

ENERGY STAR Qualified Homes Sponsor Meeting
March 11-12, 2008

Beyond

ENERGY STAR Qualified Homes
[And a Few More Myths]

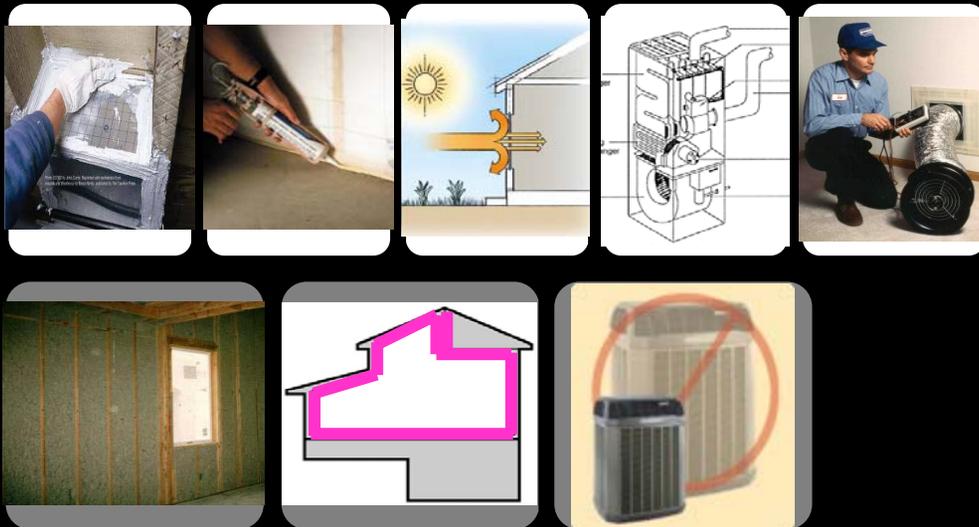
Sam Rashkin
National Director, ENERGY STAR for Homes

Beyond ENERGY STAR Qualified Homes

New Program Options

- ENERGY STAR Advanced Lighting Package
- EPA Indoor Air Package
- EPA Water Sense
- EPA 'Green' Bundle
- Carbon Neutral Home

ENERGY STAR Indoor Air Package



Source Control

- Moisture
- Radon
- Biological
- Combustion
- Chemical



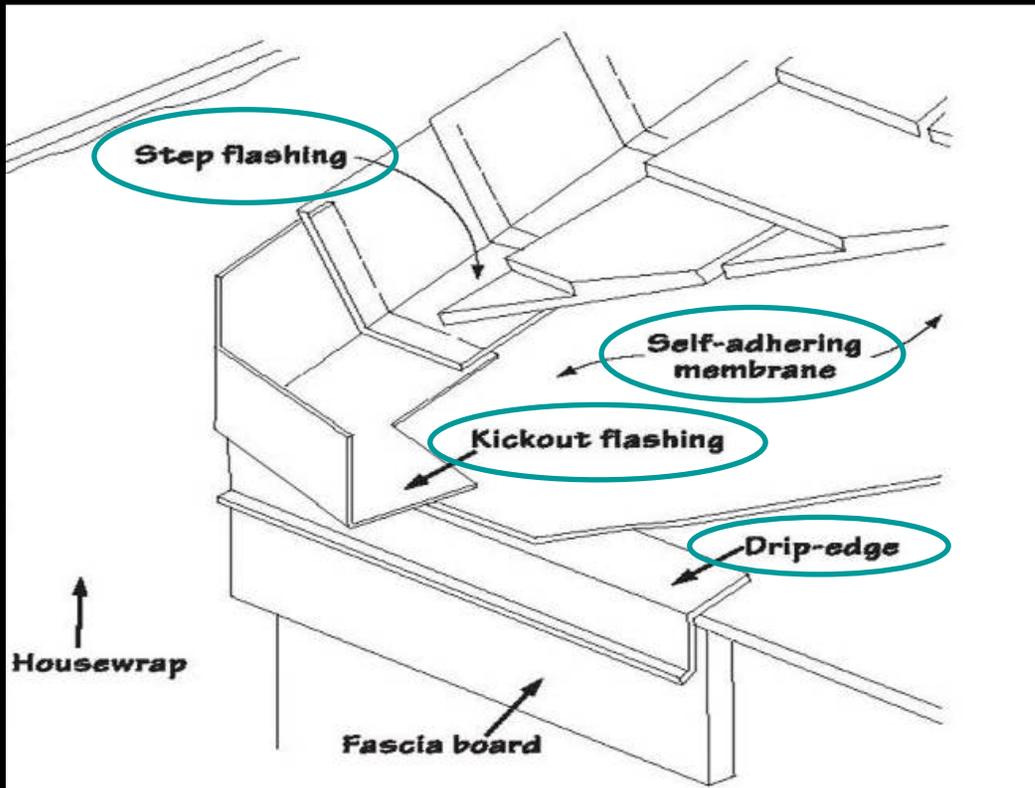
Ventilation



Filtration



SOURCE CONTROL: MOISTURE WATER MANAGED ROOFS

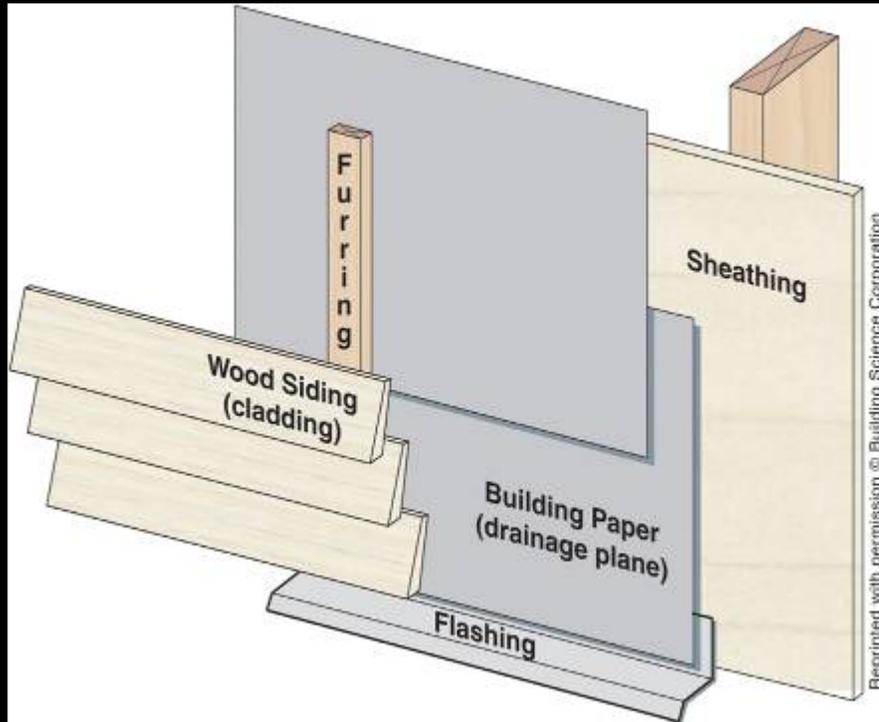


Roof Flashing Details

Bituminous Membrane at Valleys



SOURCE CONTROL: MOSITURE WATER MANAGED WALLS



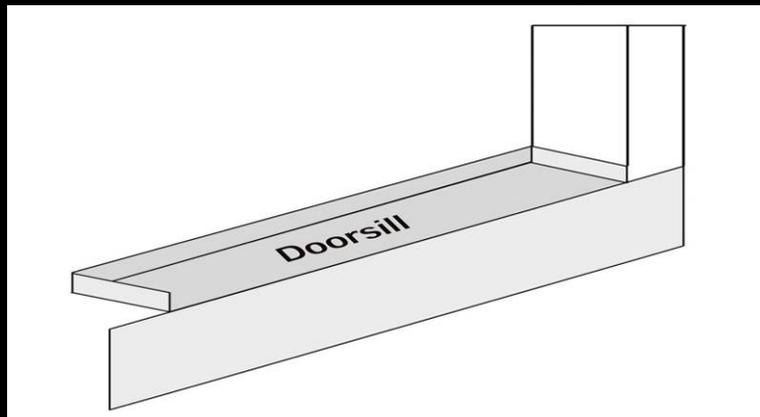
Drainage Plane



SOURCE CONTROL: MOISTURE WATER MANAGED WALLS



Pan Flashing



Window Flashing

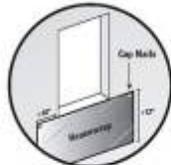


WINDOW FLASHING



Building Tips
Example of window flashing details for frame with louvering and plywood or OSB wall sheathing.

STEP 1 • IF FOLLOWUPWP (OR NOT) BEEN INSTALLED



- 1 Apply at least a 12" flap, or space, of building paper or louvering just below the window sill.
- 2 If the window sill is close to the sill plate, the space can extend all the way to the sill plate.
- 3 The space should extend at least 16" past the sides of the window opening, or to the first stud in open wall construction.
- 4 Attach only the space's top edge with cap nails.

STEP 2 • GILL FLASHING



- 1 Install self-adhesive flashing to the sill, ensuring that flashing extends up joints at least 6".
- 2 Use manufacturer product notes with two nonvolatile strips over the adhesive. Remove the first strip to expose half the adhesive and apply this strip to the sill. Begin peeling 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.
- 3 Tape down the bottom corners of the flashing.

STEP 1 • IF FOLLOWUPWP (OR NOT) BEEN INSTALLED



- 1 Cut the louvering covering the rough opening in the shape of a modified "T".
- 2 Fold the side and bottom flaps into the window opening and secure.
- 3 Above the window opening, cut a lead flap and flip up to expose sheathing, and loosely tape in place out of the way.

STEP 3 • JAMB CALLING

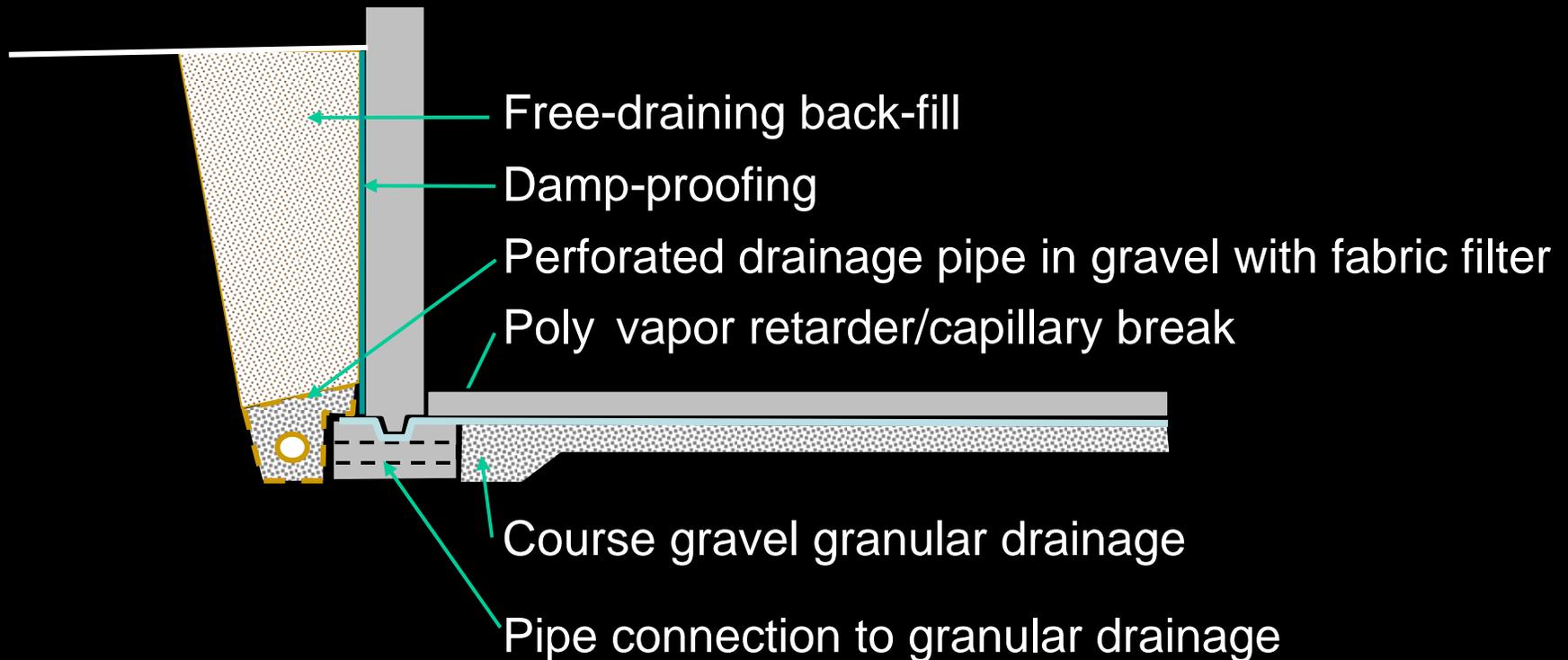


- 1 Crank the outside edges of the head and side joints.
- 2 Do not crank across the sill.
- 3 Install the window using sensitive tension methods and following manufacturer's specifications.

Building America Best Practices Series: Volume 2 – Builders and Design Handbook for Improving New Home Efficiency, Comfort, and Durability in the Hot-Dry and Mixed-Dry Climate Version 3, 5/2015 • TR2.4

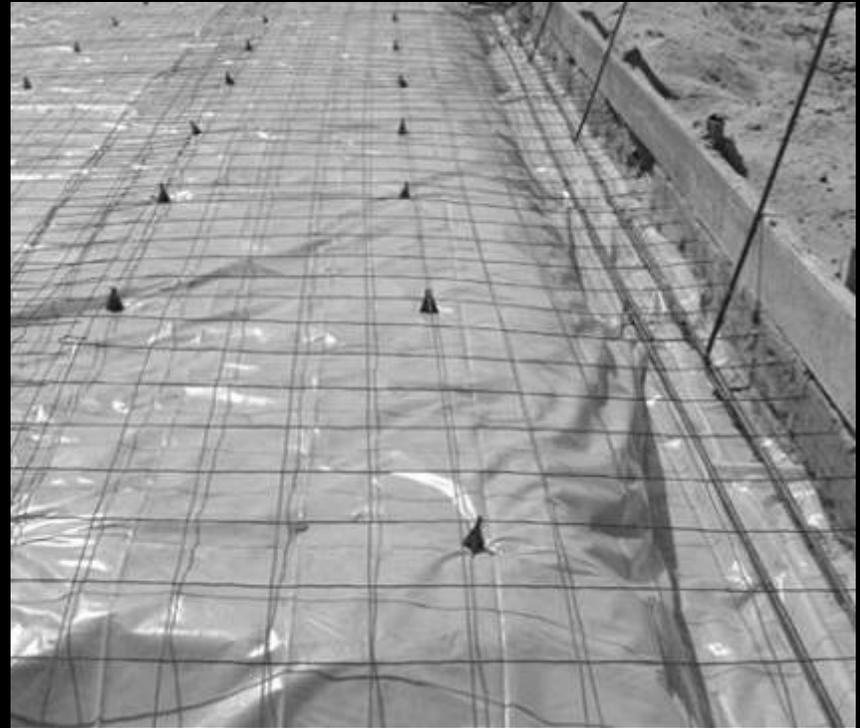
SOURCE CONTROL: MOISTURE WATER MANAGED FOUNDATIONS

Foundation Drainage System with Capillary Breaks



SOURCE CONTROL: MOISTURE/RADON: WATER MANAGED FOUNDATIONS

Unvented Crawlspace



Poly Under Slab Vapor and Radon Barrier

SOURCE CONTROL: MOISTURE PROTECT MATERIALS

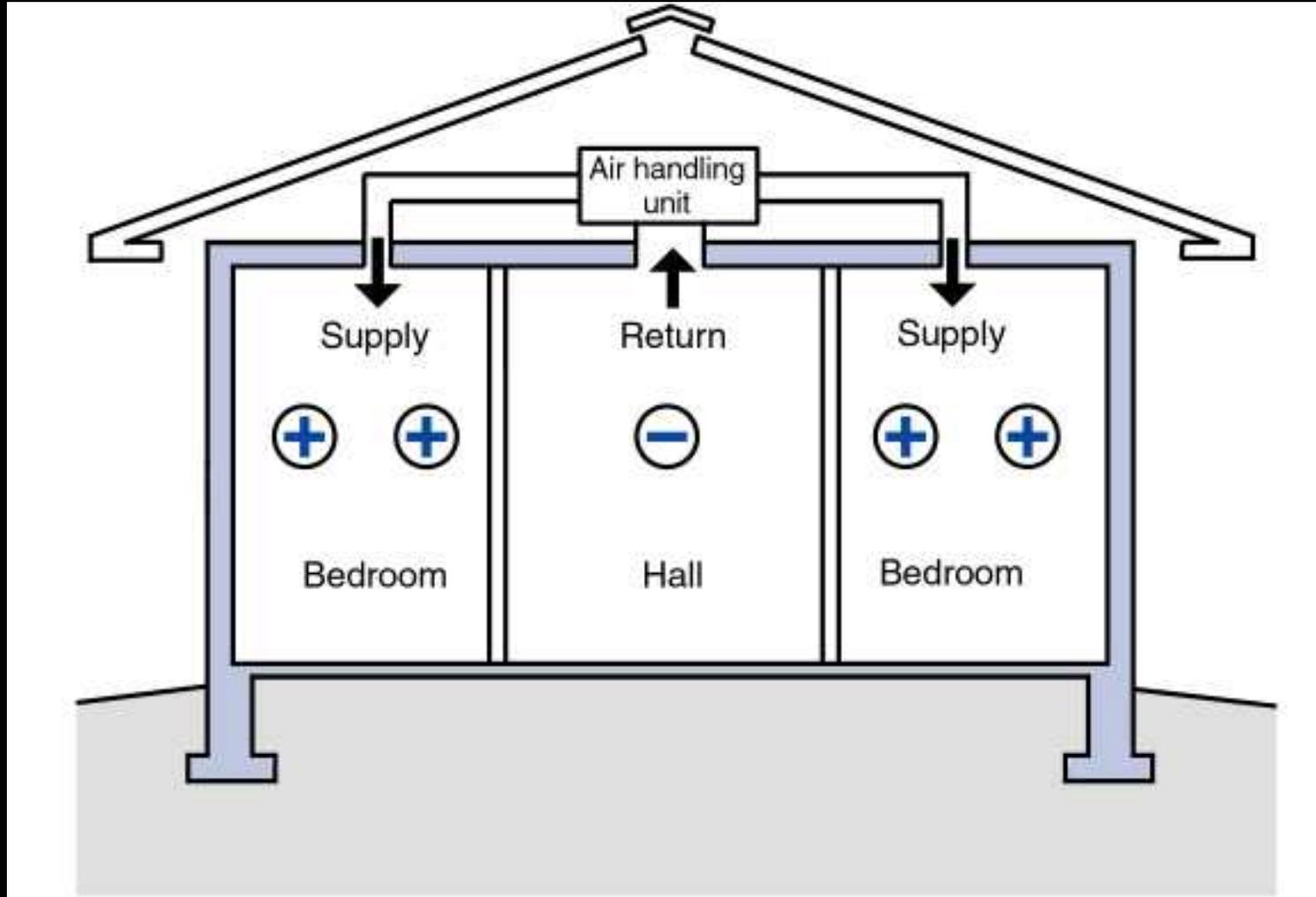


Bad

Good



SOURCE CONTROL: MOISTURE PRESSURE BALANCING PROBLEM



SOURCE CONTROL: MOISTURE PRESSURE BALANCING SOLUTION



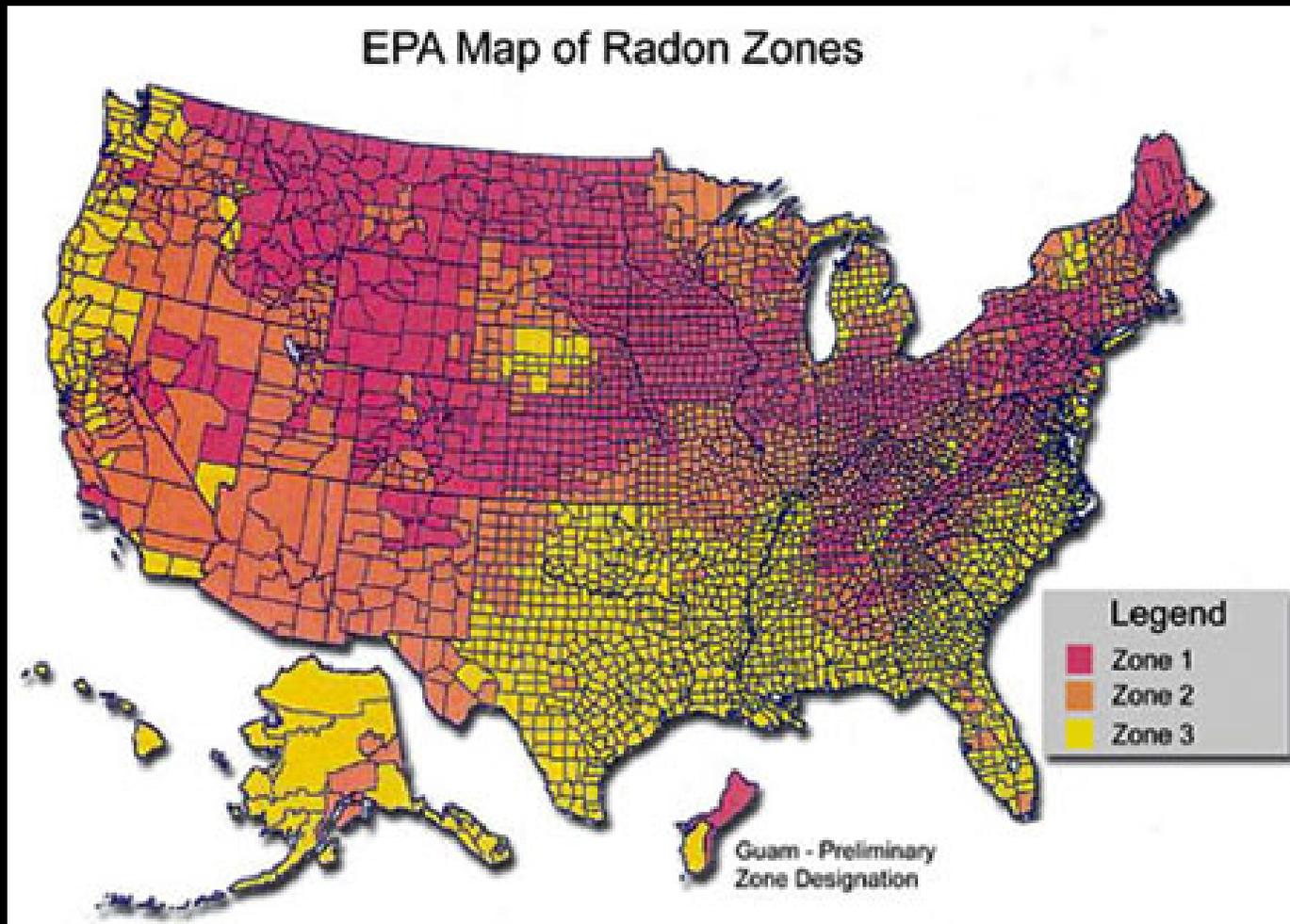
TRANSFER GRILLE



JUMP DUCT

SOURCE CONTROL: RADON

RADON RESISTANT CONSTRUCTION



RADON CONTROL HIGHLIGHTS: RADON RESISTANT CONSTRUCTION

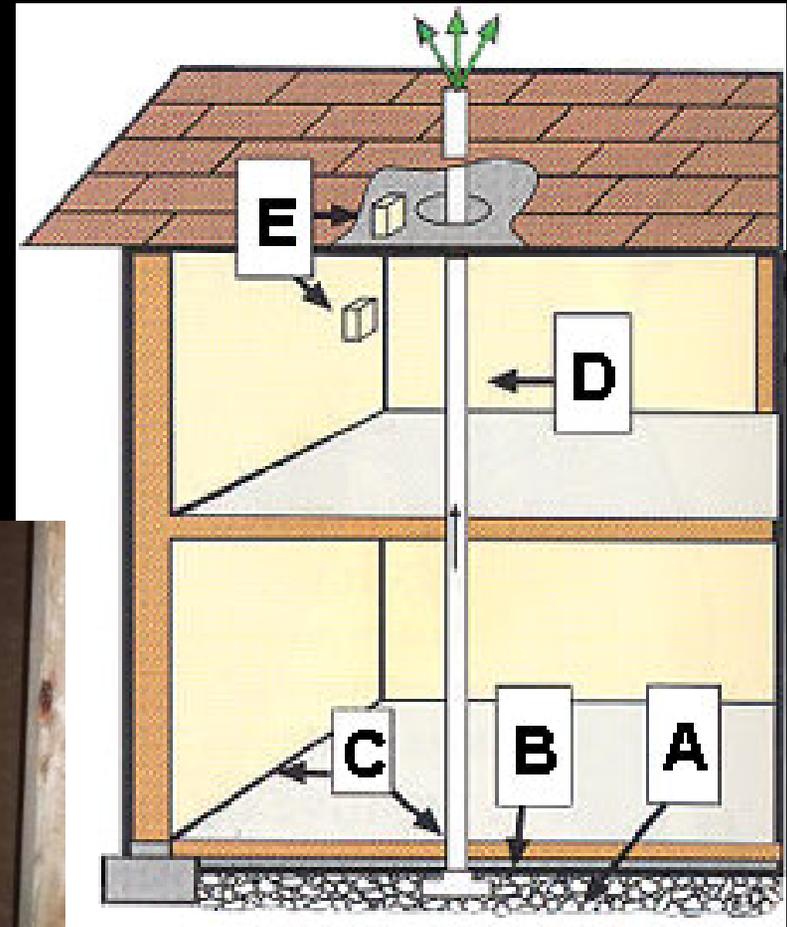
A. Gas Permeable Layer
(4" clean gravel)

B. Plastic Sheetting
(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)

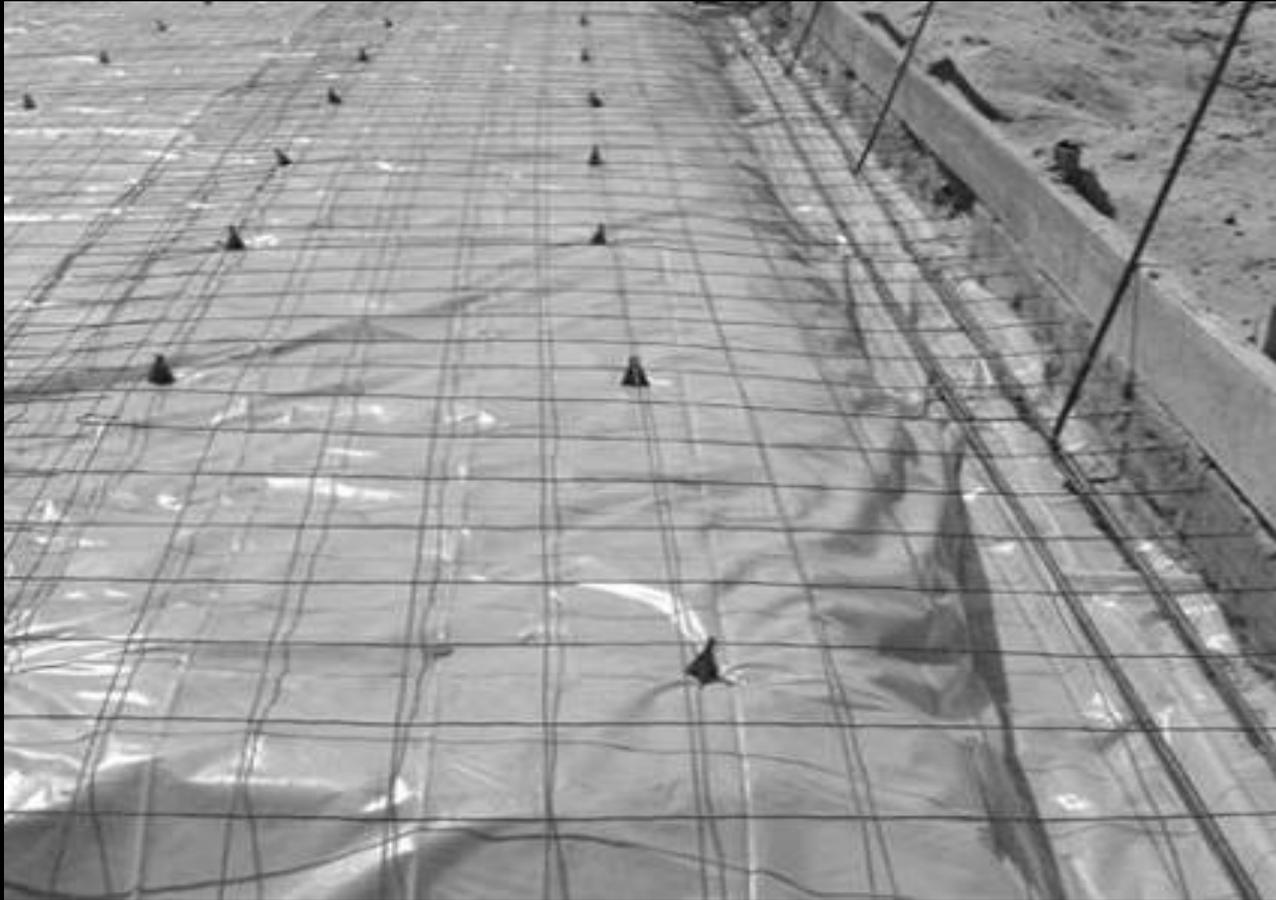


SOURCE CONTROL: BIOLOGICAL SOLID TOP COURSE FOUNDATION



Top course of block foundations must be solid

SOURCE CONTROL: BIOLOGICAL REINFORCED CONCRETE SLABS



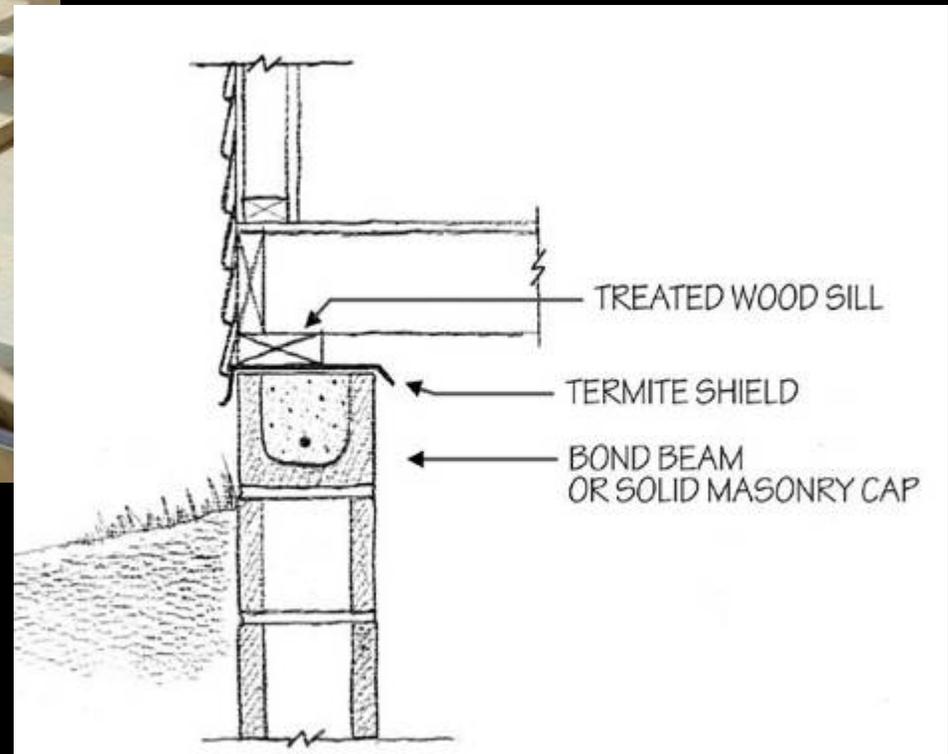
6x6 Welded Wire Mesh at Concrete Slab

SOURCE CONTROL: BIOLOGICAL TERMITE RESISTANT FOUNDATION



Courtesy of Building Science Corp.

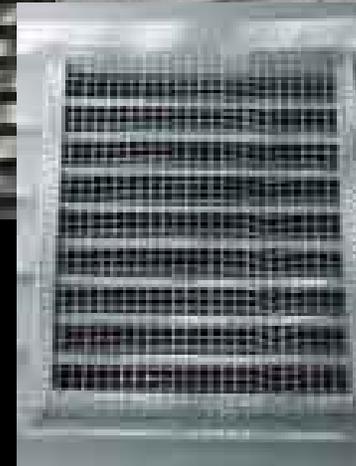
TERMITE SHIELD OPTIONAL



SOURCE CONTROL: BIOLOGICAL RODENT/BIRD SCREENS



Exception: Dryer Vent



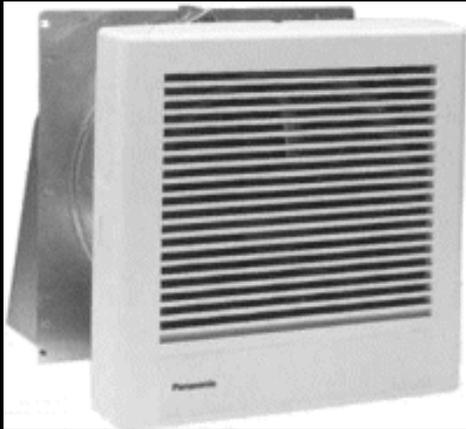
SOURCE CONTROL: COMBUSTION BYPRODUCTS VENTING PROBLEM



SOURCE CONTROL: COMBUSTION BYPRODUCTS POWER/DIRECT VENTED EQUIPMENT



SOURCE CONTROL: COMBUSTION BYPRODUCTS GARAGE EXHAUST FAN

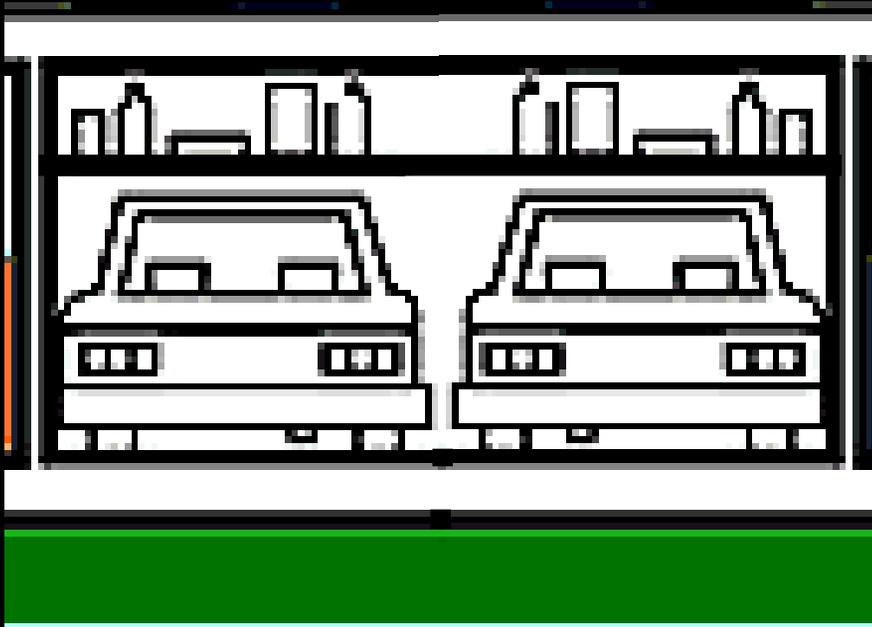


Combustion Byproduct:

- Carbon Monoxide

Plus...

- Pesticides
- Cleaners
- Solvents
- Aerosols
- Glues
- Fertilizers
- Disinfectants



SOURCE CONTROL: COMBUSTION BYPRODUCTS

CO ALARMS



CO Alarm

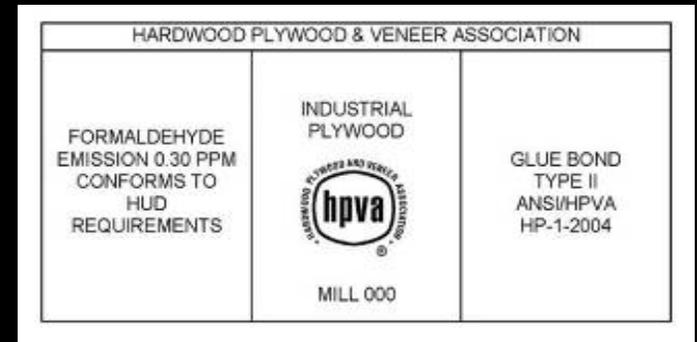
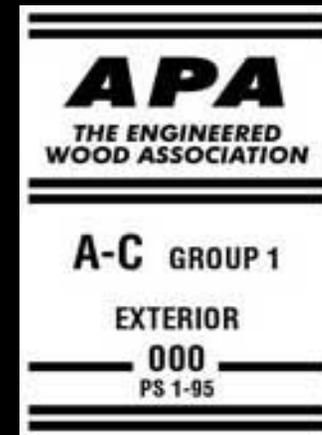


Combined CO &
Smoke Alarm

SOURCE CONTROL: CHEMICAL LOW-EMITTING MATERIALS



Certified
"Green"
Carpeting



MDF & Particleboard

VENTILATION: WHOLE-HOUSE VENTILATION



CONTINUOUS
EXHAUST

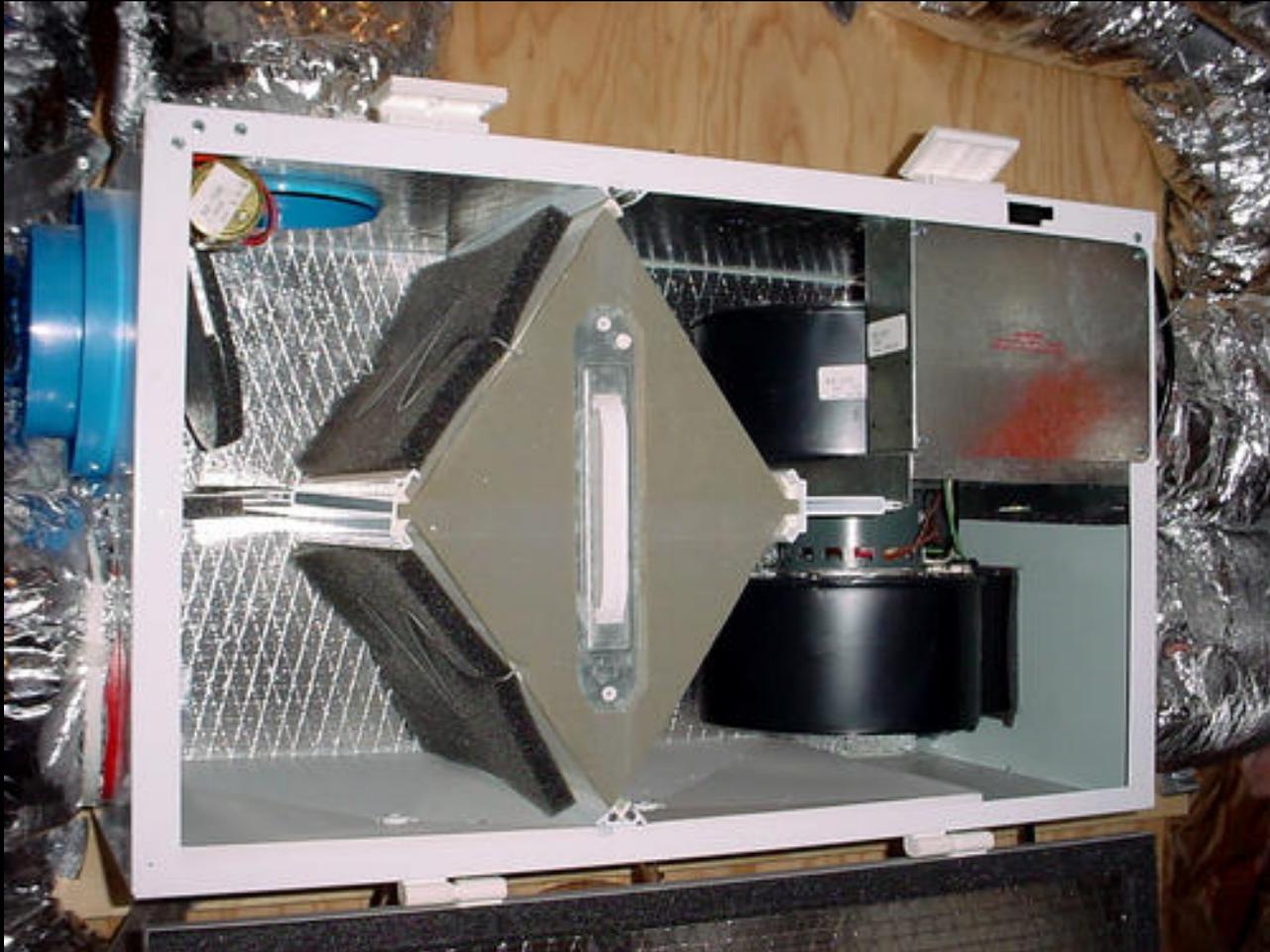


FRESH AIR
DAMPER



DUCTED FRESH
AIR SUPPLY

VENTILATION: WHOLE-HOUSE VENTILATION



ERV

VENTILATION: SPOT VENTILATION



FILTRATION: MERV 8 FILTER

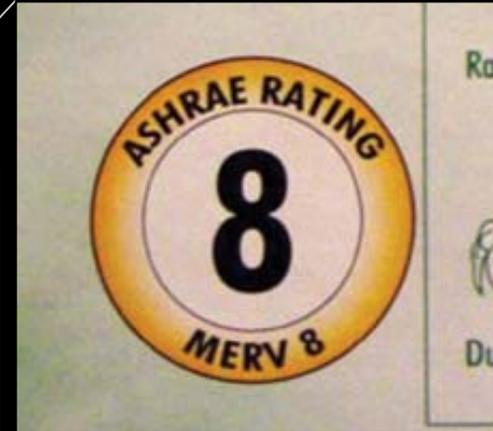


Lasts up to 90 days

Standard
Captures and Reduces These Household Problems

- Respiratory Pollen
- Mold Spores
- Dead-End Debris
- Pet Dander

15x More Effective Than Flat Panel Spun Glass Filters
Low Airflow Resistance Saves on Energy Cost



HOME COMMISSIONING FINAL PREPARATION



REFRIGERANT
CHARGE TEST

Indoor Air Package Simple Checklist Leveraging ENERGY STAR Verification



ENERGY STAR Indoor Air Package Verification Sheet - DRAFT

for Review Only

Address or Div/Lot#:		ST:		Verified		
City:				Builder	Rater	
Section	Requirements (see IAP Builder Guide for details)	N/A	Builder	Rater		
Moisture Control	Water Managed Site & Foundation per EEBA Guide or equivalent, including:					
	1.1	Site/foundation drainage: sloped grade, drain tile, & dampproofing		<input type="checkbox"/>	<input type="checkbox"/>	
	1.2	Capillary break below concrete slabs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1.3	Basements/crawlspaces unvented, insulated, conditioned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1.4	No vapor barrier on inside of basement/crawlspace walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Water Managed Wall Assembly per EEBA Guide or equivalent, including:					
	1.5	Continuous drainage plane, flashed to foundation		<input type="checkbox"/>	<input type="checkbox"/>	
	1.6	Fully flash windows and doors		<input type="checkbox"/>	<input type="checkbox"/>	
	Water Managed Roof Assemblies per EEBA Guide or equivalent, including:					
	1.7	Stormwater runoff system (e.g. gutters/downspouts) (Except Dry (B) climates - map pg 2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1.8	Fully flash roof-wall intersections (step & kickout flashing) and all roof penetrations		<input type="checkbox"/>	<input type="checkbox"/>	
	1.9	Bituminous membrane at valleys & penetrations (Except Dry (B) climates - map pg 2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1.10	Ice flashing at eaves (Except climates 1-4 - map pg 2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Interior Water Management, including:						
1.11	No wall-to-wall carpet in bathing areas				<input type="checkbox"/>	
1.12	1/2 Perm finish on inside of exterior walls (Climates 1, 2, 3A only - map pg 2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Radon	2.1	Radon resistant features per ASTM E1465, IRC, or equiv. (EPA Zones 1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2.2	Provide 2 radon test kits & instructions for use to homebuyer (EPA Zones 1 & 2)	<input type="checkbox"/>	<input type="checkbox"/>		
Pests	3.1	Air seal foundation joints & penetrations			<input type="checkbox"/>	
	3.2	Pest screens at all intentional openings (e.g. soffitt vents)		<input type="checkbox"/>	<input type="checkbox"/>	
HVAC	4.1	HVAC load calcs & equipment design documented and/or performance tested			<input type="checkbox"/>	
	4.2	Duct system design documented and/or performance tested			<input type="checkbox"/>	
	4.3	Duct system total leakage test <4 cfm/100 sf, OR no panned returns + sealed air handler			<input type="checkbox"/>	
	4.4	No air handler or ducts in garage			<input type="checkbox"/>	
	4.5	Room pressure balanced (individual room returns or jump/transfer grills)			<input type="checkbox"/>	
	4.6	Ventilation systems compliant with ASHRAE Std 62.2 (bath/kitchen exhaust + whole house)			<input type="checkbox"/>	
	4.7	Known pollutant sources vented outdoors (i.e. bath, kitchen, clothes dryers, central vac, etc.)			<input type="checkbox"/>	
4.8	Filtration system: min. MERV 8, tight fitting filter rack, no ozone generators			<input type="checkbox"/>		
4.9	Independent dehumidification control to 60% RH (Warm Humid climates only - map pg 2)	<input type="checkbox"/>		<input type="checkbox"/>		
Combustion Pollutants	Combustion Source Controls:					
	5.1	Gas heat direct vented; oil heat & hot water power vented; no unvented heating appliances			<input type="checkbox"/>	
	5.2	Fireplaces & wood/pellet stoves certified to appropriate emissions/efficiency stds (see Guide)			<input type="checkbox"/>	
	5.3	Certified CO alarms outside each sleeping area			<input type="checkbox"/>	
	5.4	No smoking common areas/outside smoking areas >25' from openings (Multi-family only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Attached Garages Isolated & Vented						
5.5	Common walls/ceilings completely sealed & openings gasketed				<input type="checkbox"/>	
5.6	Continuously rated exhaust fan (min. 50 cfm) in attached garages				<input type="checkbox"/>	
Material	6.1	Pressed wood materials (plywood, OSB, MDF) certified low-formaldehyde emissions			<input type="checkbox"/>	
	6.2	Low-VOC Paints & Finishes (approved labels only)			<input type="checkbox"/>	
	6.3	Carpet, cushion, & adhesives qualified for CRI Green Label			<input type="checkbox"/>	
Home Commissioning	HVAC & ductwork commissioned: dry, clean, proper refrigerant charge, & airflow to all registers					
	Ventilate home before occupancy, or advise buyer					
Provide home buyer with completed checklist					<input type="checkbox"/>	
Rater/Provider:		Final Inspection Date:				
Company Name:		Builder Company Name:				
Signature:		Builder Signature:				



EPA
WaterSense

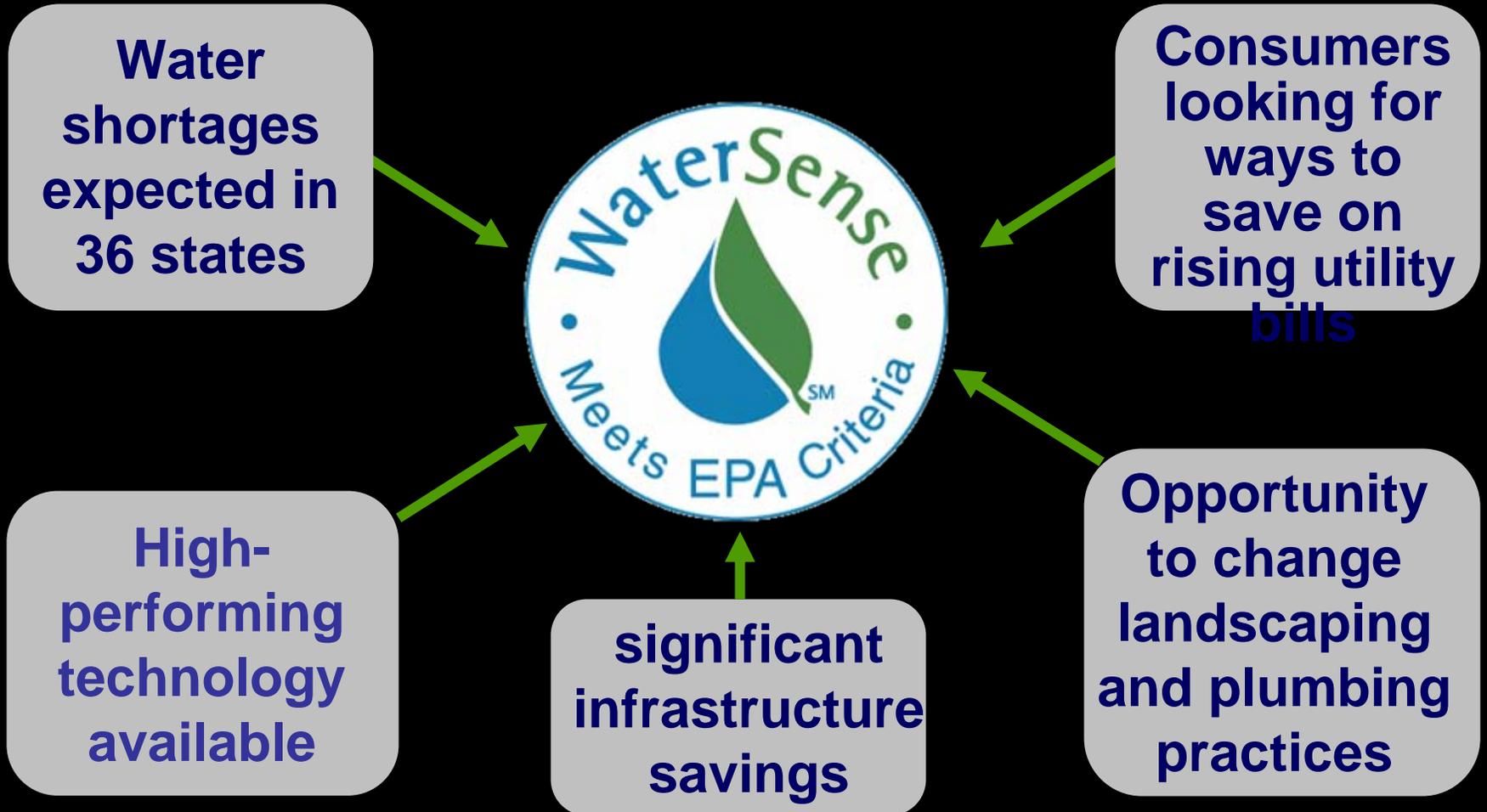
Every drop counts.

Strained Resources



- Updating infrastructure nearly \$500 billion.
- Water efficiency could help delay these costly projects and save energy associated with pumping and treating water.
- Resource constraints affecting utility power

Need for Water Efficiency



Schedule for Evaluating WaterSense Residential Products

	<i>Completed: 2006/2007</i>	<i>Planned: 2008 and Beyond</i>
<i>Irrigation</i>	<i>Certification for Irrigation Professionals</i>	<i>Moisture Sensors Drip Micro Technology Smart Controllers</i>
<i>Residential Plumbing</i>	<i>Toilets Faucets</i>	<i>Showerheads Water Softening Systems</i>
<i>Other</i>		<i>New Homes</i>

Program Benefits—Environmental

Protection:

- **Healthy Aquatic Environments**
- **Availability of Water Resource**
by decreasing need to withdraw ground or surface water supplies
- **Water Quality**
decreases amount of landscaping/irrigation runoff
- **Droughts**

Program Benefits—Energy

Water savings also translate to energy savings:

- ~80% of municipal water processing/distribution costs are for electricity.
- Nationwide, drinking water and wastewater systems use 50 billion kilowatt-hours per year—enough electricity to power more than 4.5 million homes for an entire year.

WaterSense New Home Program

- Existing WaterSense criteria for products and irrigation professionals
- Additional criteria for water-related products and designs.
- Builder differentiation with new label
- Leverage ENERGY STAR verification process

Overview of Specification

Indoor

- Plumbing fixtures
- Hot water distribution
- Appliances (if installed)
- Other equipment (if installed)

Outdoor

- Landscape Design (front only)
- Irrigation (if installed)

Whole House

- Service pressure
- Homeowner's manual



More Information

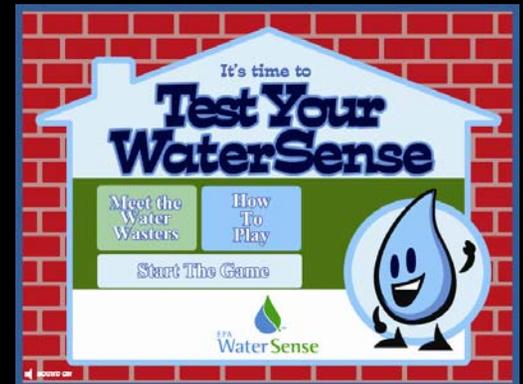
- WaterSense Information

- Web site: www.epa.gov/watersense

- List of products
 - Partnership information
 - Test Your WaterSense Quiz
 - Fact sheets and other resources

- E-mail: watersense@epa.gov

- Toll-free Helpline: (866) WTR-SENS



Myth:

Green

Reality:

Wild, Wild, West

Complex Point Schemes vs. 'Laugh Test'

- Innovation and Design Process
- Location and Linkages
- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Awareness and Education

4 Shades of Green

- Certified
- Silver
- Gold
- Platinum

What Else Do Homebuyers Care About?

- Schools
 - Low Maintenance
 - Security
 - Energy Efficiency
 - Indoor Air Quality
 - Allergy Resistance
 - Disaster Resistance
 - Structured Wiring
 - Finish Package
 - Appliance Package
- ...and the list goes on

What if every
valued attribute
was offered in
4 shades?

Does Green Pass the 'Laugh Test'?

- Truly Energy Efficient?
- Truly Water Efficient?
- Truly Durable?
[Assured Bulk Moisture Control]
- Truly Healthy?
[Toxic Material Limitations]
- Truly Resource Efficient?
[Sustainable Products, Job-Site Waste]

EPA 'Green' Strategy: Define/Promote Thresholds

Energy Efficiency

- Envelope
- Distribution
- Equipment
- Lighting
- Appliances



Indoor Environment

- Bulk Moisture
- Radon
- Pest Control
- HVAC
- Combust. Safety
- Materials

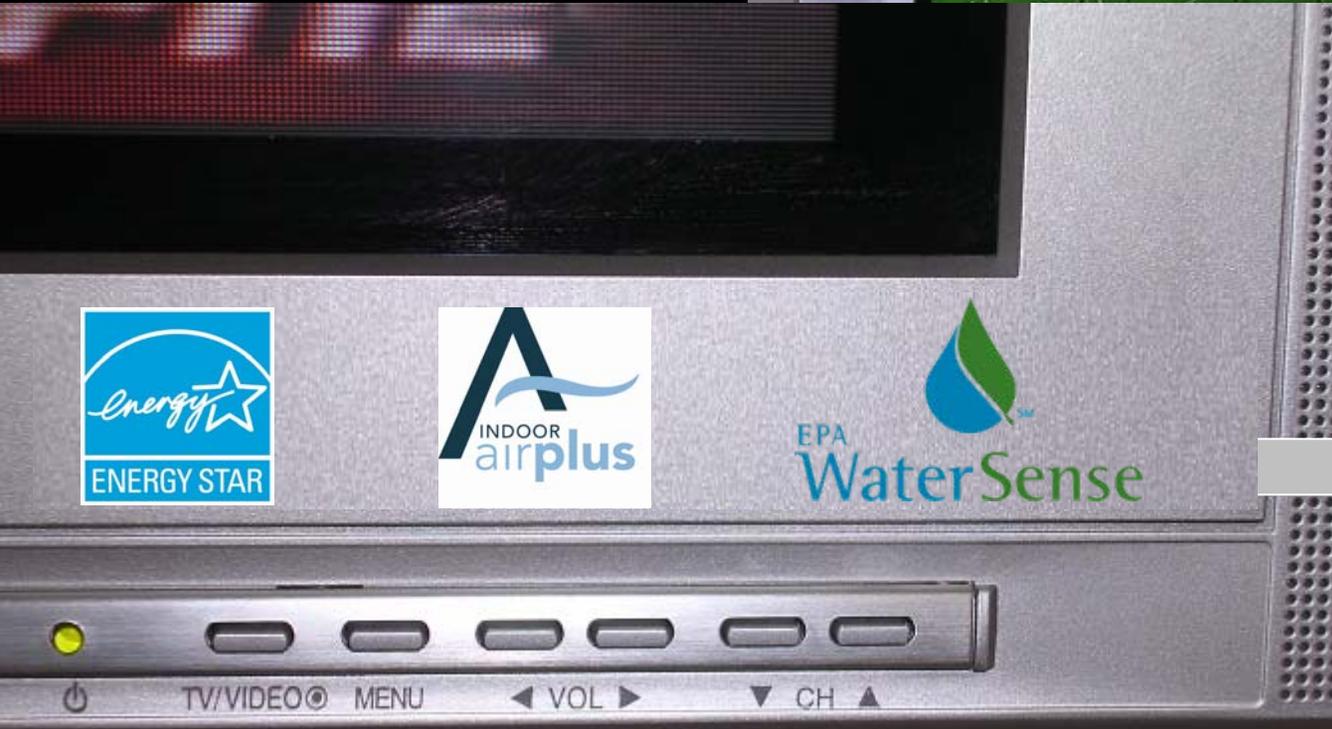


Resource Efficiency

- Water
- Materials
- Waste



EPA 'Green' Bundle



TV/VIDEO

MENU

VOL

CH

Myth:

Zero Energy Home

Reality:

Carbon Neutral Home

Example: 600 kWh/month home

Option 1: Zero Energy (2 kW PV System)

Revenue:

2 kW x 5 hr./day =

10 kWh/day

X 30 day/mo. =

300/kWh/month

X \$.13/kWh =

\$40/month

Cost:

2 kW x \$10,000/kW =

\$20,000

at 6.5% mortgage =

\$140/month

Plus:

Insurance/Maintenance:

\$10-20/month?

Example: 600 kWh/month home
Option 2: Carbon Neutral Home

Assumptions:

\$.045 renewable power premium from utility

Cost :

300 kWh/mo. x \$.045/kWh =

~\$15/month = near carbon neutral

600 kWh/mo. x \$.045/kWh =

~\$30/month = carbon neutral

Example: 600 kWh/month home: Comparison

Zero Energy Home:

2 kW PV System

-\$100+/month

300 kWh/month
carbon footprint

4 kW PV System

-\$200+/month

no carbon footprint

Carbon Neutral Home:

\$.045/kWh RP premium

-\$15/month

300 kWh/month
carbon footprint

-\$30/month

no carbon footprint

Future: Carbon Neutral Home



ENERGY STAR

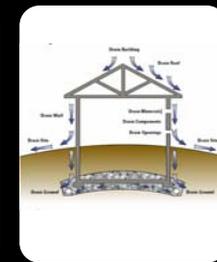
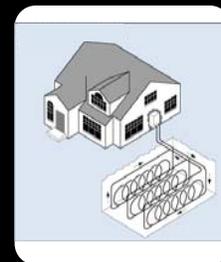
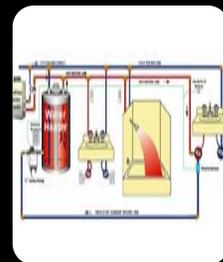
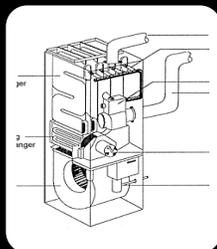
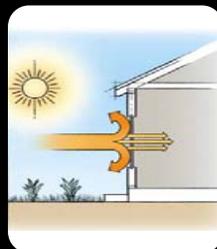
Future Spec



Schematic Diagram of the Solar Energy Systems

On-Site
Renewable

Carbon
Offsets



For More Information:



On the Web at:

<http://www.energystar.gov/homes>

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