

## KEEP IT DRY AND VENTILATED



Healthy Housing Solutions™

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### MOLD & MOISTURE RELATED HEALTH EFFECTS

- Upper respiratory tract symptoms
- Coughing
- Wheezing
- Asthma symptoms
- Hypersensitivity pneumonitis

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### DAMPNESS AND ASTHMA

Health Outcome	Estimated % Increase in Damp Homes
Upper respiratory tract symptoms	52%
Cough	50%
Wheeze	44%
Current asthma	50%
Ever-diagnosed asthma	33%



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### ASTHMA TRIGGERS

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### ASTHMA PREVALENCE

National Current Asthma\* Prevalence (2015)

Characteristic**	Number with Current Asthma (in thousands)	Percent with Current Asthma
Total	24,633	7.8%
Child (Age <18)	6,188	8.4%
Adult (Age 18+)	18,445	7.6%

24.6 million people in the United States have asthma

- 6 million children
- 18.4 million adults

Source: U.S. Centers for Disease Control and Prevention

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### MOISTURE SOURCES

- 💧 Poorly managed rainwater/groundwater
  - Poor roof, wall, window and foundation drainage
  - Defects in rain barriers
- 💧 Plumbing leaks
- 💧 Household sources and condensation
  - Surfaces chilled by mechanical equipment, earth contact, outdoor air contact
  - Unvented space heaters
  - Showers, cooking, breathing
- 💧 Air transported moisture
  - Crawl space moisture or exterior humid air
- 💧 Construction moisture

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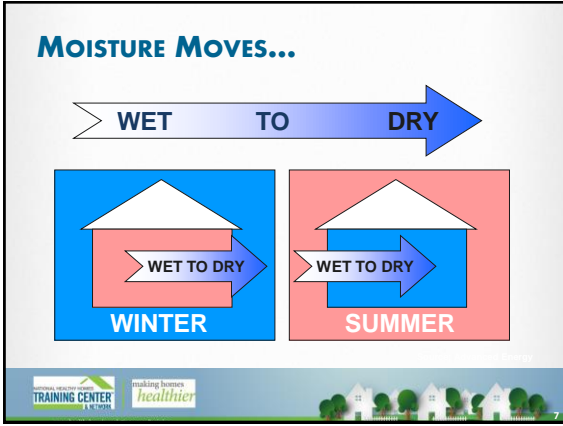
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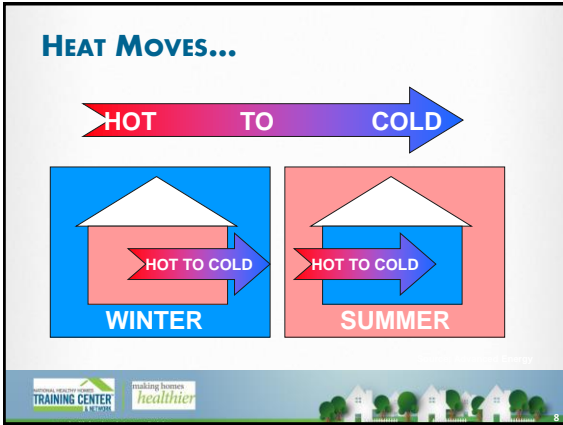
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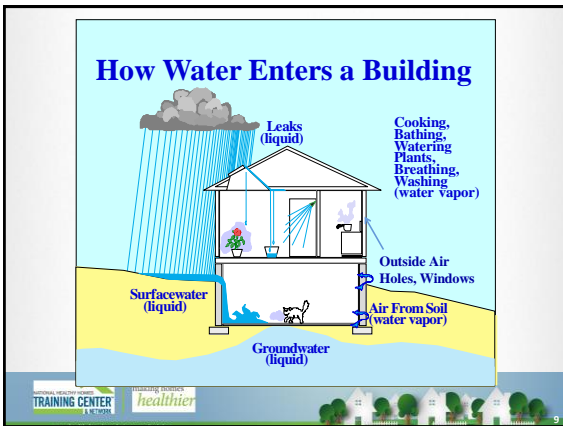
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### PLUMBING LEAKS



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Drain pan in the event of heater leak



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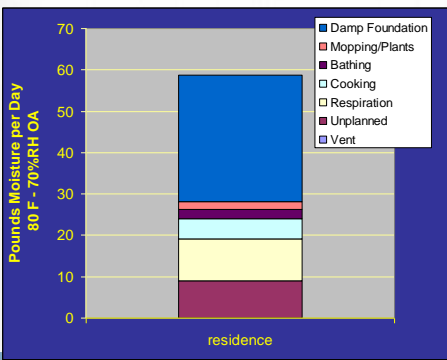
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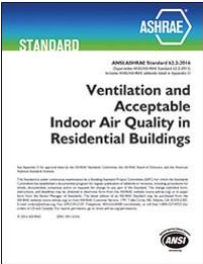
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## ASHRAE 62.2 VENTILATION STANDARD

- Defines exhaust flow requirements for:
  - ◆ Bathrooms
  - ◆ Kitchens
  - ◆ Whole Building
- Latest version is ASHRAE 62.2 - 2016



ASHRAE 62.2-2016

**STANDARD**

**ASHRAE**

**VENTILATION AND ACCEPTABLE INDOOR AIR QUALITY IN RESIDENTIAL BUILDINGS**

ANSI

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Damper work?

Ducted ok?

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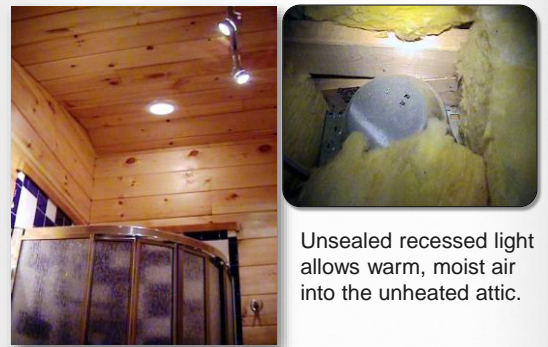
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Unsealed recessed light allows warm, moist air into the unheated attic.

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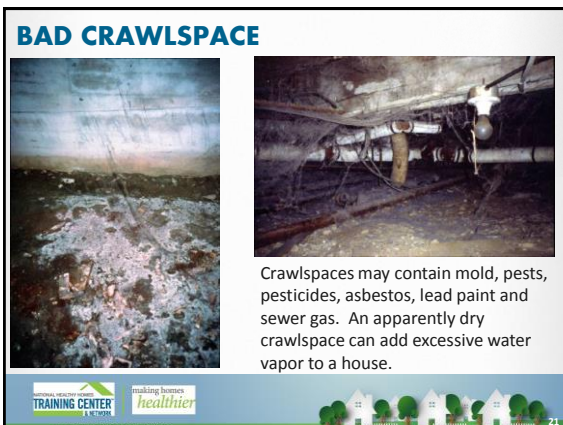
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### FLOOR ABOVE CRAWL SPACE



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### GOOD SEALED CRAWLSPACE



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### ADDRESS INTERIOR MOISTURE FIRST



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If humidity levels are greater than 95% for three to six weeks...

Vacuum bag with mold



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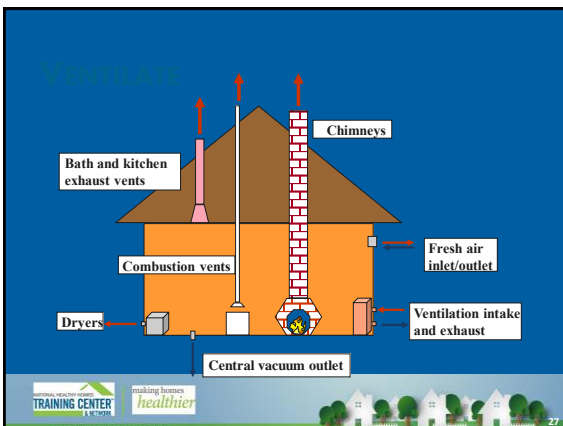
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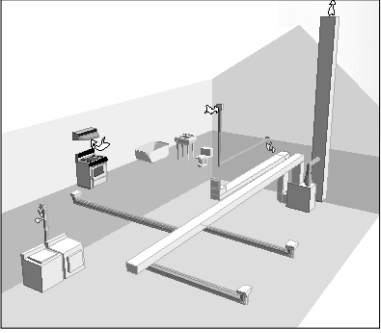
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**Whole House Ventilation**

- Run exhaust continuously
- Provide fan powered outdoor air

**Local exhaust**

- Furnace
- Dryer
- Bathroom
- Kitchen



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Source: Camroden Associates

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**VENTILATE COMBUSTION**



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Is there an exhaust in the bathroom?  
Does it work?



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### TESTING EXHAUST FAN: THE CHARMIN METHOD






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### ENERGY STAR FANS & TIMERS






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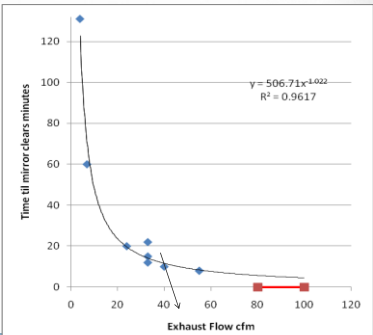
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Fog never forms at 81 cfm



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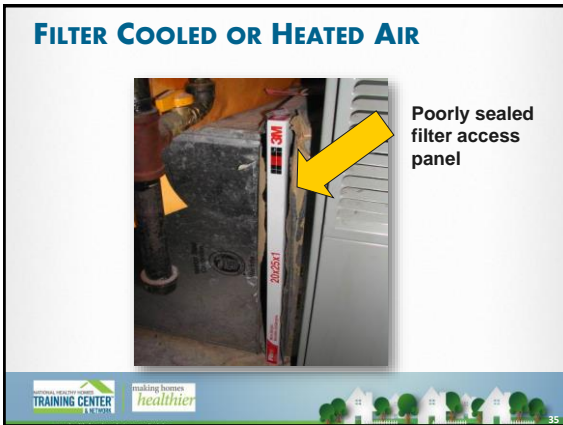
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### MERV RATINGS

Merv	Particle Size (µm)	Typical Controlled Contaminant
1 – 4	>10.0	Pollen, sanding dust, textile and carpet fibers
5 – 8	3.0 – 10.0	Mold, spores, hair spray, cement dust
9 – 12	1.0 – 3.0	Legionella, lead dust, welding fumes
13 – 16	0.3 – 1.0	Bacteria, most tobacco smoke, insecticide dust, copier toner
17 – 20	0.3	Virus, combustion particles, radon progeny



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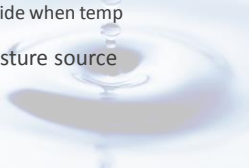
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### MOISTURE ASSESSMENT

- Wet spots/water – inside and outside
- Mold/stains/rot – inside & outside
- Condensation/humidity – attic, living space, windows, basement/crawl space
  - Warning Signs: greater than 65% Rh in when AC on or greater 55% Rh inside when temp <45 degrees
- Always ask: what's the moisture source and likely fix



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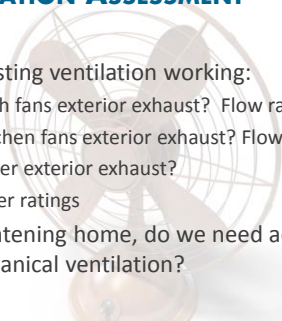
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### VENTILATION ASSESSMENT

- Is existing ventilation working:
  - Bath fans exterior exhaust? Flow rates?
  - Kitchen fans exterior exhaust? Flow rates?
  - Dryer exterior exhaust?
  - Filter ratings
- If tightening home, do we need added mechanical ventilation?



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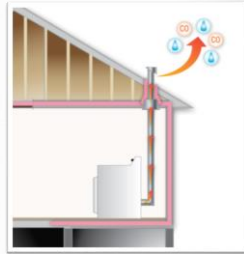
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## HEALTH RELATED WORK PRACTICES

- Venting dryers
- Installing bath fans
- Air sealing crawl spaces



See Advanced Energy for resources  
[www.advancedenergy.org](http://www.advancedenergy.org)



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