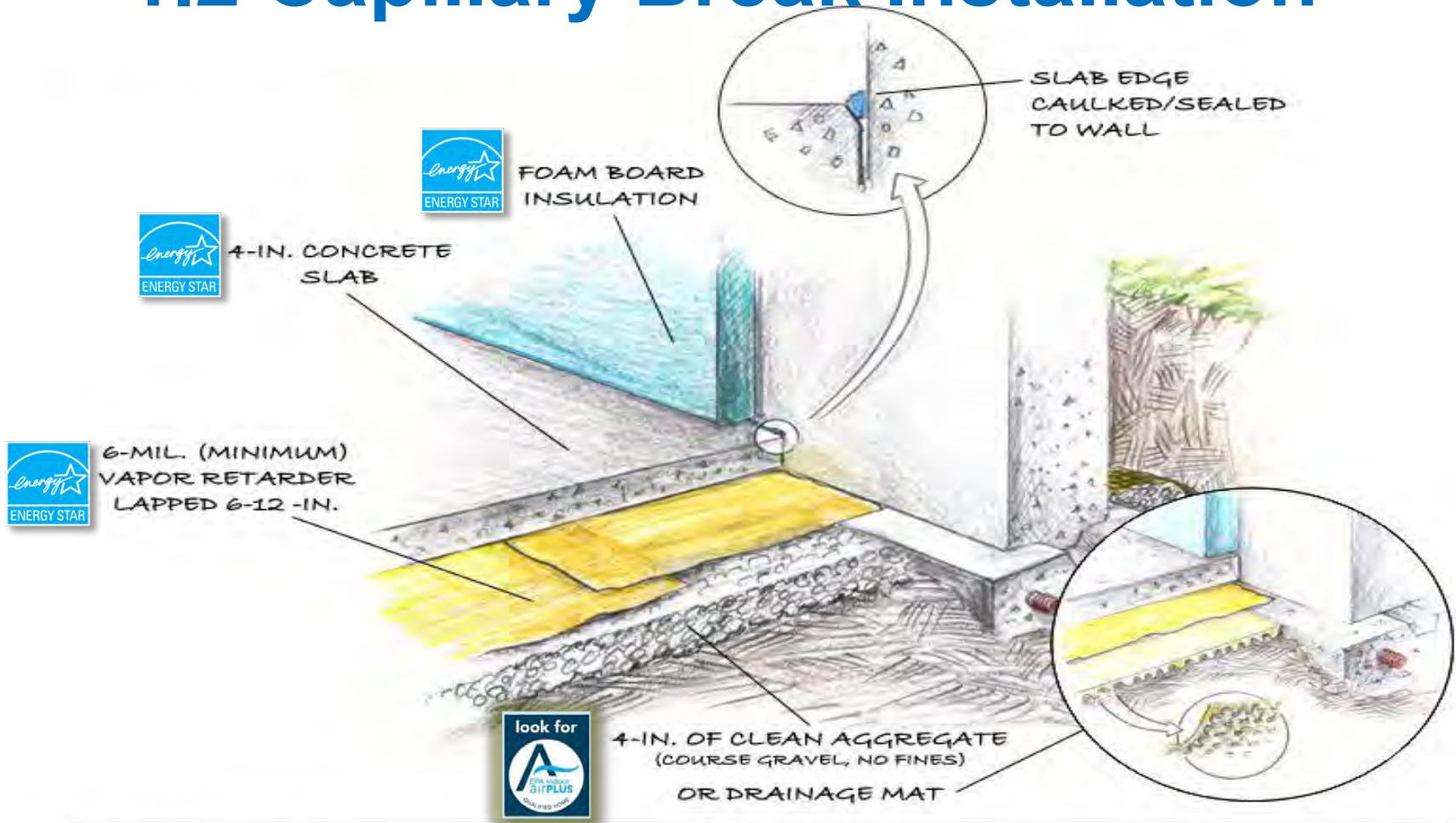
- **Under the polyethylene sheeting or extruded polystyrene (XPS) insulation:**
  - **Install a 4 in. layer of aggregate; OR**
  - **A uniform layer of sand, overlain with a layer of geotextile drainage matting.**

*Exceptions: Slab-on-grade foundations,  
certified free-draining soils and dry climates  
(only in Radon zones 2 & 3)*



Indoor Air Quality (IAQ)

# 1.2 Capillary Break Installation



BASEMENT SLAB W/ CAPILLARY BREAK - GRAVEL AND GEOTEXTILE MAT (INSET)



Indoor Air Quality (IAQ)

# 1.3+1.4 Below-grade Foundation Walls



- *Waterproof crawlspace and basement perimeter walls.*
- *All floors above unconditioned spaces shall be insulated.*



- **Insulate crawlspace and basement perimeter walls.**
- **Seal crawlspace and basement perimeter walls.**
- **Provide conditioned air (1cfm/50SF).**

*Exceptions: Dry climates, raised pier foundations, etc. (see spec)*



Indoor Air Quality (IAQ)

# 1.5 – 1.7 Wall Drainage System



- *Install a drainage plane behind exterior wall cladding.*
- *Install flashing at the bottom of exterior walls.*
- *Fully flash all window and door openings.*
- *Direct roof water away from the house using gutters or an underground catchment system.*



- **For homes that meet ENERGY STAR exceptions for gutters and downspouts, provide protection for water splash damage by one of the following**
  - **Extend the foundation walls 16 in. above grade.**
  - **Provide a drip line that is 16 in. from the foundation.**
  - **Install cladding that can tolerate wetting and a drainage plane that extends 16 in. above grade.**

**Builder:**

**“Can you use gutters?”**



**Indoor Air Quality (IAQ)**

# 1.11 Moisture-Resistant Materials



- *Install moisture-resistant backing material behind tub and shower enclosures.*
- *Install a corrosion-resistant drain pan.*



- **Install only water-resistant hard-surface flooring in kitchens, bathrooms, entryways, laundry areas, and utility rooms.**
- **Insulate water supply pipes in exterior walls with pipe wrap.**



# What does the Sales Team need to Know about Moisture Control & Water Management?



## Benefits

**Water damage reduction**

**Flood mitigation**

**Structural durability**

**Reduces potential for mold growth  
– even in places you can't see.**

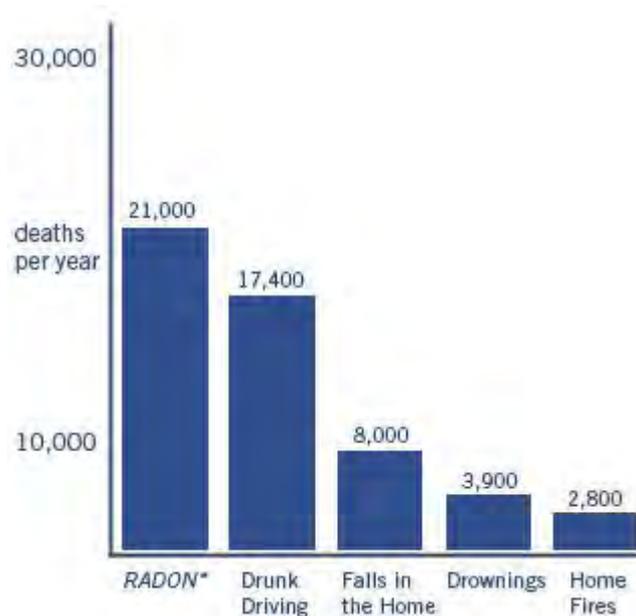
**Fewer maintenance issues from  
peeling paint and moldy grout**



**Indoor Air Quality (IAQ)**

## 2. Radon

**SURGEON GENERAL'S  
WARNING:**  
Radon Causes Lung Cancer.  
You Should Test Your Home.



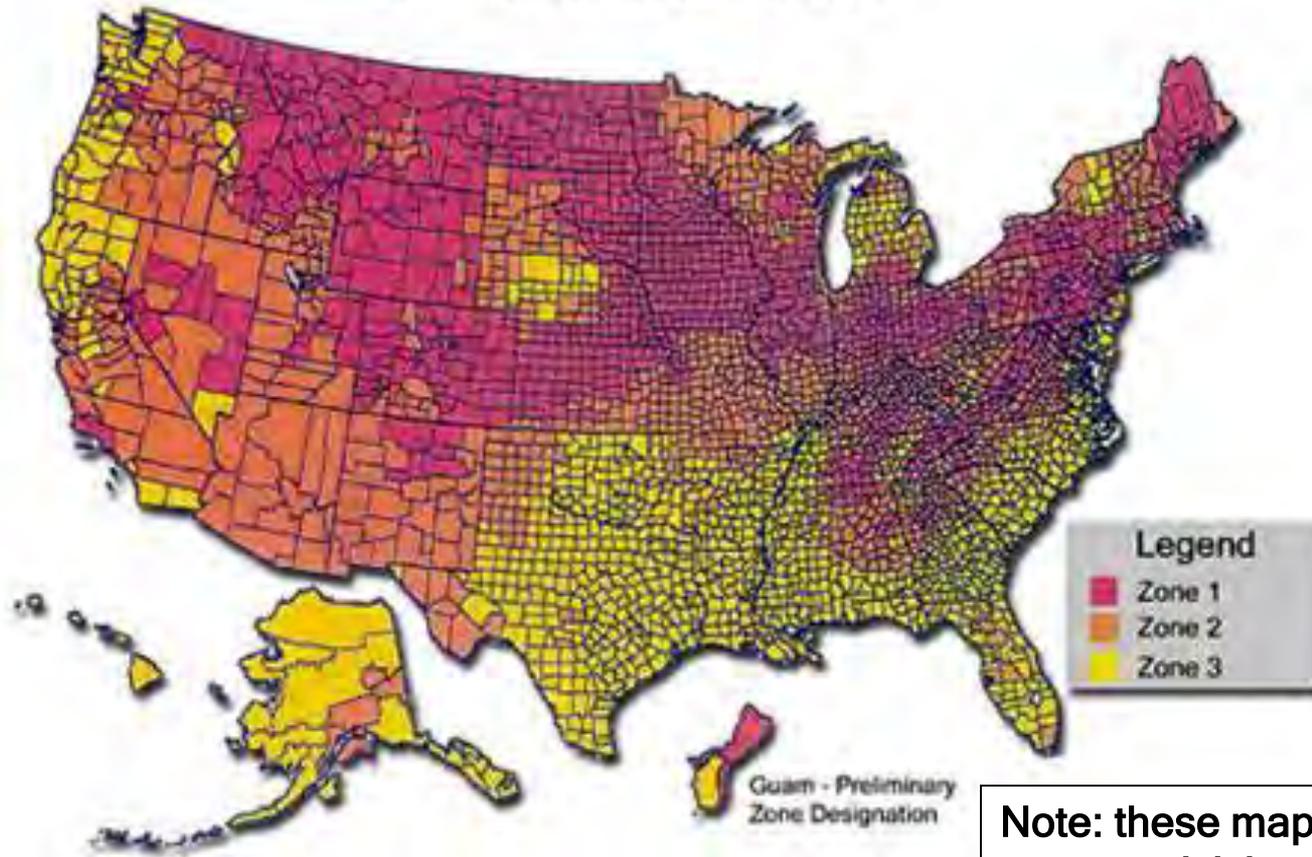
- Radon is a cancer-causing, radioactive gas created by the natural breakdown of uranium in soil.
- Radon can be found all over the US.
- 1 in 15 homes have radon above 4 pCi/L.
- You are most likely to get your greatest exposure to radon at home.
- Radon is the second leading cause of lung cancer after smoking.



Indoor Air Quality (IAQ)

# 2.1 Radon Control

EPA Map of Radon Zones



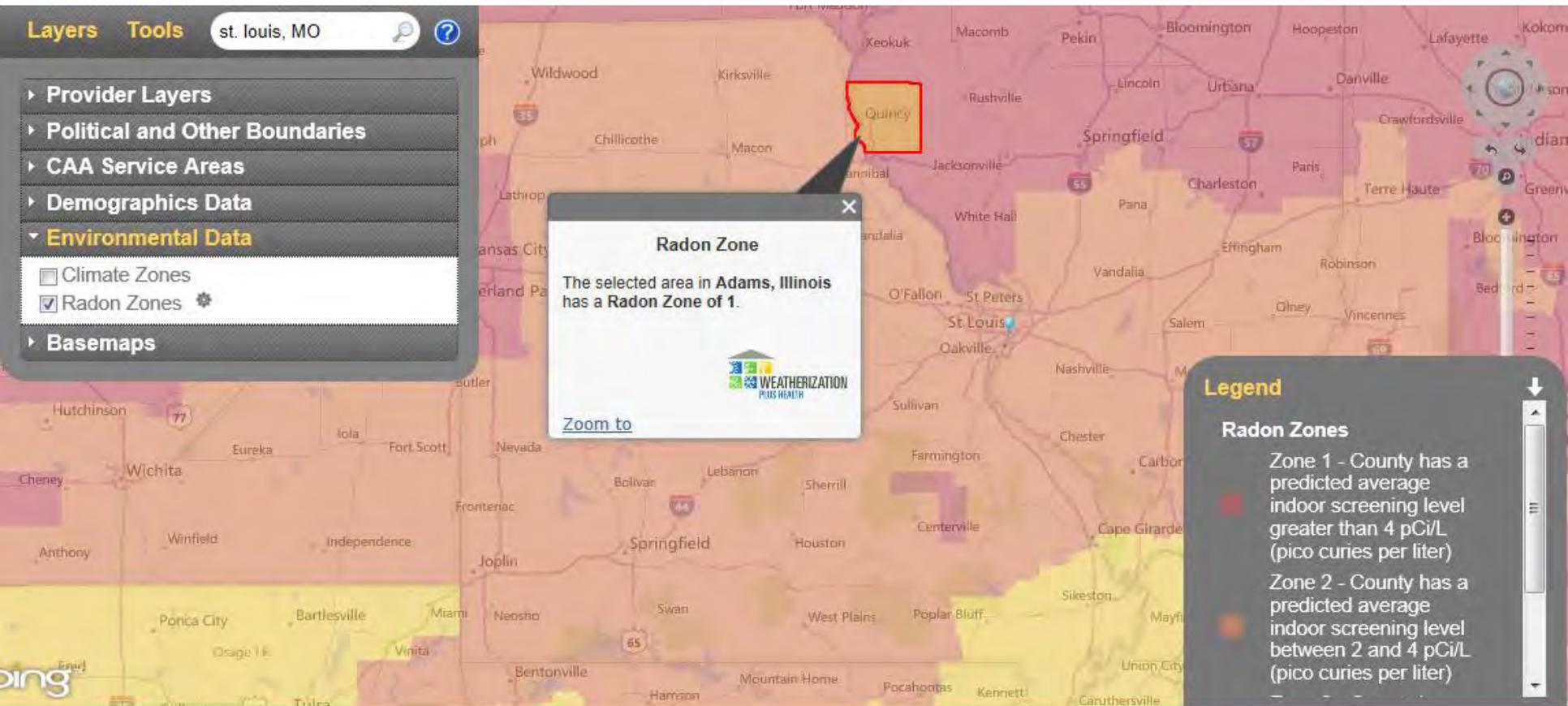
For an easy-to-use map, see:  
<http://www.wxplushealth.org/geoexplorer>

Note: these maps indicate average risk by county. However, high levels of radon can be found in any home.



Indoor Air Quality (IAQ)

# Radon Zones around St. Louis



## Weatherization Plus Health GeoExplorer

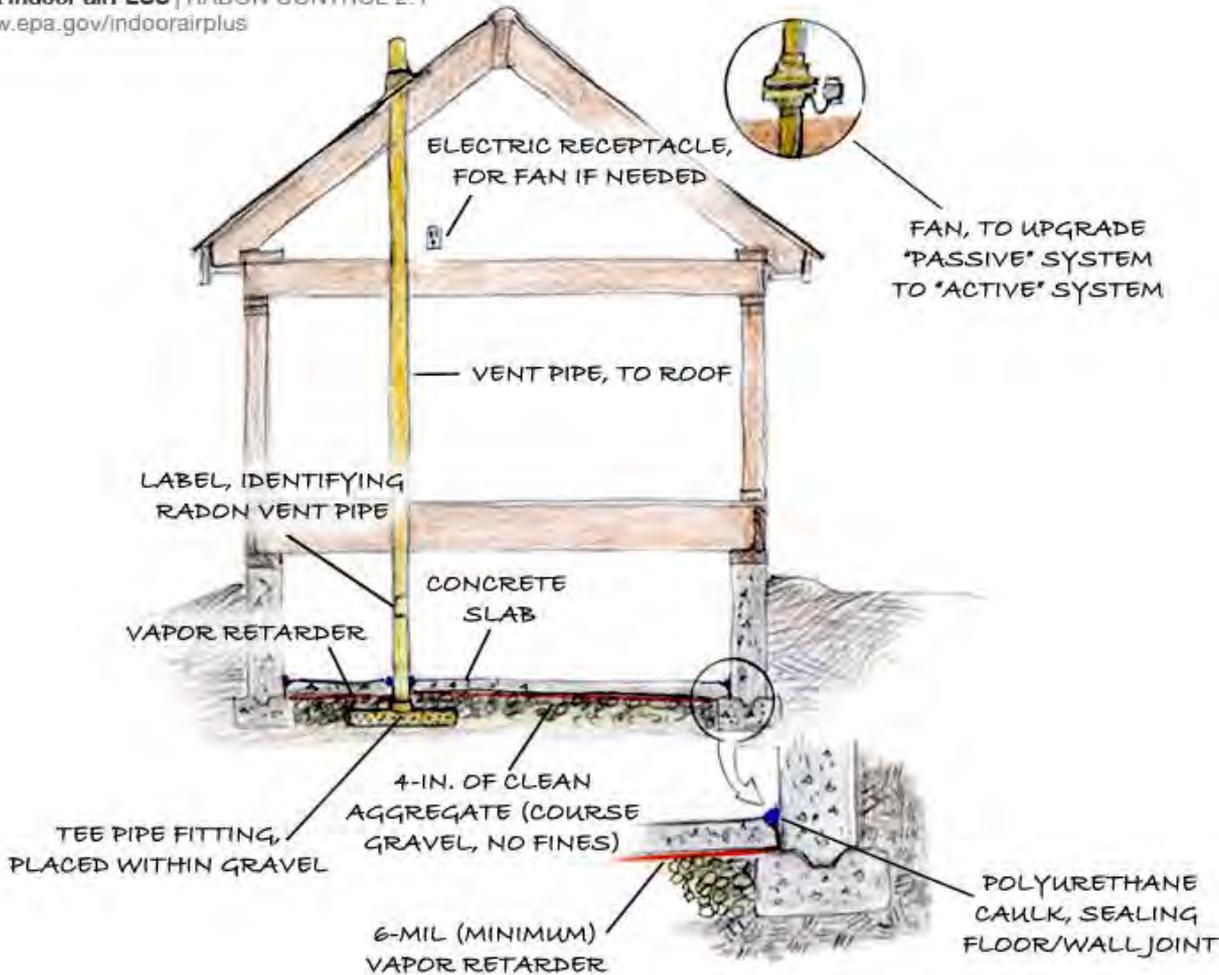
For an easy-to-use map, see:  
<http://www.wxplushealth.org/geoexplorer>



Indoor Air Quality (IAQ)

# 2.1 Radon Control

EPA Indoor airPLUS | RADON CONTROL 2.1  
www.epa.gov/indoorairplus



*Note: These techniques are only required in Radon Zone 1.*

See “*Building Radon Out: A Step-by-Step Guide on How to Build Radon-Resistant Homes*” at <http://www.epa.gov/radon/pubs/>



Indoor Air Quality (IAQ)

# 2.1 Radon Resistant Construction Verification

- Can be builder or Rater verified.
- **Verify documentation before the start of construction** of an approved radon mitigation system.
- The aggregate layer, connected to a vent pipe under overlapped polyethylene sheeting, should be **visually verified before pouring the slab.**
- The fully connected vent pipe, fan/electrical receptacle, and foundation air sealing should be **visually verified at pre-drywall inspection.**

Section	Requirements (Refer to full Indoor <u>airPLUS</u> Construction Specifications for details)	Must Correct	Builder Verified	Rater Verified	N/A
Radon	2.1 Approved radon-resistant features installed in Radon Zone 1 homes.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Indoor Air Quality (IAQ)

# What does the Sales Team need to Know about Radon Control?

## Homeowner Benefits



Protection against radon, the second leading cause of lung cancer in the U.S.

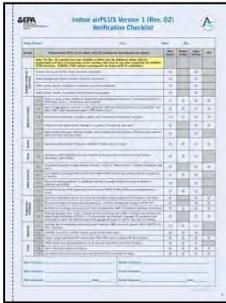
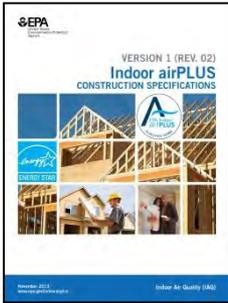


**SURGEON GENERAL'S  
WARNING:  
Radon Causes Lung Cancer.**

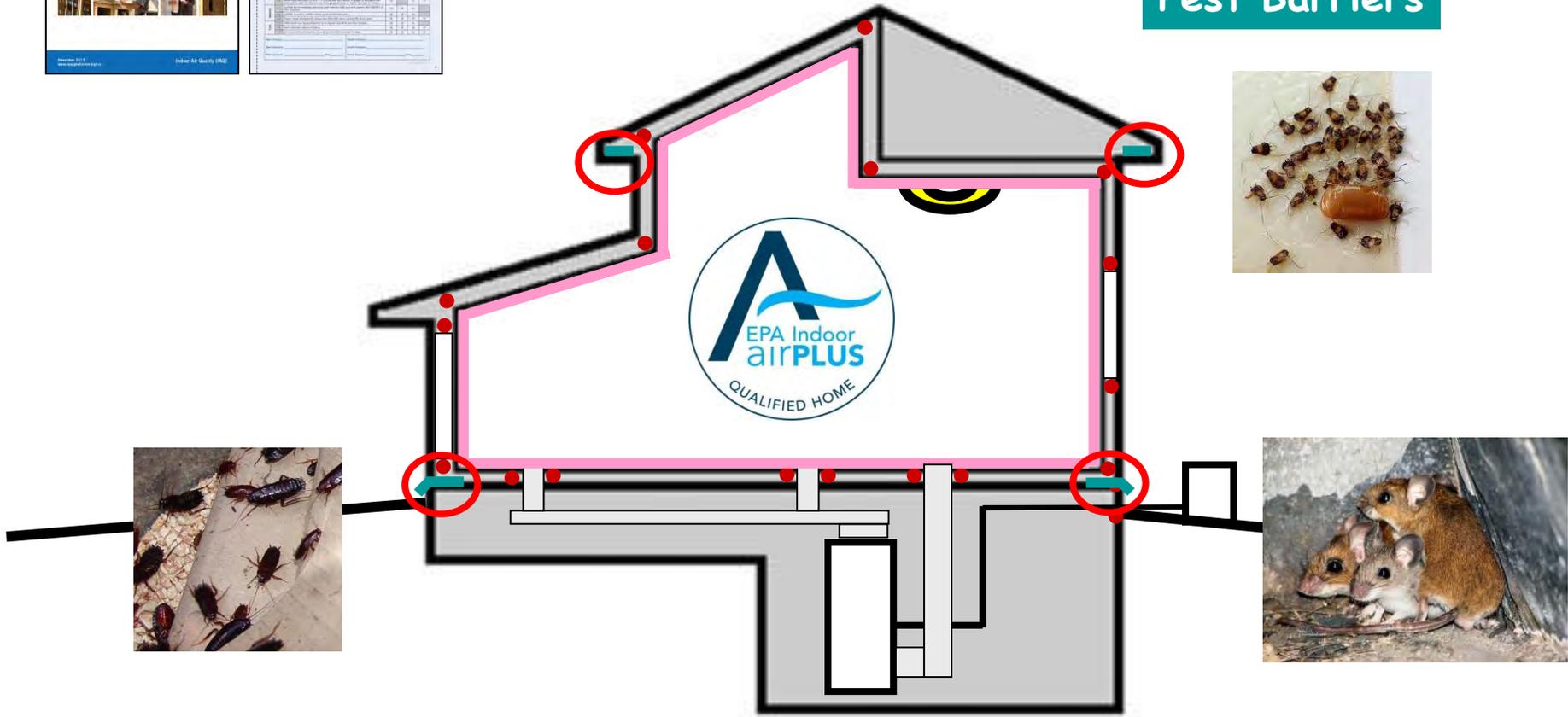


Indoor Air Quality (IAQ)

# 3. Pest Barriers



Pest Barriers



Indoor Air Quality (IAQ)

## 3.2 Rodent/Bird Screens



- Provide corrosion-proof rodent/bird screens for all openings that cannot be sealed or caulked.

*Note: Does not apply to dryer vents*



# What does the Sales Team need to know about Pest Barriers?

## Homeowner Benefits

Prevention of potential damage  
from pests

Less vacuuming and dusting

Reduced pest-related allergens,  
asthma triggers and diseases



Indoor Air Quality (IAQ)

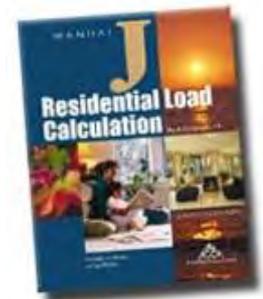
# 4.1 HVAC Sizing and Design



- *Properly size all heating and cooling equipment using ACCA Manual J, ASHRAE Handbooks, or equivalent software.*



- **"Warm-Humid" climates: equipment shall be installed with sufficient latent capacity to maintain indoor relative humidity (RH) at or below 60 percent.**



# 4.1 HVAC Sizing and Design



Location	Elevation Feet	Latitude Degrees North	Winter	Summer					
			Heating 99% Dry Bulb	Cooling 1% Dry Bulb	Coincide nt Wet Bulb	Design Grains 55% RH	Design Grains 50% RH	Design Grains 45% RH	Daily Range (DR)
Montpelier/Barre	1165	44	-6	83	68	8	15	21	M
Rutland	787	43	-8	84	70	18	25	31	M
<b>Virginia</b>									
Charlottesville	870	38	18	91	74	30	37	43	M
Danville AP	572	36	16	92	73	22	29	35	M
Fort Belvoir	69	38	18	93	76	39	46	52	M
Fredricksburg	85	38	14	93	75	33	40	46	M
Hampton, Langley AFB	10	37	24	91	77	49	56	62	M
Harrisonburg	1201	38	16	91	72	18	25	31	M
Lynchburg AP	916	37	17	90	74	31	38	44	M
Newport News	41	37	22	92	77	47	54	60	M
Norfolk AP	22	36	24	91	76	42	49	55	M
Oceana NAS	22	36	25	91	76	42	49	55	M
Petersburg	193	37	17	92	76	41	48	54	M
Quantico MCAS	12	38	21	92	76	41	48	54	M
Richmond AP	164	37	18	92	75	34	41	47	M
Roanoke AP	1193	37	17	89	72	21	28	34	M
Staunton	1201	38	16	91	72	18	25	31	M
Sterling	322	38	14	90	74	31	38	44	M
Washington, National AP	66	38	20	92	76	41	48	54	M
Winchester	727	39	10	90	74	31	38	44	M



Indoor Air Quality (IAQ)

# 4.1 HVAC Sizing and Design

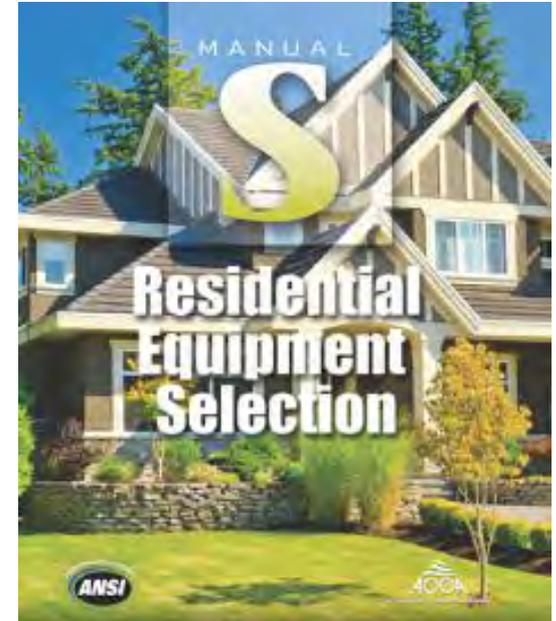
- Heating and cooling equipment generally has just two modes – on & off.
- Right sizing is key in controlling RH with HVAC systems
- The HVAC system must operate to remove moisture !



Indoor Air Quality (IAQ)

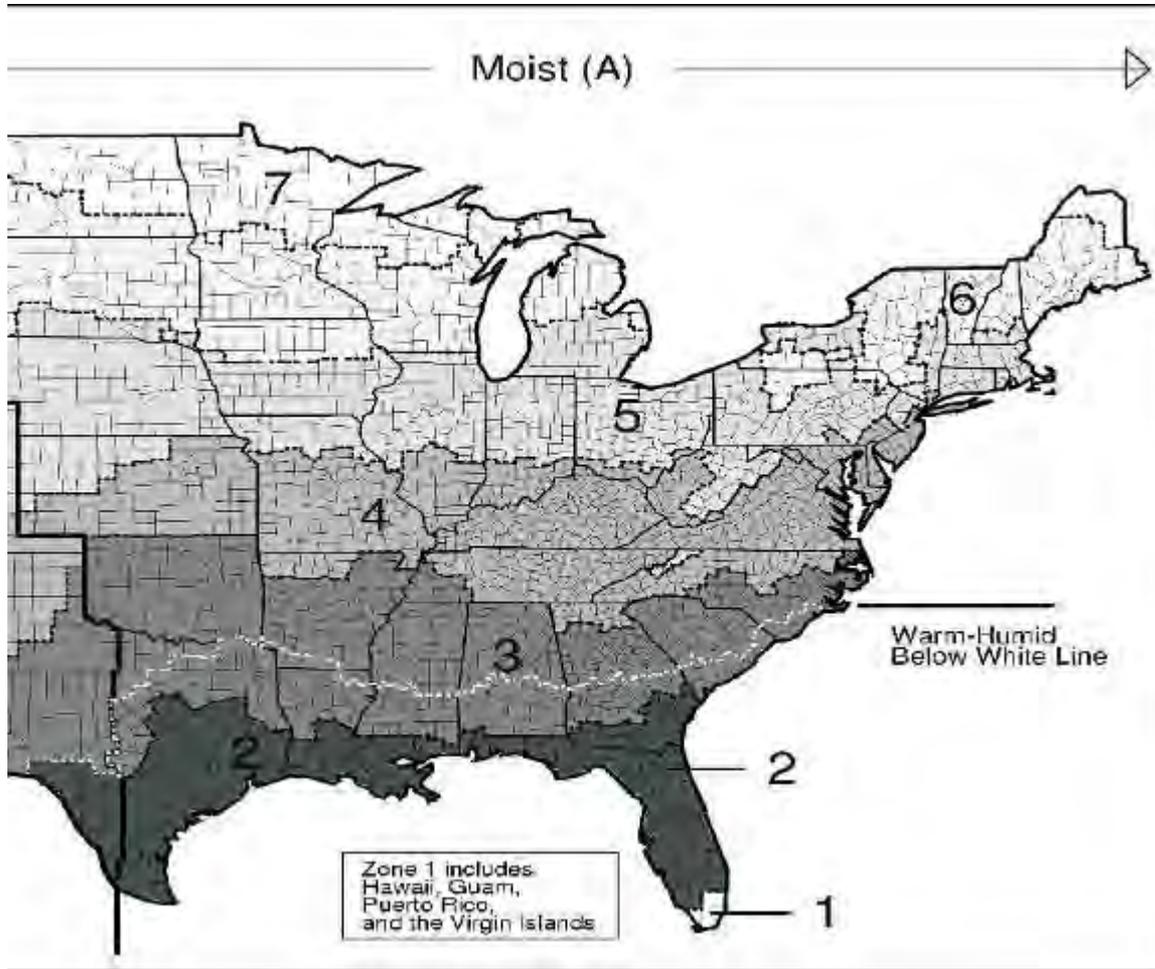
# 4.1 HVAC Sizing and Design

- **By following the procedures in Manual S for selecting HVAC systems you can ensure the HVAC system selected can cover the Latent (Moisture) load of the home.**
- **HVAC systems have a broad range of capabilities depending on fan speeds and controls.**
- **A humidistat may be used in some systems to achieve additional dehumidification.**
- **In some extreme cases a separate dehumidifier may be required to supplement moisture removal.**



Indoor Air Quality (IAQ)

# 4.1 HVAC Sizing and Design



Controlled to  $\leq 60\%$  RH

For IECC climate zone map, visit [www.iccsafe.org](http://www.iccsafe.org)



Indoor Air Quality (IAQ)

# 4.1 HVAC Sizing and Design

14ACX-036-230-13 - C33-36B/C-6F + EL296UH045V36B

Entering Wet Bulb Temperature	Total Air Volume	Outdoor Air Temperature Entering Outdoor Coil																			
		85°F					95°F					105°F					115°F				
		Total Cool Cap.	Comp Motor Input	Sensible to Total Ratio (S/T)			Total Cool Cap.	Comp Motor Input	Sensible to Total Ratio (S/T)			Total Cool Cap.	Comp Motor Input	Sensible to Total Ratio (S/T)			Total Cool Cap.	Comp Motor Input	Sensible to Total Ratio (S/T)		
				Dry Bulb					Dry Bulb					Dry Bulb					Dry Bulb		
cfm	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	kBtuh	kW	75°F	80°F	85°F	
63°F	1020	33.6	1.95	0.77	0.92	1	32	2.21	0.79	0.94	1	30.2	2.51	0.81	0.97	1	28.4	2.84	0.84	0.99	1
	1210	34.8	1.85	0.81	0.97	1	33.2	2.22	0.83	0.98	1	31.4	2.52	0.85	1	1	29.8	2.85	0.89	1	1
	1370	35.6	1.96	0.85	1	1	34	2.23	0.87	1	1	32.8	2.53	0.9	1	1	30.8	2.85	0.93	1	1
67°F	1020	35.2	1.96	0.61	0.75	0.88	33.6	2.22	0.62	0.77	0.91	31.8	2.52	0.64	0.79	0.93	30	2.85	0.65	0.81	0.96
	1210	36.6	1.97	0.64	0.79	0.94	34.8	2.23	0.65	0.81	0.96	33	2.53	0.67	0.83	0.99	31	2.85	0.68	0.86	1
	1370	37.4	1.97	0.66	0.83	0.98	35.6	2.24	0.68	0.85	1	33.6	2.54	0.69	0.88	1	31.6	2.87	0.71	0.91	1
71°F	1020	36.8	1.97	0.47	0.6	0.73	35.2	2.24	0.47	0.61	0.74	33.4	2.53	0.48	0.62	0.76	31.6	2.86	0.48	0.64	0.79
	1210	38	1.98	0.48	0.63	0.77	36.4	2.24	0.49	0.64	0.79	34.6	2.55	0.49	0.65	0.81	32.6	2.87	0.5	0.67	0.84
	1370	39	1.98	0.49	0.65	0.8	37.4	2.25	0.5	0.67	0.83	35.4	2.55	0.51	0.68	0.85	33.2	2.88	0.52	0.7	0.88

- Total Design Capacity = **33.2 kBTU/h**
- Sensible Design Capacity =  $33.2 \times 0.83 = 27.6 \text{ kBTU/h}$
- Latent Design Capacity =  $33.2 - 27.6 = 5.6 \text{ kBTU/h}$



Indoor Air Quality (IAQ)

# 4.1 HVAC Sizing and Design Verification

- Must be Rater verified.
- Rater should **verify documentation before the start of construction** showing the method and calculations for retaining an indoor relative humidity below 60 percent.
- Rater should **visually verify at final inspection** that the designed system has been properly installed.

Section	Requirements (Refer to full Indoor <u>airPLUS</u> Construction Specifications for details)	Must Correct	Builder Verified	Rater Verified	N/A
HVAC Systems	4.1 Equipment selected to keep relative humidity < 60% in “Warm-Humid” climates (Exception: see spec).	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	4.2 Duct systems protected from construction debris AND no building cavities used as air supplies or returns.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	4.3 No air-handling equipment or ductwork installed in garage AND continuous air barrier in adjacent assemblies.	<input type="checkbox"/>		<input type="checkbox"/>	
	4.7 Central forced-air HVAC system(s) have minimum MERV 8 filter AND no ozone generators in home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



Indoor Air Quality (IAQ)

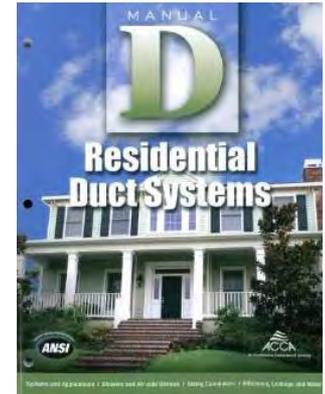
# 4.2 Duct System Design and Installation



- *Design all duct systems according to ACCA Manual D, ASHRAE Handbooks, or equivalent software.*
- *Ensure that all duct systems are airtight and properly balanced.*



- **Do not use building cavities as part of the forced air supply or return systems.**
- **Cover duct openings throughout construction or vacuum out ducts prior to installing registers.**



# 4.2 Duct System Design and Installation

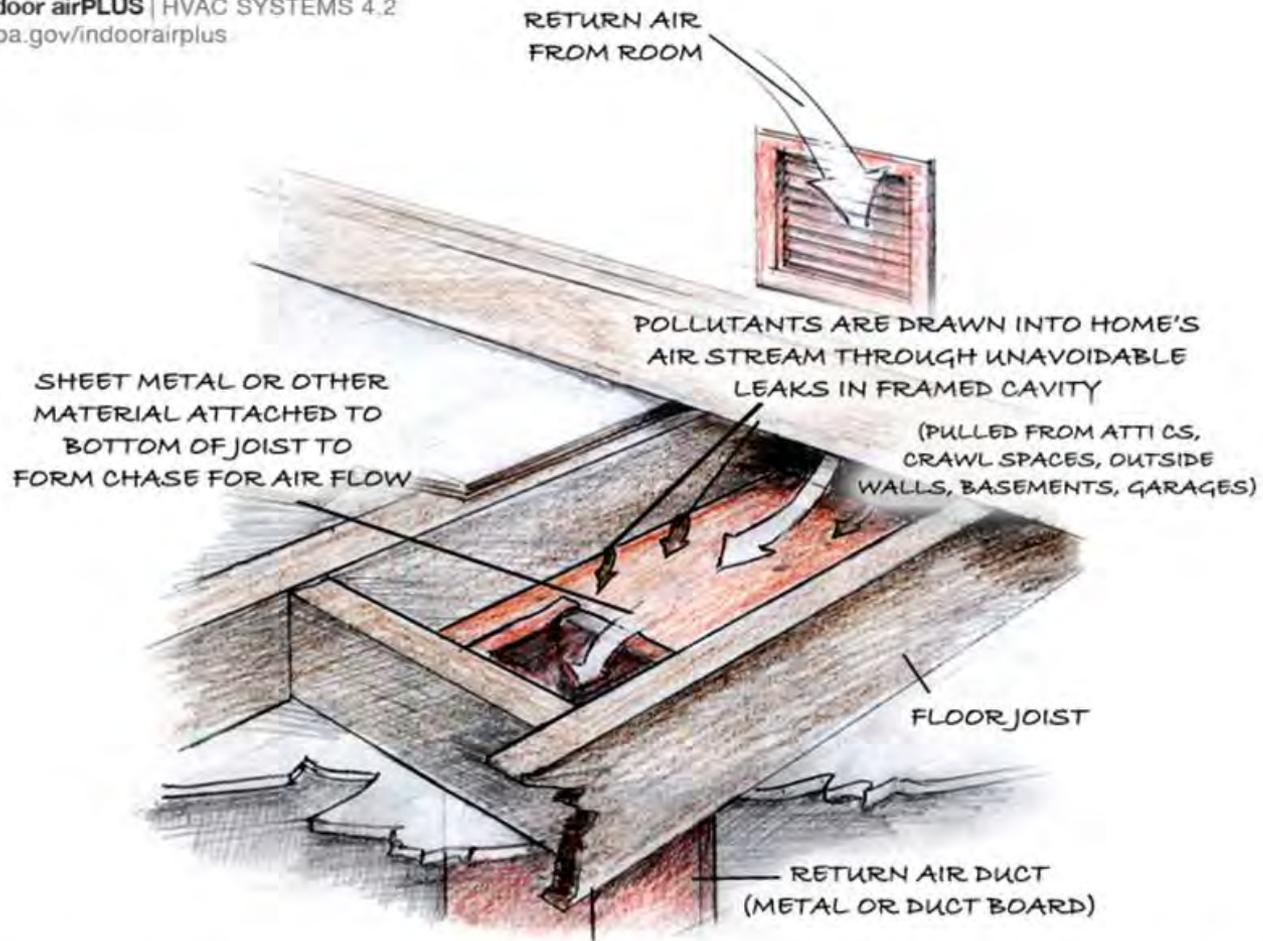


**COVERING DUCT OPENINGS DURING CONSTRUCTION**



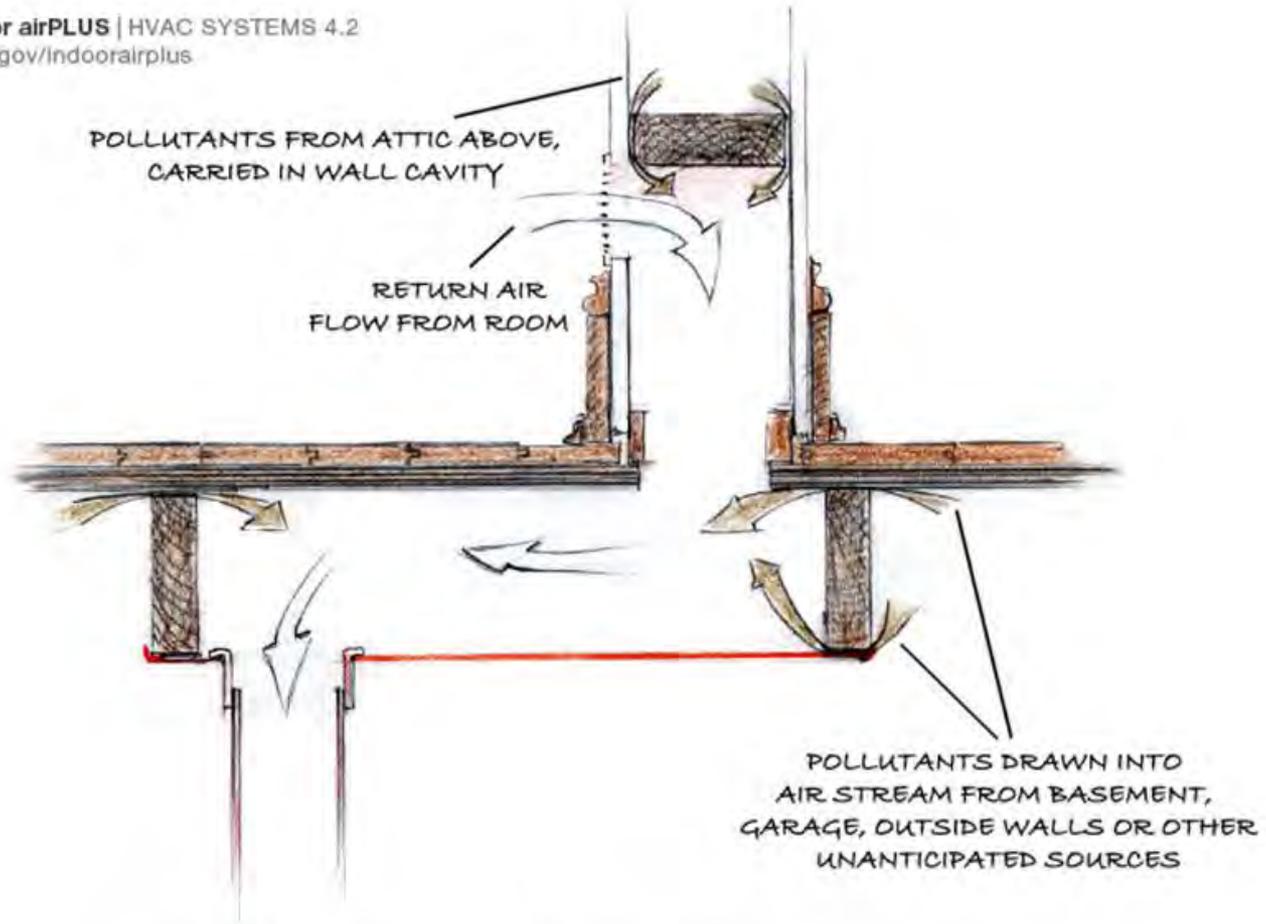
**SEALING WITH MASTIC**





**BUILDING CAVITIES (E.G., PANNED JOISTS) SHALL NOT BE USED AS FORCED-AIR SUPPLIES OR RETURNS (1 OF 2)**





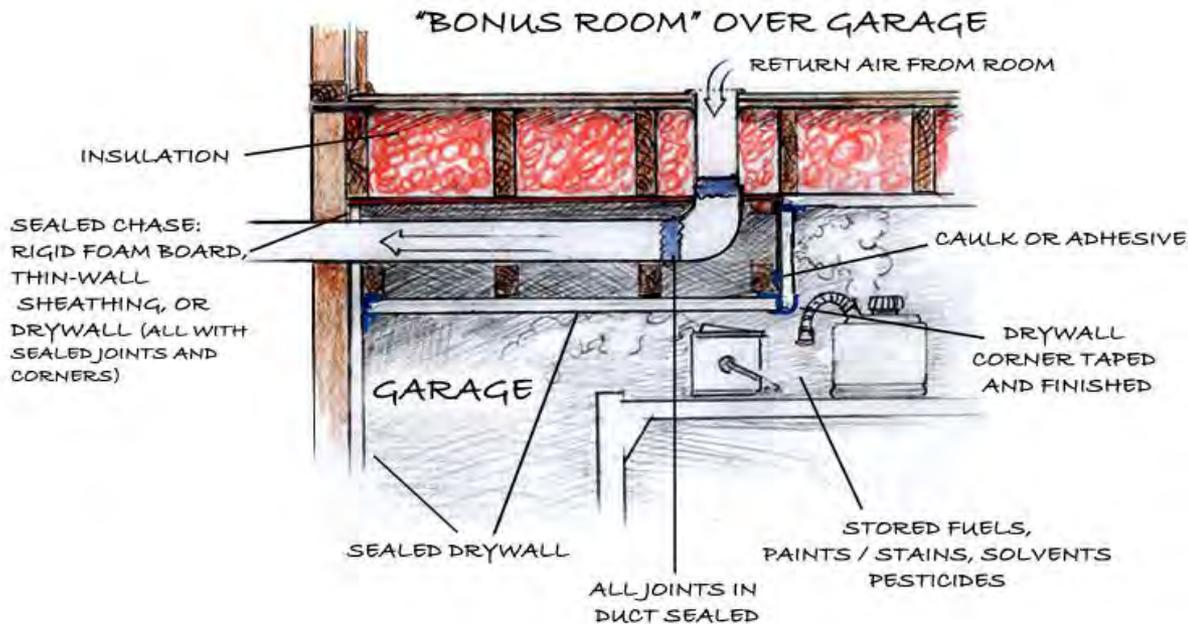
BUILDING CAVITIES (E.G., PANNED JOISTS)  
SHALL NOT BE USED AS FORCED AIR SUPPLIED OR RETURNS, 2/2



# 4.3 Location of Air Handler and Ducts



- Do not locate air-handling equipment or ductwork in garages.
- Note: Ducts may be located in building cavities adjacent to the garage if they are separated with a continuous air barrier.



## 4.5 Mechanical Whole-House Ventilation



- *Provide mechanical whole-house ventilation meeting ASHRAE 62.2-2010.*
- *Test airflows to ensure they meet ASHRAE 62.2-2010.*



- **Advisory: Outdoor air ducts connected to the return side of an air handler should be used as supply ventilation only if the manufacturers' requirements for return air temperature are met.**



# 4.5 Mechanical Whole-House Ventilation



**FRESH AIR DAMPER**



**DUCTED FRESH AIR SUPPLY**



# 4.7 Filtration



- *Equip all filter access panels with gasket material or comparable sealing mechanism to prevent bypass air.*



- **Install only HVAC filters that are rated MERV 8 or higher.**
- **Do not install any air-cleaning equipment designed to produce ozone.**



# 4.7 Filtration for Central Forced-Air HVAC Systems

- Filters come multiple sizes.
- Filters are typically 1", 2" or 4" in depth.
- In years past the primary purpose for filtration was to protect the HVAC system not IAQ.



Indoor Air Quality (IAQ)

# 4.7 Filtration for Central Forced-Air HVAC Systems

Typical Performance Data

- Filters have performance data that must be accounted for in the duct design.
- When selecting a filter try to find a filter that creates the least amount of resistance.
- There are multiple types of filter sizes and depths.
- Media filters have a much greater surface area and will cause less restriction.

Filter Depth	Nominal Size	Capacities (CFM)		Resistance (inches W.G.)			Pleats per Linear foot	Media Area (SQ. FT)
		Med	High	Med	High	Final		
1"	12x24	600	1000	.18	.36	1.0	14	4.7
	16x20	650	1100	.18	.36	1.0	14	5.3
	16x25	850	1350	.18	.36	1.0	14	6.6
	20x20	850	1350	.18	.36	1.0	14	6.7
	20x25	1050	1750	.18	.36	1.0	14	8.3
	24x24	1200	2000	.18	.36	1.0	14	9.3
2"	12x24	600	1000	.14	.26	1.0	10	6.7
	16x20	650	1100	.14	.26	1.0	10	7.8
	16x25	850	1350	.14	.26	1.0	10	9.7
	20x20	850	1350	.14	.26	1.0	10	9.4
	20x25	1050	1750	.14	.26	1.0	10	11.8
	24x24	1200	2000	.14	.26	1.0	10	13.3
4"	12x24	600	1000	.12	.22	1.0	11	14.7
	16x20	650	1100	.12	.22	1.0	11	16.7
	16x25	850	1350	.12	.22	1.0	11	20.8
	20x20	850	1350	.12	.22	1.0	11	21.1
	20x25	1050	1750	.12	.22	1.0	11	26.4
	24x24	1200	2000	.12	.22	1.0	11	29.3
	25x29	1500	2500	.12	.22	1.0	11	37.1



Indoor Air Quality (IAQ)

# What does the Sales Team need to know about HVAC Systems?



## Homeowner Benefits

**Reduced exposure to mold and mildew**

**Increased comfort**

**Helps remove allergens, toxins, irritants and asthma triggers from the home**

**House stays cleaner**



**Indoor Air Quality (IAQ)**

# 5. Combustion Pollutants



- Accidental carbon monoxide (CO) poisoning kills an average of 439 persons annually (CDC; MMWR; 12/21/2007).
- Carbon monoxide, an odorless, colorless gas, which can cause sudden illness and death, is produced any time a fossil fuel is burned.



Indoor Air Quality (IAQ)

# 5.1 Combustion Equipment



- *Mechanically draft or direct vent all gas- and oil-fired furnaces, boilers and water heaters.*
- *Fireplaces that are not mechanically drafted must meet exhaust flow or pressure differential.*



- **Do not install any unvented combustion space-heating appliances.**
- **Ensure naturally drafted fuel-burning appliances comply with ASHRAE 62.2 or conduct a Worst Case Depressurization Combustion Air Zone (CAZ) Test.**
- **Ensure that all fireplaces and other fuel-burning appliances are vented to the outdoors and supplied with ventilation air.**
- **Meet emissions standards and restrictions for all fuel-burning appliances located in conditioned spaces.**





# 5.2 Carbon Monoxide Alarms



- All homes with combustion appliance(s) or an attached garage shall have a carbon monoxide (CO) alarm installed in a central location in the immediate vicinity of each separate sleeping zone.



**CO ALARM**



**COMBINED CO & SMOKE ALARM**



# 5.3 Multi-family ETS Protections



- **Reduce exposure to environmental tobacco smoke (ETS) in multi-family buildings by:**
  - **Prohibiting smoking in indoor common areas.**
  - **Locating designated outdoor smoking areas.**
  - **Minimizing uncontrolled pathways for ETS transfer between individual dwelling units by sealing walls, ceilings, and floors of dwelling units.**



# 5.4 Attached Garages



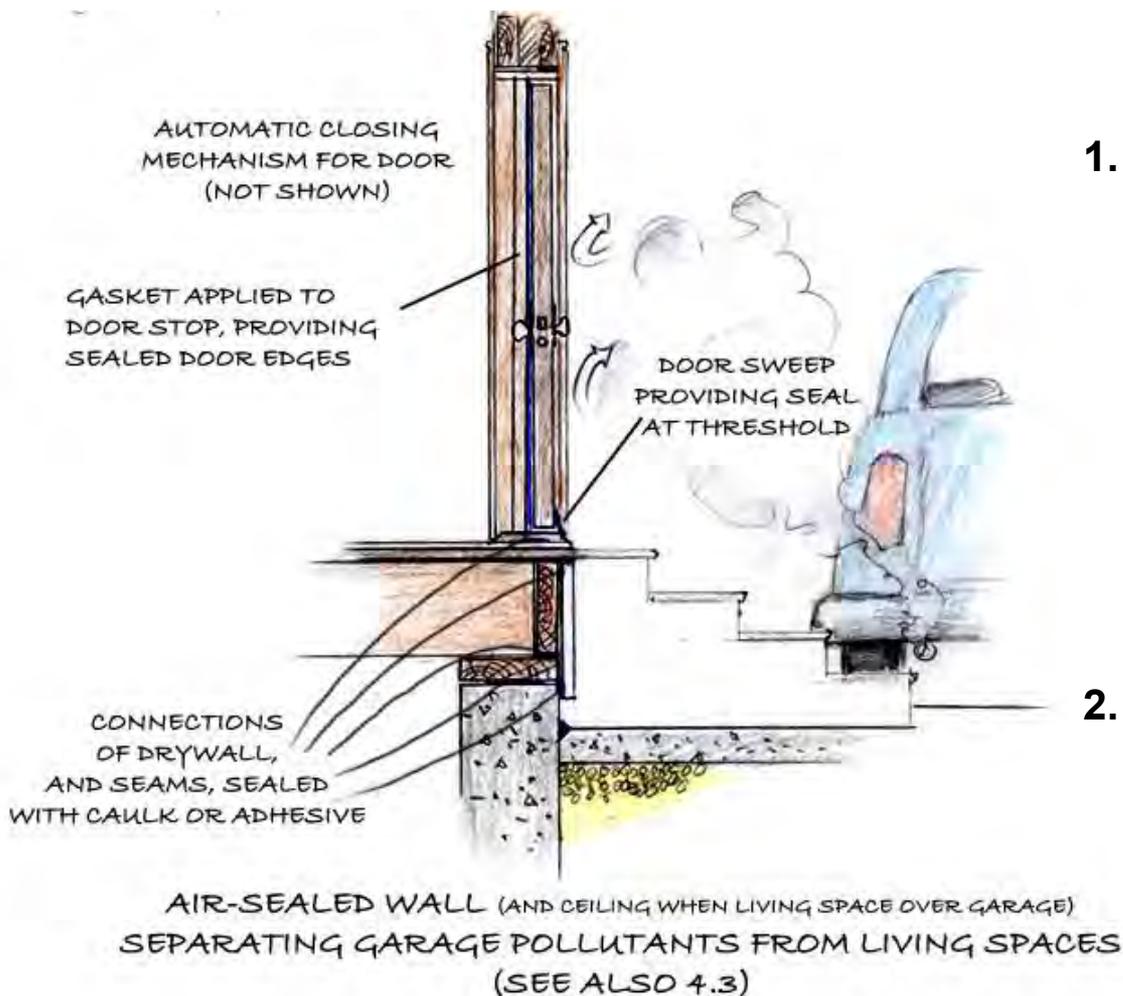
**Note: Requirements for attached garages revised. See [November 13, 2013 Policy Record update](#).**

- *Isolate attached garages from conditioned spaces:*
    - *Air-seal common walls and ceilings.*
    - *Use weather stripping on all doors between living spaces and attached garages.*
  - Install an automatic door closer on all connecting doors between living spaces and attached garages.
  - In homes with exhaust-only whole-house ventilation either:
    - Equip the attached garage with an exhaust fan with a minimum installed capacity of 70 cfm that is vented directly outdoors;
- OR
- Conduct a pressure test to verify the effectiveness of the garage-to-house air barrier.



Indoor Air Quality (IAQ)

# 5.4 Attached Garages



1. **Isolated** from conditioned spaces:
  - Common walls and ceilings are **air-sealed**.
  - **No HVAC equipment or ducts** in garage
  - **Weather stripping** and an **automatic door closer** is installed on connecting doors between living space and garage.
2. **Appropriate ventilation strategy or pressure testing** ensures separation from living space.



Indoor Air Quality (IAQ)

# 5.4 Attached Garages

## Verification

- Rater should **verify proper functioning of the automatic door closer** at final inspection.
- In homes with **exhaust only ventilation system**, at final inspection Rater should:
  - **Visually verify at final inspection** that an appropriate garage fan has been installed.
  - If the garage is ventilated by a ducted fan, a Rater should perform a flow test to confirm the required CFM is being met.

**OR**

- **Conduct 45 Pascal pressure test** with all garage openings closed to verify the garage-to-house air barrier.
  - Test can be performed during required ENERGY STAR blower door test
  - If garage-to-house air barrier does not pass pressure test, additional air sealing or a garage fan required.



Section	Requirements (Refer to full Indoor airPLUS Construction Specifications for details)		Must Correct	Builder Verified	Rater Verified	N/A
Combustion Pollutants	5.1	Emissions standards met for fuel-burning and space-heating appliances (Exception: see spec).	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	5.2	CO alarms installed in each sleeping zone (e.g., common hallway) according to NFPA 720.	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
	5.3	Multifamily buildings: Smoking restrictions implemented AND ETS transfer pathways minimized.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.4	Attached garages: Door closer installed on all connecting doors AND in homes with exhaust-only whole-house ventilation, EITHER a 70 cfm exhaust fan installed in garage OR a pressure test conducted to verify the effectiveness of the garage-to-house air barrier. See spec for details.	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>



Indoor Air Quality (IAQ)

# What does the Sales Team need to Know about Combustion Pollutants



## Benefits

**Reduced exposure to carbon monoxide.**

**Pollutants in attached garages isolated from living space.**

**Round-the-clock peace of mind.**



**Indoor Air Quality (IAQ)**

# 6. Low Emission Materials



## Potential Issues:

- Indoor levels of many chemical pollutants can be **2-5 times higher than outdoor levels.**
- Volatile Organic Compounds (**VOCs**) include a variety of chemicals, some of which may have short- and long-term adverse health effects, including eye, nose, and throat irritation, headaches, loss of coordination, nausea, damage to liver, kidney, and central nervous system.

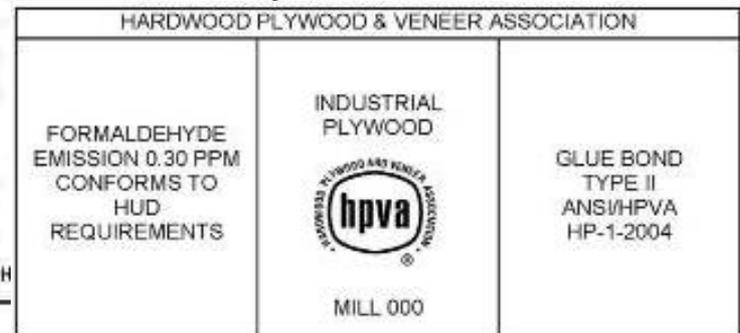
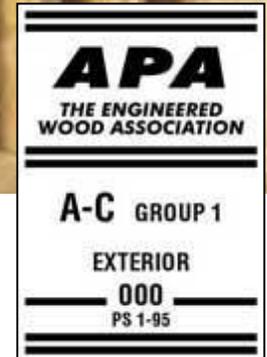


Indoor Air Quality (IAQ)

# 6.1 Composite Wood



- Structural plywood is rated for **durability and moisture resistance** (PS1 or PS2)
- Composite wood is certified as **low-formaldehyde** (see spec for referenced standards)



Indoor Air Quality (IAQ)

# 6.2 Interior Paints and Finishes



- *Interior paints and finishes are certified as **low-VOC or no-VOC***
  - *Greenseal GS11*
  - *Greenguard*
  - *Scientific Certification Systems*
  - *Master Painters Institute*
  - *Verified using CA 01350(CDPH Standard Method V1.1-2010).*



# 6.3 Carpets and Carpet Adhesives



- Use carpets and carpet adhesives labeled with the Carpet and Rug Institute (CRI) Green Label Plus testing program criteria.
  - Note: at least 90% of carpeted area
- For carpet cushion (i.e., padding), use only products certified to meet the CRI Green Label testing program criteria.



# What does the Sales Team need to know about Low Emission Materials



**Homeowner Benefits**



**Less “chemical” smell**



**Lowered exposure to VOCs**



**Reduced potential for occupant health complaints**



**Indoor Air Quality (IAQ)**



# 7. Home Commissioning



Indoor Air Quality (IAQ)

# 7.1 HVAC and Duct Verification



- *Verify that HVAC systems and ductwork are installed according to their design.*



- **Inspect ductwork to verify it is dry and substantially free of dust or debris. If duct openings were not covered during construction, thoroughly vacuum out each opening.**
- **Inspect air-handling equipment and verify that heat exchangers/coils are free of dust AND the filter is new, clean and meets specified MERV rating.**



# 7.2 Ventilation after Material Installation



- **Verify that the home has been ventilated with outside air:**
  - **During and shortly after installing products that are known sources of contaminants, AND**
  - **During the period between finishing and occupancy.**
- *Note: Encourage the builder to maintain a record of the times ventilation of the home is completed.*



# Quiz - Last Item on the Checklist: What else should the Builder communicate to the Homebuyer?

Hint: They may need the Rater's help.

## 7.3 Buyer Information Kit



- Provide buyers with information and documentation of the home's IAQ protections, including:
  - A copy of the **Indoor airPLUS Verification Checklist.**
  - HVAC, duct, and ventilation system **design documentation.**
  - **Operations and maintenance instruction manuals** for all installed equipment and systems addressed by Indoor airPLUS and ENERGY STAR requirements.



Indoor Air Quality (IAQ)

# That's it. You're ready to build & label Indoor airPLUS homes!

**EPA** Indoor airPLUS Version 1 (Rev. 02) Verification Checklist

Home Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Section	Requirements (Refer to full Indoor airPLUS Construction Specifications for details)	Must Correct	Builder Verified	Rater Verified	N/A
<b>Note:</b> The Rev. 02 checklist has been modified to reflect only the additional Indoor airPLUS requirements and their corresponding section numbers that must be met after completing the ENERGY STAR checklist. ENERGY STAR remains a prerequisite for Indoor airPLUS certification.					
ENERGY STAR E3 Checklist	Thermal Enclosure System Rater Checklist completed:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Water Management System Builder Checklist completed:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	HVAC System Quality Installation Contractor Checklist completed:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	HVAC System Quality Installation Rater Checklist completed:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical Control	1.1 Drain or pump pans (installed in basements and crawlspaces (Exception: non-draining walls, in EPA Rater Zone 1), check also also installed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.2 Leak if applicable or seal to no air paths to ceiling/insulated (new joints (Exceptions: see spec) AND vapor techniques used in EPA Rater Zone 1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.4 Barriers/crawlspaces insulated, sealed and conditioned (Exceptions: see spec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ratins	1.7 Protector from water spill/leakage (7 no gutters (Exceptions: see spec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.11 Radon surface covering in kitchens, baths, entry, laundry and utility rooms, AND piping in exterior walls insulator with pipe wrap.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pests	2.1 Approved radon-resistant features installed in Rater Zone 1 homes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.2 Corrosion-resist metal/die-cast screens installed at all openings that cannot be fully sealed (Exception: door screens)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC Systems	4.1 Equipment checked to meet relative humidity < 50% in "Warm season" climates (Exception: see spec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.2 Duct systems connected from manufacturer directly AND no building materials used as air supply or return.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.3 No air-handling equipment or ductwork installed in garage AND continuous air barrier in attached garages.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.7 Central forced-air HVAC systems) have minimum MERV 8 filter AND no code generators in home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical Contaminants	5.1 Emissions standards met for fast burning and space heating appliances (Exception: see spec)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2 CO alarm installed in each sleeping zone (e.g., common hallway) according to NFPA 720	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.3 Multi-family buildings: Smoking restrictions implemented AND ETS transfer pathways minimized.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Materials	6.1 Attached garages: Door closer installed on all connecting doors AND in homes with attached only whole-house ventilation (EPA 9.7) the radon fan installed in garage OR a pressure test conducted to verify the effectiveness of the garage-to-house air barrier. See spec for details.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6.2 Certified low-VOC or no-VOC interior paints and finishes used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6.3 Carpet, carpet adhesives OR Green Label Plus AND carpet cushion OR Green Label.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final	7.1 HVAC systems and ductwork verified to be dry and clean AND new filter installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	7.2 Home ventilated before occupancy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.3 Completed checklist and other required documentation provided for Rater.					
Rater Company: _____		Builder Company: _____			
Rater Employee: _____		Builder Employee: _____			
Rater Signature: _____ Date: _____		Builder Signature: _____ Date: _____			

One additional checklist verified by the Rater



Place the Indoor airPLUS label adjacent to the ENERGY STAR label



Indoor Air Quality (IAQ)

# Indoor airPLUS Examples - St. Louis



**Blue Brick Renovation and  
Construction  
309 South Spoele Rd**

Images courtesy of  **ASERusa**  
Building Performance



**Indoor Air Quality (IAQ)**



# St. Louis . . .

Hibbs Homes  
215 Gray Avenue

- Active House
- Ecohome
- IAQ monitoring



Images courtesy of 



Indoor Air Quality (IAQ)

# St. Louis . . .



Image courtesy of



**Horve Builders**  
**1003 & 1001 Annabelle Lane**



**Indoor Air Quality (IAQ)**

# Indoor airPLUS Homes Around St. Louis – Affordable Housing



Photos courtesy of Kyle Lee Hunsberger, Director of Construction, Habitat for Humanity - Saint Louis



Indoor Air Quality (IAQ)

## Habitat for Humanity – St. Louis

- Over 120 Indoor airPLUS homes built since 2009
- Volunteer and homeowner labor



Photos courtesy of Kyle Lee Hunsberger, Director of Construction, Habitat for Humanity - Saint Louis



Indoor Air Quality (IAQ)



**2109 North 13th Street**



**6801 Virginia Avenue**



**Photos courtesy of Kyle Lee Hunsberger, Director of Construction, Habitat for Humanity - Saint Louis**



**Indoor Air Quality (IAQ)**



**Rainscreen siding application**  
**Excellent durability (although not required by Indoor airPLUS)**

Photos courtesy of Kyle Lee  
Hunsberger, Director of Construction,  
Habitat for Humanity - Saint Louis



**Indoor Air Quality (IAQ)**



**Rainscreen siding application -  
maintaining positive drainage**



**Indoor Air Quality (IAQ)**



## Rainscreen siding application - window flashing details



Indoor Air Quality (IAQ)

# “Superior” details

- **Balanced ventilation with ERV**
- **Superior Walls in basement**



Indoor Air Quality (IAQ)

# Moisture management and radon resistance



Indoor Air Quality (IAQ)

# “Superior” details, but more affordable



- 2” foam with furring
- Subslab membrane sealed to concrete wall
- Slab poured to foam



Indoor Air Quality (IAQ)

# Basement Details



- **Creating livable, comfortable, and DRY basement space**



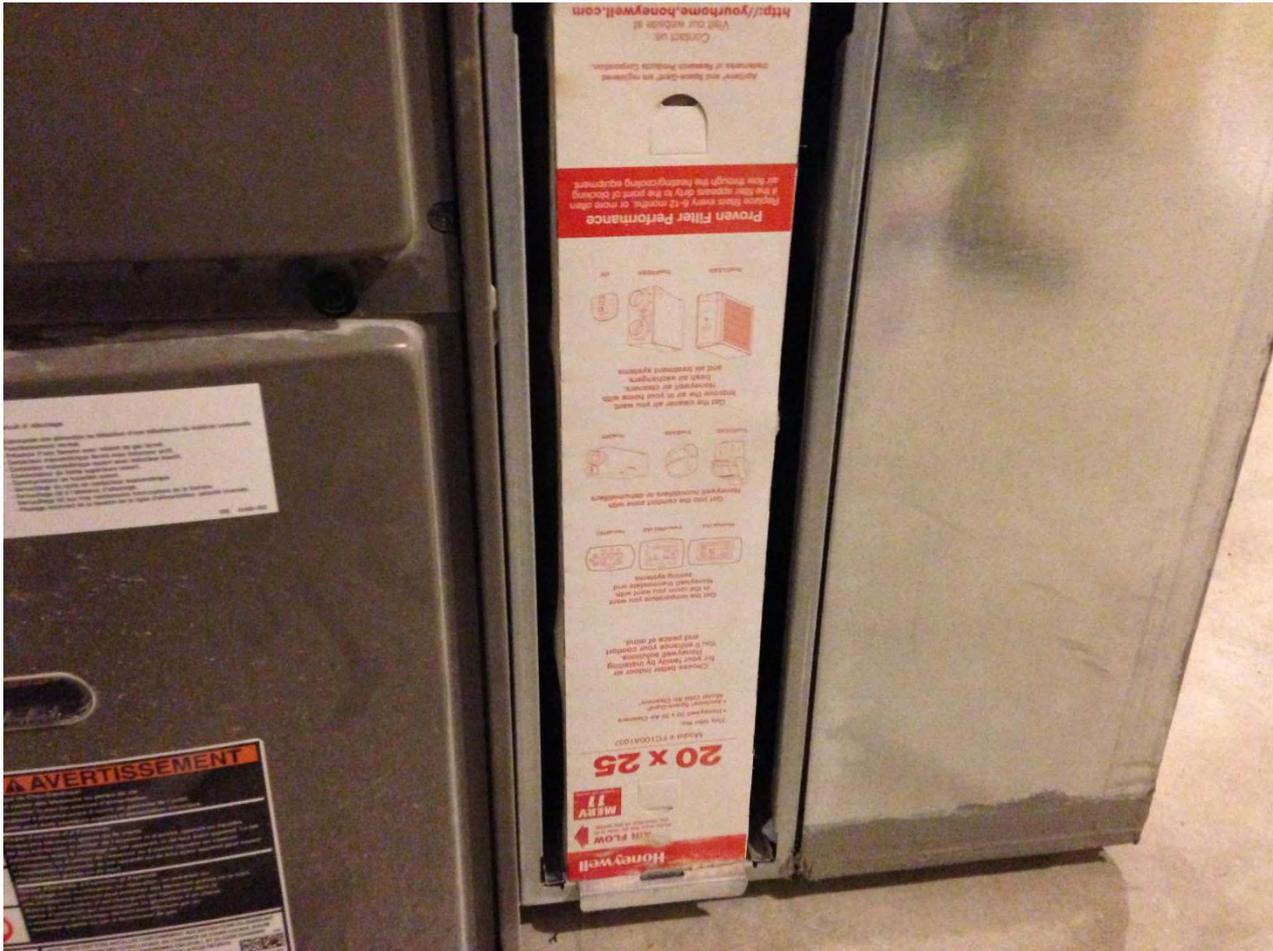
Indoor Air Quality (IAQ)

# Basement Details



Indoor Air Quality (IAQ)

# HVAC Details



- **MERV 11 filter comes with unit.**
- **Close out home with MERV 13**

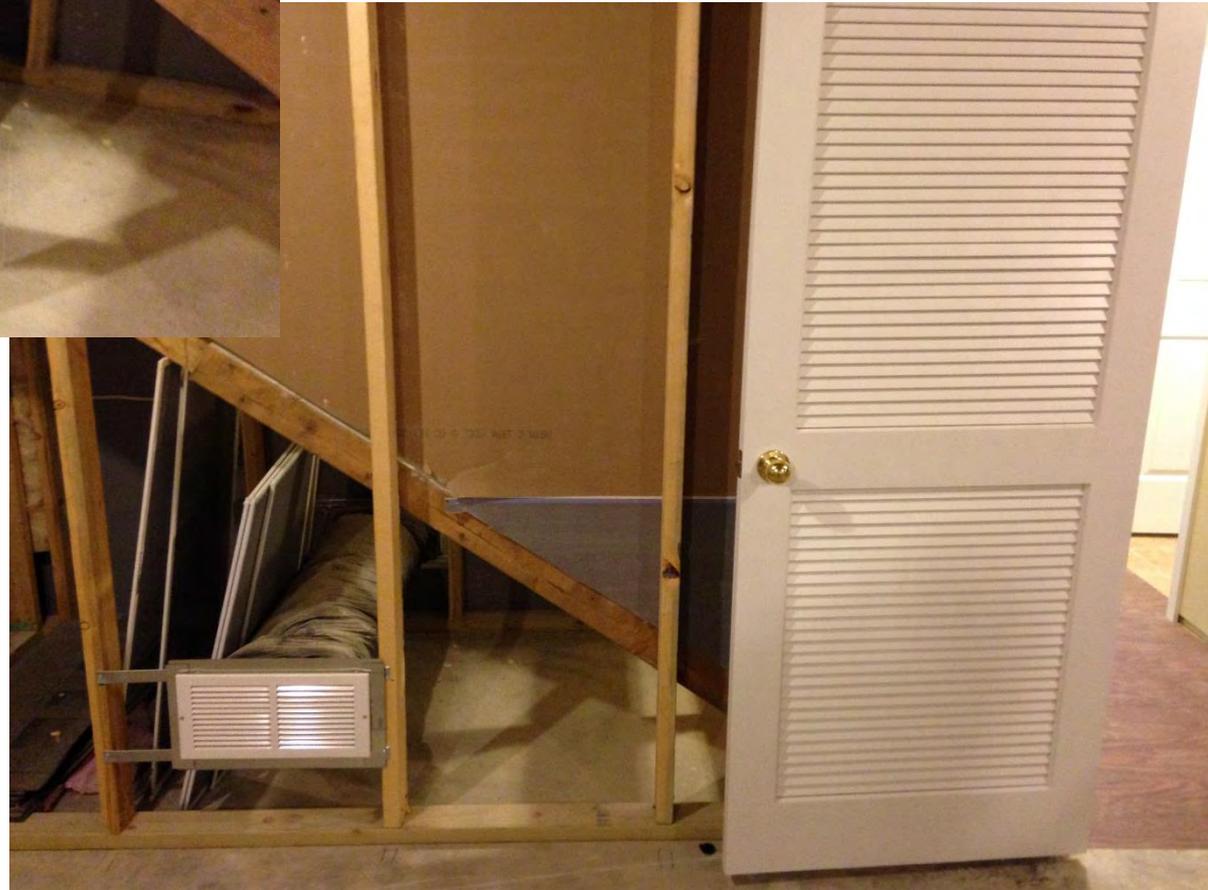


Indoor Air Quality (IAQ)

# HVAC Details



- **Pressure balancing solutions**



Indoor Air Quality (IAQ)

# HVAC Details



- **Supply side ventilation instead of ERV**



Indoor Air Quality (IAQ)

# Protecting ductwork during construction



- **Very economical**
- **Scrap lumber and weatherstripping**
- **Reusable**
- **Keeps jobsite safe and ductwork clean**



Indoor Air Quality (IAQ)

# Indoor airPLUS Builder Successes



- **Poolesville, MD**
- **79 homes**
  - About 7 lots remaining



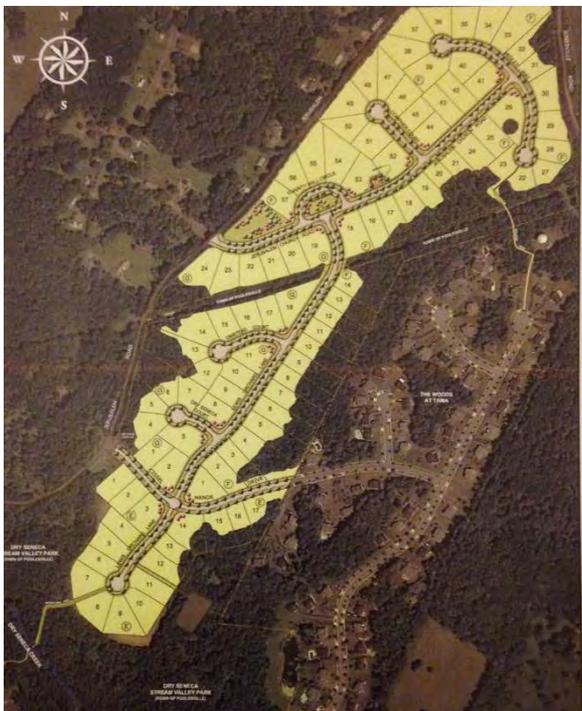
Photos and graphics courtesy of Dave Griffin and Dick Kettler, Kettler Forlines Homes



Indoor Air Quality (IAQ)

# Indoor airPLUS Builder Successes

- “The Reserve”
  - 98 home lots
  - Breaking ground fall 2014



Indoor Air Quality (IAQ)



HOME ABOUT BRIGHTWELL CROSSING MODELS & PLANS INTERACTIVE SITE PLAN ABOUT US FOR REALTORS CONTACT US

## ENERGY EFFICIENCY & INDOOR AIR QUALITY

ABOUT BRIGHTWELL CROSSING

AREA SCHOOLS

ENERGY EFFICIENCY/INDOOR AIR QUALITY

AMENITIES

PHOTO GALLERY

NEWS & PRESS

ABOUT OUR SCHOOLS



### Kettler Forlines Homes Commitment to Energy Efficiency and Healthy Indoor Living

It's no surprise that new homes have been getting tighter and more energy efficient. Over the past twenty years, building materials and techniques have gradually changed to reflect ever increasing energy costs. In the past, when electricity and other fuels were cheap, it was easy to simply increase the size of the heating, ventilation and cooling equipment to compensate for a leaky structure. Today, the building codes and building industry standards have increased to provide a higher level of energy efficiency. At Kettler Forlines Homes, the standards have been set to an even higher level. Since January of 2008, we have been an Energy Star Builder Partner. Energy Star for Homes is an Environmental Protection Agency program that requires qualified third party testing to ensure that our homes are 15% to 30% more efficient in terms of energy use than homes that are built to current building codes. Utilizing building science and state of the art diagnostic equipment, we are able to identify where improvements to the building envelope can be made. That, along with improved material and equipment specifications, allows us to meet our energy efficiency goals. At Brightwell Crossing, we are now enrolled in the EPA Indoor Air PLUS program, which works together with Energy Star to provide assurance that our homes incorporate proper ventilation and air flow. Indoor Air PLUS includes a set of material and



Download Brochure: Kettler Forlines Energy Star

Download Brochure: Kettler Forlines Indoor Air Quality



# Indoor Air Quality (IAQ)

# Energy Efficiency Details



- Raised heel trusses
- 2x4s with insulated exterior sheathing



Indoor Air Quality (IAQ)

# Pressure Balancing

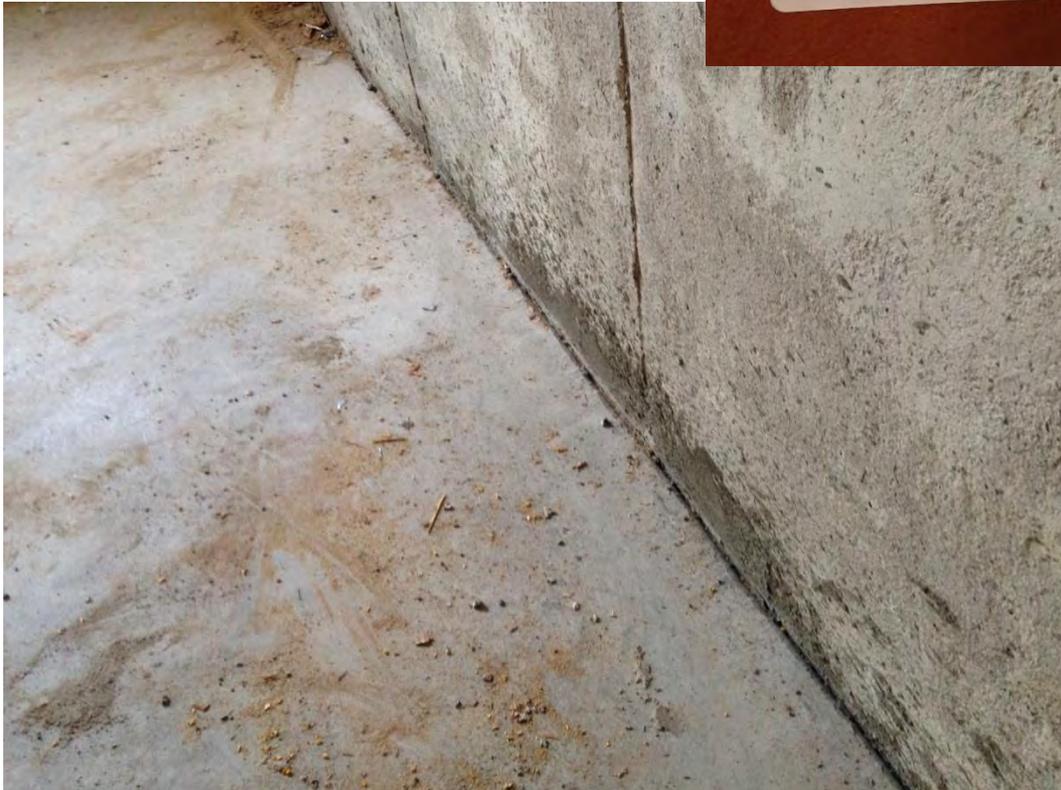


- **Standard grill over BR door**
- **Filter for noise & light**



Indoor Air Quality (IAQ)

# IAQ Details



- **KCMA Certified cabinetry**
- **Basement slab caulked to walls**



Indoor Air Quality (IAQ)

# Indoor airPLUS Leader Awards



**Steven Winter Associates, Inc.**  
Improving the Built Environment Since 1972



**Announced July 2014:**

[www.epa.gov/indoorairplus](http://www.epa.gov/indoorairplus)

## 2014 Verifier Leaders



Indoor Air Quality (IAQ)

# Indoor airPLUS Leader Awards

**C & B CONSTRUCTION**  
a division of C&B Custom Homes, Inc.  
Lic. #115300 B-1 Commercial #39973 - B Residential

 **FOXWOOD**  
BUILDERS, INC

  
**PALO DURO**  
HOMES, INC.



- **2014 -- 1<sup>st</sup> annual Builder Award Winners**
- **2015 applications available in January**

**To see company profiles, visit the INDOOR airPLUS website:**

[http://www.epa.gov/indoorairplus/leader\\_awards](http://www.epa.gov/indoorairplus/leader_awards)

2014 Builder Leaders



Indoor Air Quality (IAQ)

# Resources and Tools

## Marketing and Technical Support for Partners



- Construction requirements
- Technical guidance
- Recorded webinars
- YouTube videos
- Builder and consumer resources
- Partner locator
- Website widgets
- Free brochures



[www.epa.gov/indoorairplus](http://www.epa.gov/indoorairplus)



Indoor Air Quality (IAQ)

# New Marketing Resources

## Better Environments Inside and Out

Look for the U.S. Environmental Protection Agency (EPA) Indoor airPLUS and ENERGY STAR labels on your new home. Reduced indoor air pollutants help protect your family inside. Reduced greenhouse gas emissions help protect the air outside.



Homes displaying the Indoor airPLUS and ENERGY STAR Certified Home labels provide unparalleled energy efficiency, comfort, durability, indoor air quality and peace of mind.

Text Box 1. (ADD BUILDER'S NAME HERE)  
Is proud to offer new homes that have earned both the Indoor airPLUS and ENERGY STAR Certified Home labels because it means your home has been designed and built to standards well above most other homes on the market today.

Text Box 2. (INSERT ADDITIONAL COMPANY INFORMATION HERE, e.g., homeowner testimonials, description of company's participation in ENERGY STAR and Indoor airPLUS and commitment to energy efficiency and improved indoor air quality.)

## Indoor air quality Matters

People are increasingly concerned about mold, radon, carbon monoxide and toxic chemicals in their homes. Poor indoor air quality can lead to eye irritation, headaches, allergies, respiratory problems such as asthma, and other serious health problems.

EPA studies show that levels of many indoor air pollutants can be two to five times higher than outdoor levels. And since most people spend close to 90% of their time indoors, keeping indoor pollution levels as low as possible is the right thing to do for you and your family.

Text Box 3. (INSERT LOGO ABOVE AND INSERT COMPANY NAME AND ADDITIONAL INFORMATION HERE, e.g., company history, company's ENERGY STAR/Indoor airPLUS web page.)



Only ENERGY STAR Certified Homes are eligible to earn the Indoor airPLUS label.

## Breathe Easy In Your NEW Indoor airPLUS Home



Designed and built for improved indoor air quality and energy efficiency.



Co-Brand Image Box

## Co-brandable Consumer Brochure

- Add company name, logo, and other info (testimonials, etc.)

## Visit your My ENERGY STAR Account

[www.energystar.gov/MESA](http://www.energystar.gov/MESA)



Indoor Air Quality (IAQ)

### Mold and Moisture Control

Paying close attention to moisture details:

- ▶ Increases structural durability
- ▶ Reduces the potential for mold-related health issues
- ▶ Prevents recurring maintenance issues

### Homeowner Education

Indoor airPLUS homebuyers receive:

- ▶ An Indoor airPLUS label and certificate
- ▶ A list of features included in their home
- ▶ Instructions for regular equipment maintenance

### Radon Control

Planning for the possibility of radon helps reduce risks posed by the second leading cause of lung cancer in the United States.

### Efficient HVAC Systems

A well-designed heating, ventilation, and air conditioning system provides:

- ▶ Improved comfort
- ▶ Humidity control
- ▶ Enhanced filtration
- ▶ Clean, well-sealed ductwork

Indoor airPLUS construction specifications are designed to help improve indoor air quality (IAQ) in new homes compared with homes built to minimum code. However, these features alone cannot prevent all IAQ problems. Occupant behavior is also important for IAQ. For example, products used in the home after occupancy and smoking inside may both negatively impact the home's IAQ and the performance of the specified Indoor airPLUS features.

See: <http://www.epa.gov/indoorairplus/> for more information.

### Building Materials

Choosing low-emission building materials:

- ▶ Lowers exposure to Volatile Organic Compounds (VOCs)
- ▶ Reduces the potential for health problems
- ▶ Minimizes "chemical smell" in the home

### Combustion Pollutant Control

Careful attention to venting and combustion sources:

- ▶ Reduces pollutants in living spaces
- ▶ Minimizes CO exposure
- ▶ Provides peace-of-mind for everyone in the home

### Pest Barriers

Blocking pest entry:

- ▶ Keeps the home cleaner
- ▶ Limits allergens, germs, and asthma triggers
- ▶ Prevents potential pest damage

# Benefits of an Indoor airPLUS Qualified Home

# Resources and Tools

## Building America Solution Center

Solution Center Home

Help

FIND YOUR TOPIC BY:

Building Components

Guides A-Z

ENERGY STAR Certified Homes

**Zero Energy Ready Home**

FIND RESOURCES:

References and Resources

CAD Files

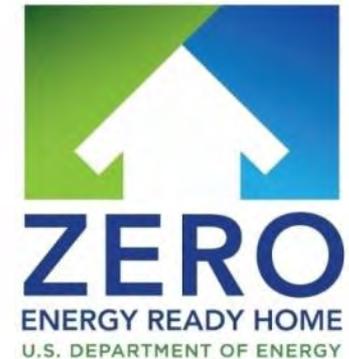
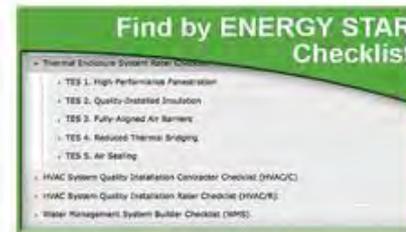
Image Gallery

Case Studies

FIND PUBLICATIONS:

Building Science Publications

The Building America Solution Center provides access to expert information on hundreds of high-performance construction topics, including air sealing and insulation, HVAC components, windows, indoor air quality, and much more. Click on the links below to explore the Solution Center.



- **Indoor airPLUS is required for Zero Energy Ready Home certification.**
- **More IAQ resources coming soon! Please consider submitting images and content:**

<https://basc.pnnl.gov/criteria-submitting-content-building-america-solution-center>

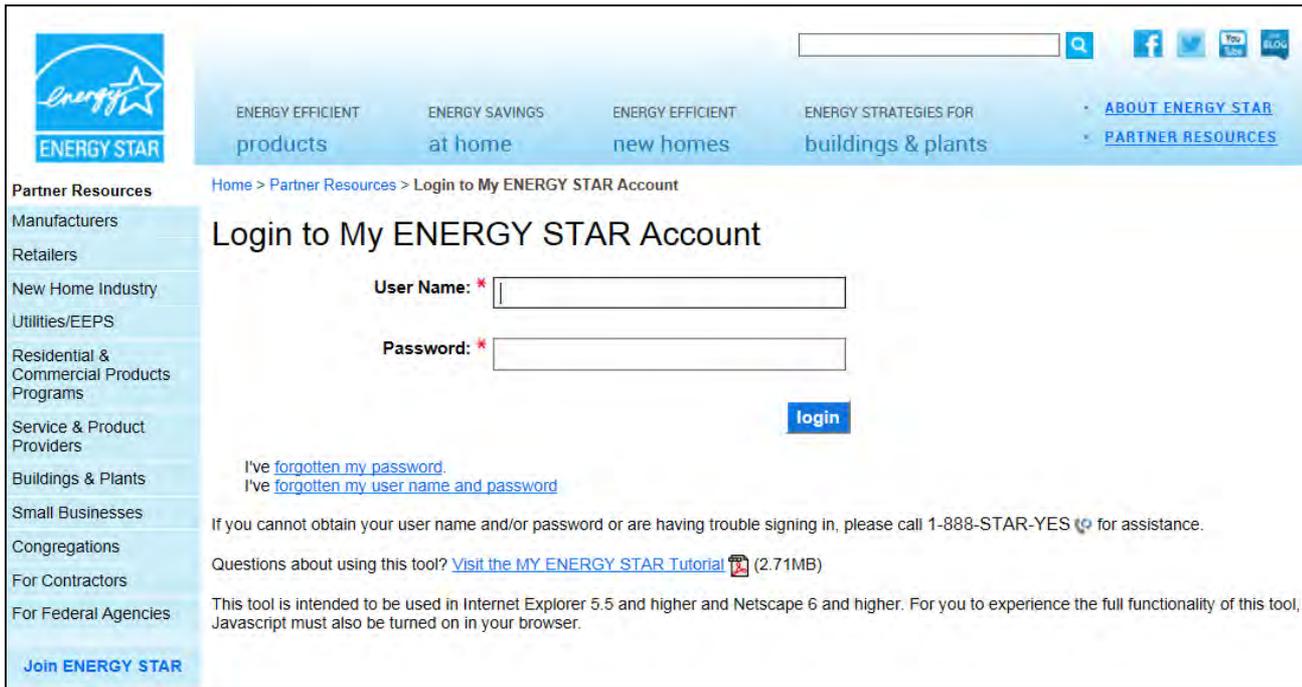


Indoor Air Quality (IAQ)

# What's Next?

## Become an Indoor airPLUS Partner

- For current ENERGY STAR Partners:
  - Log into your My ENERGY STAR Account (MESA)  
[www.energystar.gov/mesa](http://www.energystar.gov/mesa)



The screenshot shows the 'Login to My ENERGY STAR Account' page. At the top left is the ENERGY STAR logo. The navigation bar includes links for 'ENERGY EFFICIENT products', 'ENERGY SAVINGS at home', 'ENERGY EFFICIENT new homes', and 'ENERGY STRATEGIES FOR buildings & plants'. There are also social media icons for Facebook, Twitter, YouTube, and LinkedIn. A search bar is located in the top right. Below the navigation bar, the page title is 'Login to My ENERGY STAR Account'. The main content area contains two input fields: 'User Name: \*' and 'Password: \*', both with asterisks indicating they are required. A blue 'login' button is positioned below the password field. To the left of the login fields is a sidebar with a 'Partner Resources' section containing a list of categories: Manufacturers, Retailers, New Home Industry, Utilities/EEPS, Residential & Commercial Products Programs, Service & Product Providers, Buildings & Plants, Small Businesses, Congregations, For Contractors, and For Federal Agencies. Below the sidebar, there are links for 'I've forgotten my password.' and 'I've forgotten my user name and password'. At the bottom of the page, there is a note: 'If you cannot obtain your user name and/or password or are having trouble signing in, please call 1-888-STAR-YES for assistance.' and another note: 'Questions about using this tool? Visit the MY ENERGY STAR Tutorial (2.71MB)'. At the very bottom, there is a disclaimer: 'This tool is intended to be used in Internet Explorer 5.5 and higher and Netscape 6 and higher. For you to experience the full functionality of this tool, Javascript must also be turned on in your browser.'

If you don't know your user name and password, click the link or email [energystarhomes@energystar.gov](mailto:energystarhomes@energystar.gov) for assistance.



Indoor Air Quality (IAQ)

# Become an Indoor airPLUS Partner

- After entering your account, click “Join Indoor airPLUS”.
  - For builders, be sure you’ve completed the required ENERGY STAR training.

The screenshot shows the 'My ENERGY STAR Account' page. The top navigation bar includes 'ENERGY STAR', 'My ENERGY STAR Account', and links for 'Contact ENERGY STAR | Help | Logout'. The left sidebar contains 'Partner Resources' with links for 'Welcome', 'My Organization Information', 'My Contact Information', 'My Tools', 'Quick Links', 'Change Password', and 'Contact Us'. A 'Join ENERGY STAR' button is also present. The main content area shows the breadcrumb 'Home > Partner Resources > My ENERGY STAR Account', the title 'My ENERGY STAR Account', and a welcome message for 'FIRST TESTER!'. Below this is an invitation to navigate to other ENERGY STAR tools and sites. A 'To-Do List' section highlights 'New Homes Builder Training' with a 'Start Training' button and a note about browser requirements. A 'My ENERGY STAR Tools' section lists several links, with 'Join Indoor airPLUS' circled in red.

**ENERGY STAR®**  
My ENERGY STAR Account

ENERGY STAR

Partner Resources Contact ENERGY STAR | Help | Logout

Home > Partner Resources > My ENERGY STAR Account

## My ENERGY STAR Account

Welcome, *FIRST TESTER!*

You are invited to navigate directly to other ENERGY STAR tools and sites, change your password for your password-protected ENERGY STAR tools, or update contact information for you, your organization, and your colleagues.

**To-Do List:**

**New Homes Builder Training**  
You were required to complete training by 06/09/2013. Please complete the training to reactivate your partnership.

[Start Training](#)

(Internet Explorer or Firefox are the preferred browsers for this training. Please turn off your browser pop-up blocker.)

**My ENERGY STAR Tools:**

- [Linking Opportunities](#)
- [Certified Homes Co-brandable Consumer Brochure](#)
- [Certified Homes Co-brandable Banners](#)
- [Join Indoor airPLUS](#)



Indoor Air Quality (IAQ)

# Become an Indoor airPLUS Partner

- Use the logos to promote your partnership and commitment to offering healthier, more durable homes.

## Indoor airPLUS Certification Mark



Indoor airPLUS Certification Mark (vertical)  
[EPS](#) | [JPG](#)



Indoor airPLUS Certification Mark (vertical)  
[EPS](#) | [JPG](#)

[Back to Top](#)

## Indoor airPLUS Promotional Marks



Indoor airPLUS Promotional Marks (vertical)  
[EPS](#) | [JPG](#)



Indoor airPLUS Promotional Marks (vertical)  
[EPS](#) | [JPG](#)



Indoor airPLUS Promotional Marks (vertical)  
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Indoor airPLUS Promotional Marks (vertical)  
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Indoor airPLUS Promotional Marks (vertical)  
[EPS](#) | [JPG](#)



Indoor airPLUS Promotional Marks (vertical)  
[EPS](#) | [JPG](#)



Indoor Air Quality (IAQ)



# Indoor airPLUS



A new opportunity for leading builders to create better environments inside and out

**Learn more at:**

**[www.epa.gov/indoorairplus](http://www.epa.gov/indoorairplus)**

**OR contact the Indoor  
airPLUS Team at**

**[indoor\\_airPLUS@epa.gov](mailto:indoor_airPLUS@epa.gov)**