

Allowable Activities

Train the Trainer

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

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)

Section Transition

Learning Objectives (Slide #2)

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.

Defining Allowable Activities (Slide #3)

Training must be consistent with:

- DOE *rules* and guidance.
 - **Appendix A (Title 10 CFR Part 440)** – These regulations, established by the Energy Conservation in Existing Buildings Act of 1976, direct DOE to provide weatherization assistance to low-income persons. Appendix A is that portion of the regulations that defines allowable materials that may be installed on homes.
 - **Weatherization program notices (WPN)** – Program notices released periodically by DOE to *grantees* provide program guidance, policy, or clarifications. Examples include WPN 08-4, “Space Heater Policy,” and WPN 02-6, “Weatherization Activities and Federal Lead-based Paint Regulations.” The grantees must distribute WPNs to their *subgrantees* and training network.
- State program standards:
 - Mirror DOE rules.
 - Defer to local authority having jurisdiction – Local codes may be more stringent than Federal or State regulations or the **International Residential Code (IRC)**. Trainers should stress that agencies must abide by the most stringent code.

Reference Appendix A and WPN 08-4.

Building Codes (Slide #4)

- **International Codes Council (ICC)** codes (**I-Codes**) (www.intlcode.org) provide minimum construction safeguards for homes, schools, and the workplace. The I-Codes are comprehensive, coordinated building safety and fire prevention codes. They are available for purchase at www.intlcode.org.
- IRC (www.intlcode.org) is a comprehensive, stand-alone residential code that creates minimum regulations for one- and two-family dwellings of three stories or less. (See also ICC.) The 09 IRC refers to the code published in 2009.

Electrical and Mechanical Codes (Slide #5)

- The *American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)* (www.ashrae.org) develops standards for refrigeration processes and the design and maintenance of indoor environments.
- The *National Fire Protection Association (NFPA)* (www.nfpa.org) develops, publishes, and disseminates **codes** and standards that minimize the possibility and effects of fire and other risks. Codes are available for purchase at www.nfpa.org. Frequently referenced codes in weatherization are *NFPA 211*, “*Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*,” *NFPA 54*, “*National Fuel Gas Code*,” and *NFPA 31*, “*Standard for the Installation of Oil-Burning Equipment*.”
- The *National Electric Code (NEC)*, also known as NFPA 70, is a comprehensive, stand-alone residential code that creates minimum regulations for one- and two-family dwellings of three stories or less. (See also ICC). The 09 IRC refers to the code published in 2009. The NEC is available at www.nfpa.org.
- The *International Association of Plumbing and Mechanical Officials (IAPMO)* (www.iapmo.org) works with government and industry to implement comprehensive plumbing and mechanical systems codes around the world through the *Uniform Mechanical Code (UMC)* and the *Uniform Plumbing Code (UPC)*.
- National Fuel Gas Code – The *American Gas Association (AGA)* promulgates revisions of the National Fuel Gas Code through the *American National Standards Institute’s (ANSI) Accredited Standards Committee*. The ASC Z223 develops and publishes the National Fuel Gas Code, also known as ANSI Z223.1 and NFPA 54. The code is jointly developed with the NFPA 54 Committee.

Student Safety #1 (Slide #6)

Is it safe?

Q: What’s wrong with the picture on the right?

*A: Ladder scaffolding must be approved by the **Occupational Safety and Health Administration (OSHA)** or it must be free-standing steel scaffolding.*

Q: What’s wrong with the picture on the left?

A: Drinking on the job is absolutely forbidden. The short piece of lumber being cut should be clamped to the saw horse. The saw blade is reversed.

Student Safety #2 (Slide #7)

Trainers must:

- Assure safety of students.
- Follow safety regulations.
- Provide *personal protective equipment (PPE)*.

Safe work practices must be applied in a training lab and in on-site training, just as they would on a real job.

Trainer Requirements (Slide #8)

Trainers must possess a working knowledge of:

- U.S. Department of Energy (DOE) Weatherization Assistance Program regulations and policy regarding worker safety.
- *U.S. Environmental Protection Agency (EPA)* guidelines for asbestos, lead, mold, and other health hazards – In homes built before 1978, *lead safe weatherization (LSW)* practices are required to minimize the dangers of lead dust. An EPA *Certified Renovator* must be on site during this work.
- Occupational Safety & Health Act (OSHA) standards. See <http://www.osha.gov/>.
- *Material Safety Data Sheets* (MSDS) contain data on the properties of potentially unsafe substances. MSDS provide workers and emergency personnel with procedures for handling or working with those substances safely.

Hand out MSDS on two-part foam, “OSHA Fall Protection Tips,” and “OSHA Fact Sheet – Outreach Training Program.” Review documents in class, pointing out the important elements contained within.

Best Practices (Slide #9)

Best practices:

- Explain how to do the right things the right way.
- Go well beyond standards.
- Offer a consistent technical approach.
- Promote quality workmanship.
- Help with quality assurance.

Best practices are guidelines for how work should be performed by auditors, heating technicians, and workers in the field. Field guides such as those that have been published for various weatherization regions are an effective means of communicating best practices. One example is the “Midwest Weatherization Best Practices Field Guide,” available at www.waptac.org. Technical briefs, such as “Combustion Appliance Safety & Efficiency Testing,” published as part of the DOE Hot Climate Initiative, are another excellent resource.

Reference Midwest Weatherization Best Practices Field Guide, available at www.waptac.org, and hand out “Combustion Appliance Safety & Efficiency Testing.”

Exercise — What Is Required? (Slide #10)

Introduce Exercise #1: What Is Required? (45 minutes). Refer to Lesson Plan for details. Hand out Applicable Codes Table.

Insulate over Knob and Tube Wiring (Slide #11)

Knob and tube wiring is common in homes built before World War II. Properly installed and used as designed, it is safe. Problems typically arise from circuit over-fusing and overloading and from amateur modifications.

Codes and rules govern weatherization measures that come into contact with knob and tube wiring.

- The 2008 National Electric Code 314.29 requires that all wiring junction boxes remain accessible. Flagging all boxes before insulating over them achieves this easily.
- The 2008 National Electric Code 394.12 forbids enveloping knob and tube wiring in thermal insulation. While it is a national code, it is enforced at the State and local levels.
- Generally, one of the national building codes—all of which reference the NEC for electrical requirements—is the basis for State and local code. Therefore, if a building code is in effect, the NEC knob and tube ban is also in effect unless the code has been amended locally.
- DOE’s official position on installation of thermal insulation around knob and tube wiring is stated in the October 21, 1988 DOE’s knob and tube memorandum: “...it is the state’s responsibility to ensure that such work be in conformance with the applicable codes in the jurisdiction where the work is being performed.”
- 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.
 - #14 wire = 15 amp fuse/circuit breaker.
 - #20 wire = 20 amp fuse/circuit breaker.
 - 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, etc.

- A State weatherization program wishing to take advantage of the DOE policy must say it is doing so in its DOE State Plan, and also determine that the activity is allowable under any applicable State and local codes.

Applicable codes/rules:

- 2008 National Electric Code 314.29 and 394.12.
- *DOE Memorandum.*

Attic Venting (Slide #12)

Add attic venting as needed. Attic (and crawl space) venting is extremely controversial. The International Residential Code (IRC) requirement for attic venting of 1 square foot of net free vent area for every 300 square feet of attic space (1/300) is an arbitrary number dating back to a 1942 document with no citations or references.¹ Refer interested students to DOE's Building America program or www.buildingscience.com. Both have extensive coverage of the pros and cons of attic and crawl space venting, along with code-approved alternatives.

Applicable codes/rules:

- IRC 806.1 – 806.4.
- EPA/OSHA lead paint rules and regulations (if house was built before 1978).

Replace Bedroom Window (Slide #13)

Applicable codes/rules:

- National Fire Protection Association egress code, 2006 & 2009 IRC 310.1 - 310.4

Q: Is the replacement window “grandfathered?”

A: No.

- WPN 09-6 and EPA/OSHA lead paint rules and regulations (if house was built before 1978).

Replace Attic Hatch (Slide #14)

Applicable codes/rules:

- 2009 IRC 807.1.
- WPN 09-6 and EPA/OSHA lead paint rules and regulations (if house was built before 1978).

¹ Rose, William B. *Early History of Attic Ventilation*. Building Research Council – School of Architecture, University of Illinois at Urbana-Champaign. 1995.

Install New Bath Fan and Control (Slide #15)

Applicable codes/rules:

- National Electric Code.
 - Anyone can disconnect electrical wiring, but only a licensed electrician or the resident homeowner can connect electrical equipment.
- 2009 IRC 1501.1 – Bath fan may not discharge into any part of the attic.
- WPN 09-6 and EPA/OSHA lead paint rules and regulations.
- **ASHRAE 62 -1989** or **ASHRAE 62.2 -2007**.

Note: Use Floor Plan slide for volume and square footage of conditioned space.

Floor Plan (Slide #16)

Use dimensions from this slide to calculate bath fan *cubic feet per minute (CFM)* and run time.

Refer to Lesson Plan for calculations.

Summary (Slide #17)

- Weatherization trainers must be aware of and incorporate all applicable rules and codes into their training curriculum.
- Trainers must assure the safety of their students in lab exercises and on-site training activities.
- Trainers should incorporate nationally recognized best practices into all their teaching protocols.