

KEEP IT DRY AND VENTILATED

Prepared by The National Center for
Healthy Housing

National Healthy Homes
Training Center
and Network



IOM REPORT MOLD & MOISTURE RELATED HEALTH EFFECTS

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



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%



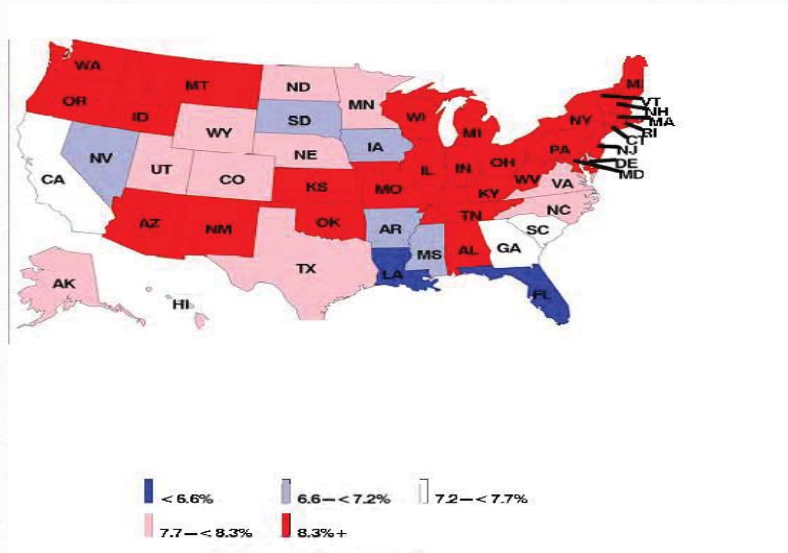
3

ASTHMA TRIGGERS



4

ADULT ASTHMA PREVALENCE 2007



Source CDC



5

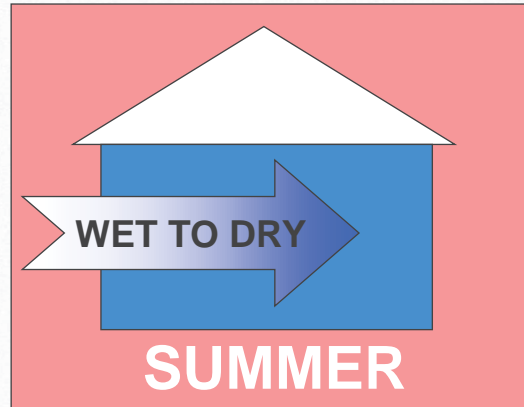
MOISTURE SOURCES

- Poorly managed rainwater/groundwater
 - ◆ Poor roof, wall, window and foundation drainage
 - ◆ Defects in rain barriers
- Plumbing leaks
- Household sources & 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



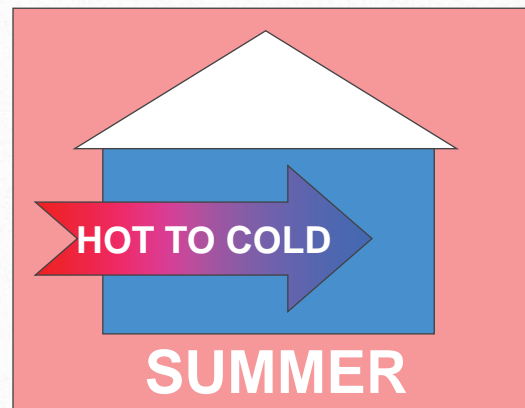
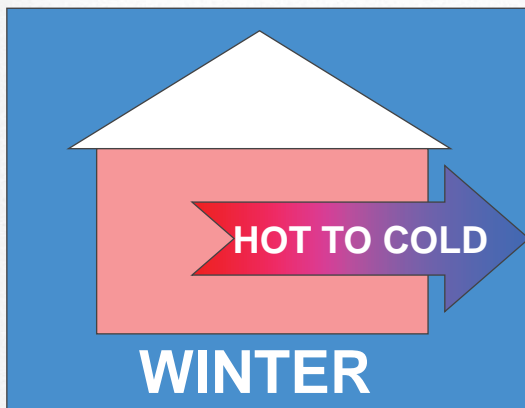
6

MOISTURE MOVES...



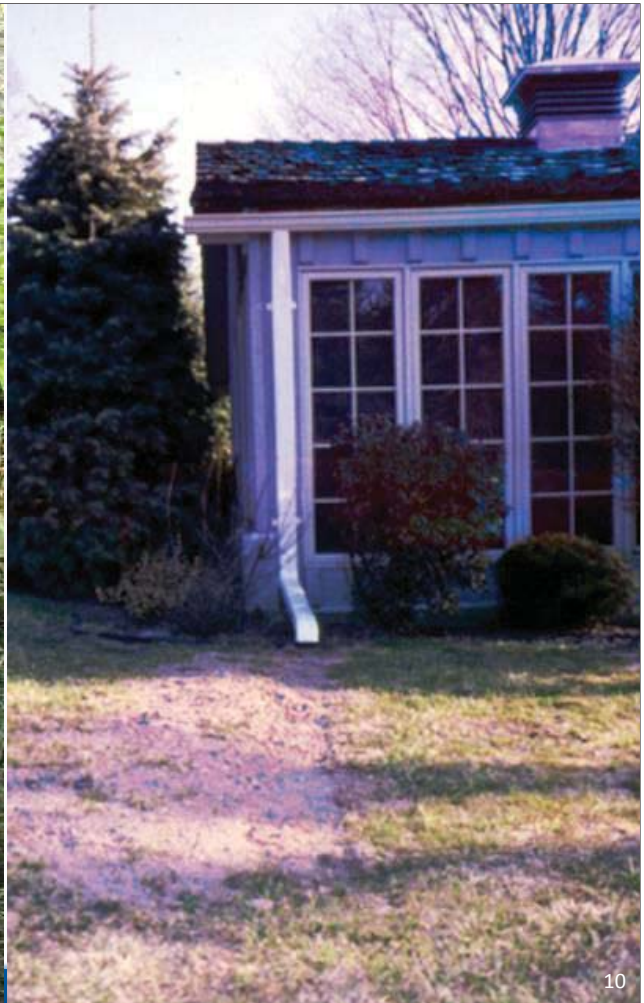
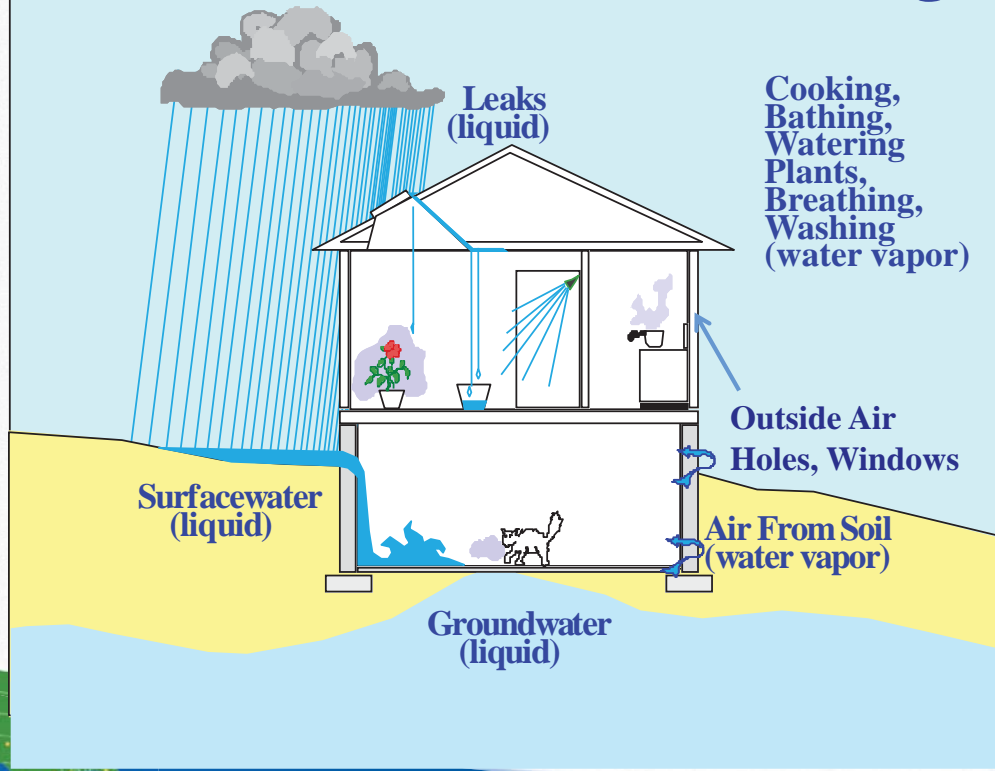
Wind Energy

MOISTURE MOVES...



Wind Energy

How Water Enters a Building





Retrofit rainwater protection



Windows leak?

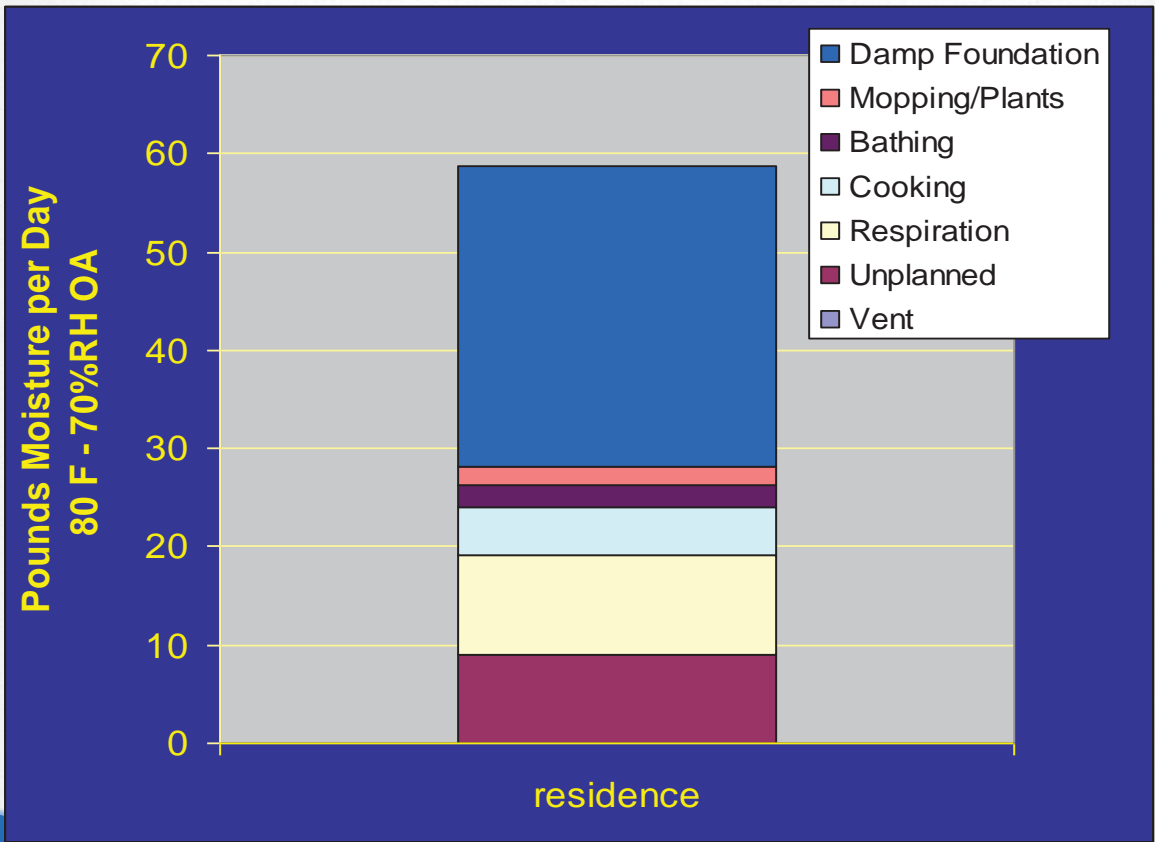


PLUMBING LEAKS



Drain pan in the event of heater leak





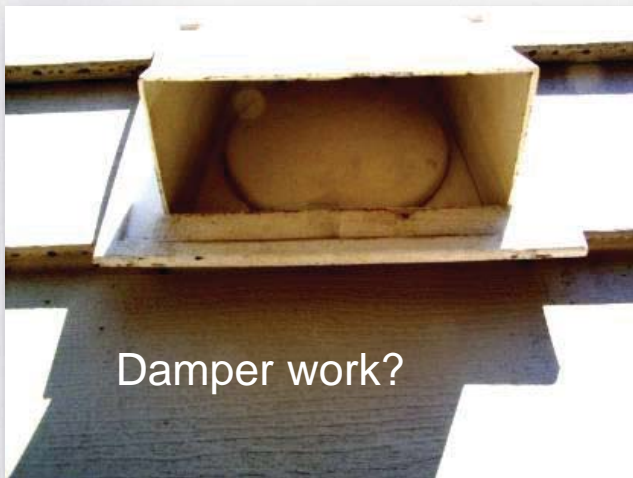
ASTM 62.2

BATHROOM EXHAUST

- 20 cfm continuous
- 80 cfm **intermittent** controlled by: switch, motion sensor, humidistat, etc.



17



18



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



Failed drainage systems



Mold in the air conditioner?



BAD CRAWLSPACE



Crawlspaces may contain mold, pests, pesticides, asbestos, lead paint and sewer gas. An apparently dry crawlspace can add excessive water vapor to a house.



FLOOR ABOVE CRAWL SPACE



GOOD SEALED CRAWLSPACE





Moisture meters are useful in determining whether a material is wet or not and tracing the source of problem water.



25

ADDRESS INTERIOR MOISTURE FIRST



- Moisture where you don't want to insulate – attic sheathing
- Wet walls
- Etc.

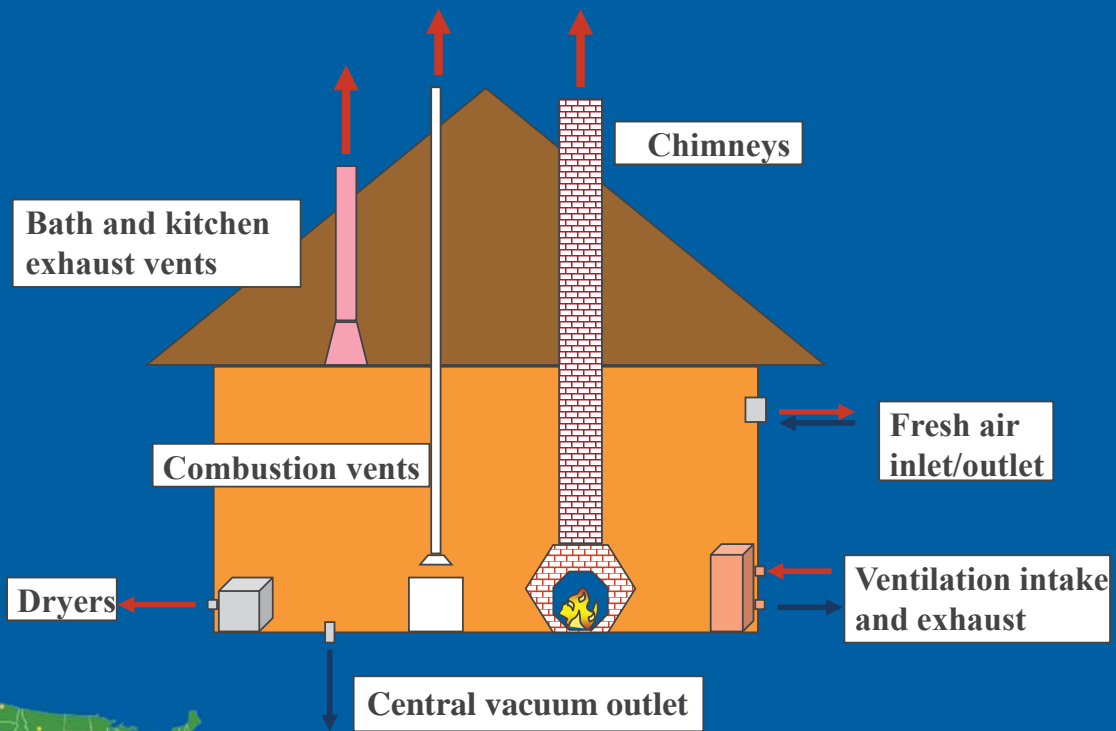


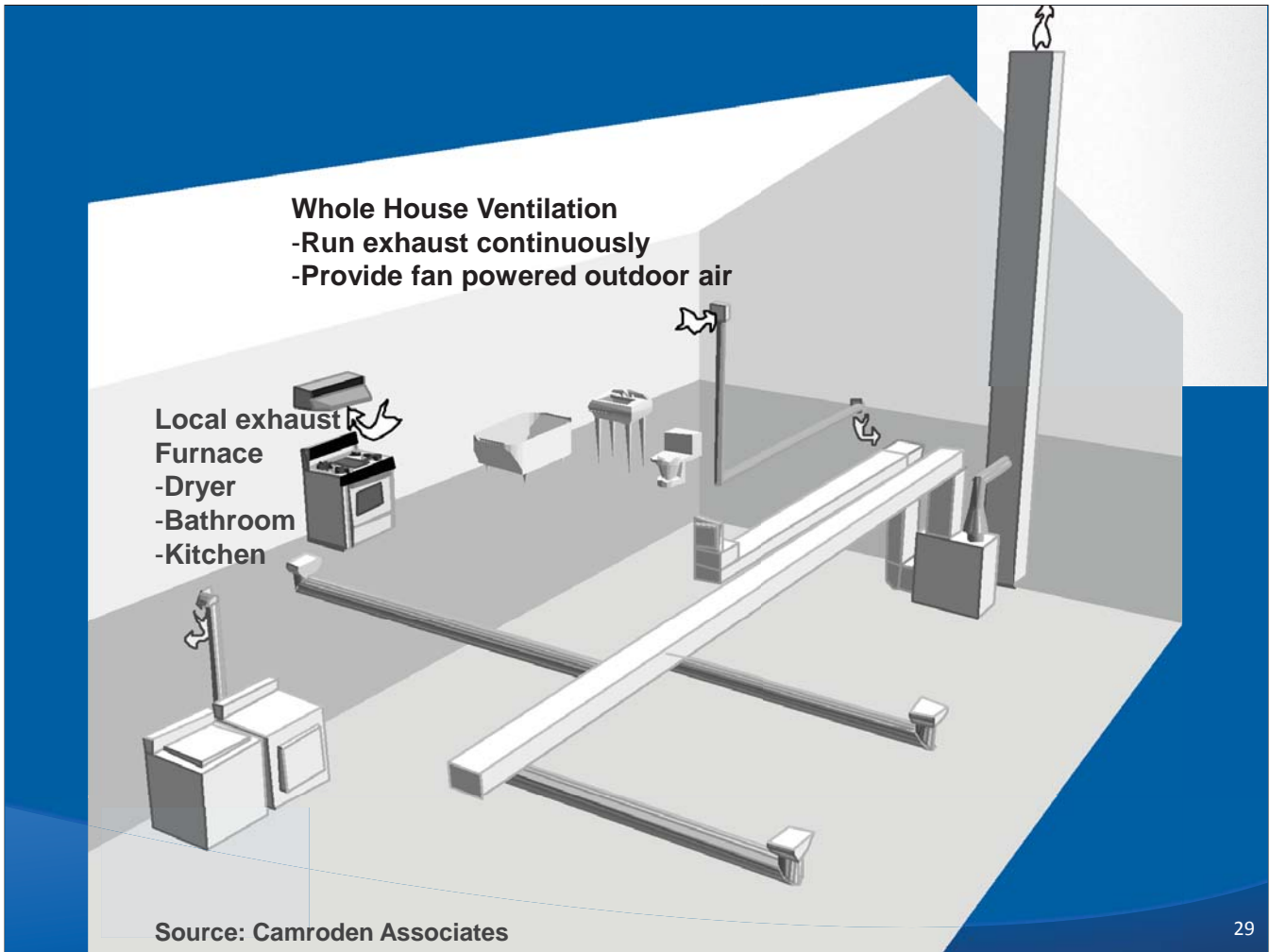
26



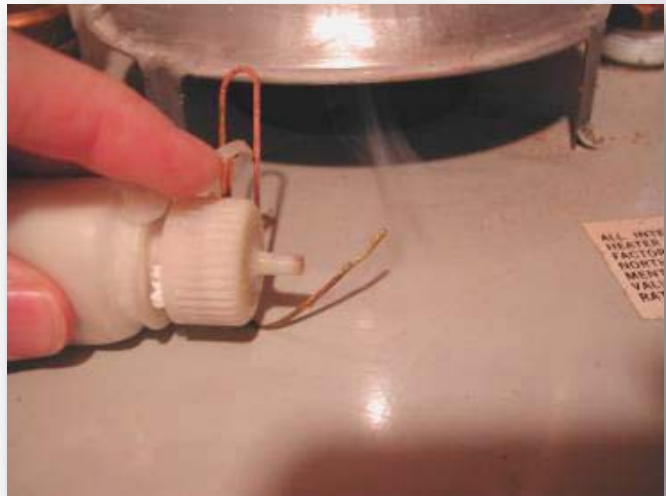
If humidity levels are greater than 95% for three to six weeks...

Vacuum bag with mold





VENTILATE COMBUSTION



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



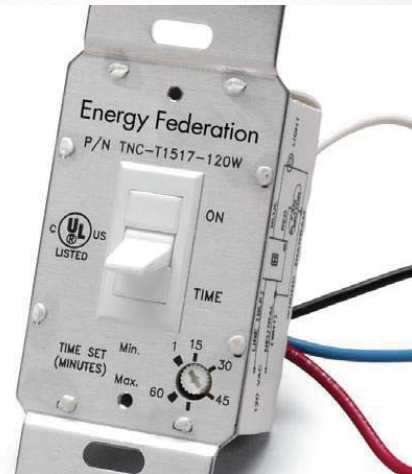
31

TESTING EXHAUST FAN: THE CHARMIN METHOD

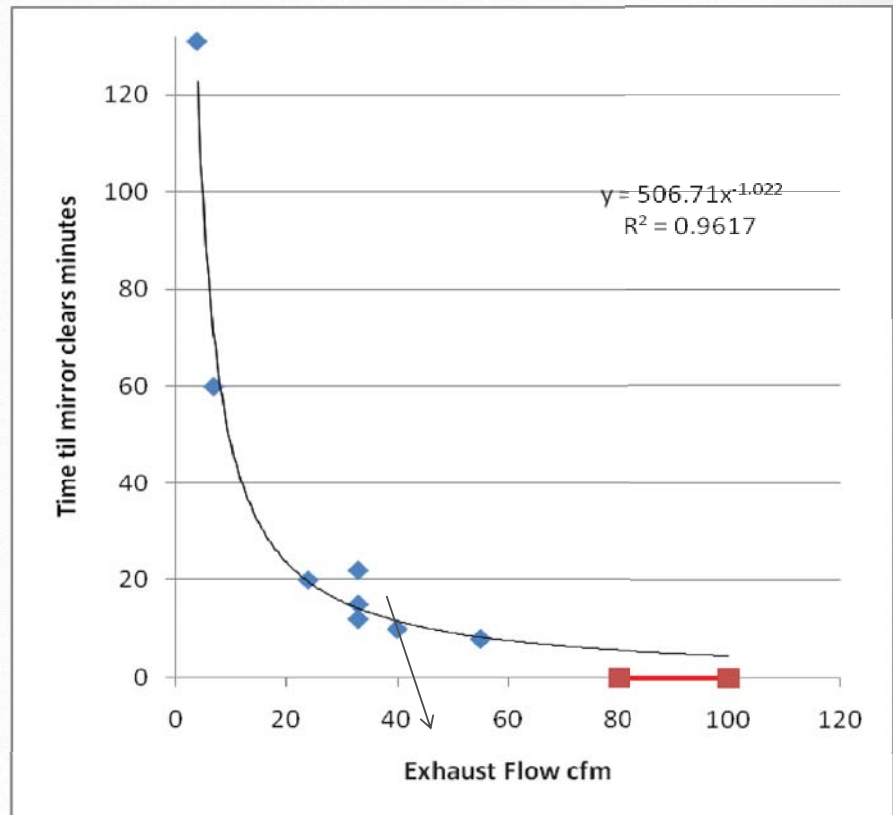


32

ENERGY STAR FANS & TIMERS



**Fog never
forms at
81 cfm**





FILTER COOLED OR HEATED AIR



Poorly sealed
filter access
panel



MERV



- Minimum Efficiency Rating Value (MERV)
- ASHRAE Standard 52.2 – Efficiency in collecting very small particles



37

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



38

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



39

VENTILATION ASSESSMENT

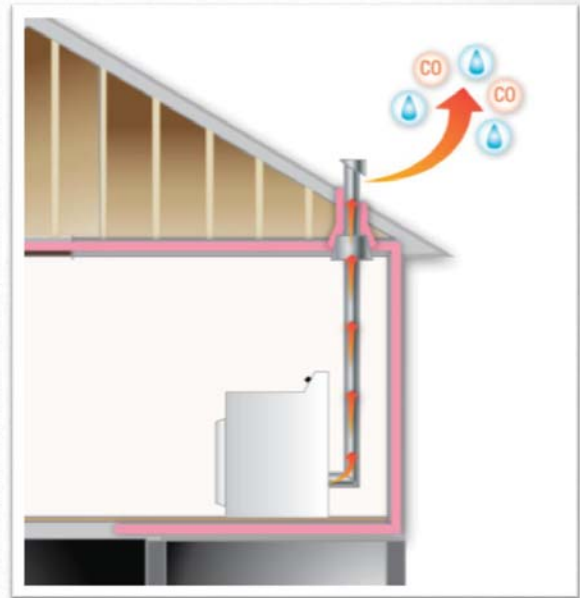
- Is existing ventilation working:
 - ◆ Bath fans exterior exhaust? Flow rates?
 - ◆ Kitchen fans exterior exhaust? Flow rates?
 - ◆ Dryer exterior exhaust?
 - ◆ Filter ratings
- If tightening home, do we need added mechanical ventilation?



40

HEALTH RELATED WORK PRACTICES

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



See Advanced Energy for resources
www.advancedenergy.org