Allowable Activities

Train the Trainer

Learning Objectives

By attending this session, participants will gain an understanding of:

- DOE rules and guidance.
- Definitions and resources for residential building, electrical, and mechanical codes.
- Application of codes in weatherization.
- Definitions and resources for worker safety requirements.
- Benefits of and resources for best weatherization practices.

Key Terminology

American Gas Association (AGA)

American National Standards Institute (ANSI)

Accredited Standards Committee (ASC)

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

Appendix A

ASHRAE 62 - 1989, 62.2 - 2007

Certified Renovator

Codes

Cubic Feet per Minute (CFM)

DOE Memorandum

Grantee

I-Codes

International Association of Plumbing and Mechanical Officials (IAPMO)

International Codes Council (ICC)

International Residential Code (IRC)

Knob and tube wiring

Lead Safe Weatherization (LSW)

Material Safety Data Sheet (MSDS)

National Electric Code (NEC)

National Fire Protection Association (NFPA)

NFPA 31, “Standard for the Installation of Oil-Burning Equipment”

NFPA 54, “National Fuel Gas Code”

NFPA 211, “Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances”

Occupational Safety and Health Administration (OSHA)

Personal Protective Equipment (PPE)

Rules

Subgrantee

Title 10 CFR Part 440

U.S. Department of Energy (DOE)

U.S. Environmental Protection Agency (EPA)

Uniform Mechanical Code (UMC)

Uniform Plumbing Code (UPC)

Weatherization Program Notices (WPN)

Supplemental Materials

Handouts & Resources

Appendix A

Applicable Codes Handout

Applicable sections of NFPA 54: *National Fuel Gas Code*

MSDS for two-part foam

Occupational Safety and Health Administration. "Carbon Monoxide Poisoning QuickCard™" OSHA 3282 – 2005. www.osha.gov/OshDoc/data_Hurricane_Facts/carbon_monoxide.pdf.

Occupational Safety and Health Administration "Fall Protection Tips QuickCard™" OSHA 3267 – 2005. www.osha.gov/Publications/fall_protection_qc.html

U.S. Department of Energy Hot Climate Initiative. *Combustion Appliance Safety & Efficiency Testing*.U.S. Department of Energy. Knob and Tube Memorandum 1988. Oct. 21, 1988.

U.S. Department of Energy Weatherization Assistance Program, Midwest Regional Field Office. *Midwest Weatherization Best Practices Field Guide* May 2007: 37-56. www.karg.com/ pdf/Midwest_Wx_Best_Practices_May_2007.pdf.

U.S. Department of Energy. Weatherization Assistance Program. *WPN 08-4 Space Heater Policy*. March 3, 2008. www.waptac.org.

Weatherization Training Approaches and Resources Appendix (located in "Ongoing Training – Approaches and Resources" folder).

Class Overview

Deliver the presentation to the class. This presentation focuses as much on pointing out resources as on content. If Wi-Fi access is available, use the links in the PowerPoint presentation to show the Websites listed in the bullets. Distribute handouts when prompted in the speaker notes and for the class exercise.

- **Exercise – What is required?**

  Slides 11 through 16 illustrate common weatherization work order requests. Distribute the "Applicable Codes Handout." Divide the class into manageable groups of three or four students. For each slide, give the groups 5 to 10 minutes to decide which codes/rules apply. Have them list any required actions, any needed calculations to size installed measures or equipment, etc. Have each group list its answers on a flip chart. Compare answers and decide as a class on the correct response(s) to each situation.

  Suggested responses:

  - **Slide 11: Work order says, "Insulate over knob and tube wiring."**

    The National Electric Code requires that all wiring junction boxes, not just knob and tube, be flagged before insulating over them.

    The National Electric Code 394.12 specifically forbids enveloping knob and tube wiring with thermal insulation.

    DOE policy allows insulating around knob and tube wiring if certain conditions are satisfied:

    - All affected live knob and tube wiring is visually examined to see that it is in good condition and tested to see that the circuit voltage drop is less than 10%.
    - The circuit breaker or fuse controlling the circuit is matched to the wire gauge.
    - Correct amperage "S" type fuses are installed if the fuse panel has screw-in fuses.
    - All affected circuits in walls are evaluated, not just visible wiring in attics or elsewhere.

  - **Slide 12: Work order says, "Add attic venting as necessary."**

    The International Residential Code requirement for attic venting is:

    - 1 sq. ft. of net free vent area for every 300 sq. ft. of attic floor area if there is a vapor barrier.
    - 1 sq. ft. of net free vent area for every 150 sq. ft. of attic floor area if there is no vapor barrier (2009 IRC 806.2).

    Sloped ceiling area is included in the attic floor area for this calculation.

Existing ventilation:

- Three 8-ft. x 26-ft. ceiling sections = 624 sq. ft./300 sq. ft. = 2.08 sq. ft. net free vent area required.
- (12 in. x 18 in.)/2 [screening blocks 1/2 of the free vent area] x 2 vents = 2 x (1 ft. x 1.5 ft.)/2 = 1.5 sq. ft. net free vent area existing.
- 0.58 sq. ft. additional net free vent area is needed.

Choices:

- Add one 8 in. x 10 in. vent to each end = 2 vents x (0.67 ft. x 0.83 ft.)/2 = 0.56 sq. ft. added net free vent area.
- Replace existing vents with 12 in. x 24 in. vents = 2 x (12 in. x 24 in.)/2 = 2 x (1 ft. x 2 ft.)/2 = 2 sq. ft. net free vent area.
- Replace existing vents with 14 in. x 24 in. vents = 2 x (1.17 ft. x 2 ft.)/2 = 2.34 sq. ft. net free vent area.
    - Which is correct?
- Adding the 8 in. x 10 in. vents is the least expensive way to satisfy the code requirement, but it is usually cosmetically unacceptable.
- Replacing the existing vents with 12 in. x 24 in. vents creates a net free vent area that's slightly under the code, but it's probably close enough for most authorities.
- Replacing the existing vents with 14 in. x 24 in. vents creates a net free vent area that's slightly over the code. It's the safe choice.

Think outside the box! Use zonal pressure diagnostics (ZPD) to establish existing net free ventilation area from existing cracks and holes. Almost all houses have sufficient crackage to meet ventilation code requirements without adding any venting! Be sure to check with codes official to confirm acceptance of this method.

- **Slide 13: Work order says, "Replace bedroom window."**

  2006 & 2009 IRC 310.1.2 & 3 require a minimum 20-in. wide by 24-in. high, 5.7 sq. ft. clear opening area, or 5.0 sq. ft. with direct grade-level access for upper-story bedroom egress windows, including habitable attics. Note: 24 in. x 20 in. = 3.34 sq. ft., meaning at least one dimension must be greater than the code minimum. Yes, both dimensions can exceed the minimum.

  27 in. x 44 in. = 1,188 sq. in./144 sq. in. = 8.25 sq. ft., but the existing window is single hung, allowing only half the opening or 4.125 sq. ft.

  Q: Is the replacement window "grandfathered?"

  A: No. It must be an egress window.

  A casement window is the easy answer, but it won't match the building style or appearance.

The pictured double-hung unit is acceptable because both sashes tilt in, allowing almost the full sash area to be free of any obstruction.

For a home built before 1978:

- Installers must be lead-safe certified by EPA and work must be supervised by a certified firm.
- Lead-safe work practices must be used.

- **Slide 14: Work order says, "Replace attic hatch."**

  The International Code Council's International Residential Code (IRC), 2009 IRC 807.1 requires a minimum rough opening of 22 in. x 30 in. if the attic is larger than 30 square feet. 2009 IRC 807.1 requires a minimum of 30 inches of headroom between the hatch opening and roof framing at one point at least.

  For a home built before 1978:

  - Installers must be lead-safe certified by EPA and work must be supervised by a certified firm.
  - Lead-safe work practices must be used.

- **Slides 15, 16: Work order says, "Install new bath fan and control."**

  The National Electric Code applies. All wiring must be done by a licensed electrician. Legally, a resident homeowner can wire his own home. Over the years, some Community Action Agency employees and contractors have convinced homeowners to "twist the screws and wirenuts" to save a few dollars. DO NOT DO THIS! The potential liability risks are too high.

  For homes built before 1978:

  - Installers must be lead-safe certified by EPA and work must be supervised by a certified firm.
  - Lead-safe work practices must be used.

What is the appropriate fan CFM?

- ASHRAE 62-1989: Greater of 15 CFM/person (minimum 5 persons) or 0.35 air changes per hour (ACH) (conditioned volume)
  - 5 x 15 = 75 CFM
  - 0.35 ACH = volume x 0.35 = 9,000 cu. ft. x 0.35 = 3,150 cu. ft. per hour (CFH)/60 minutes = 52.5 CFM
  - The fan must provide at least 75 CFM
- ASHRAE 62.2-2007: Bath fan must be rated at 100 CFM. If used to satisfy indoor air quality, ventilation must provide 7.5 CFM/person (occupancy determined by number of bedrooms plus 1) plus 1% of the conditioned floor area in sq. ft.
  - [7.5 CFM x (3+1)] + [0.01 x (12 ft. x 20 ft. + 16 ft. x 8 ft. + 16 ft. x 26 ft. + 16 ft. x 26 ft.)] = (7.5 x 4) + [0.01 x (240 sq. ft. + 128 sq. ft. + 416 sq. ft. + 416 sq. ft.)] = 30 + 0.01 x 1,100 sq. ft. = 30 + 11 = 41 CFM
  - The fan should be set to deliver 41 CFM continuous, 20.5 CFM, ½ hour on, and ½ hour off.

Ask students to volunteer similar situations they regularly encounter, describing what is usually done and why.