# Mobile Home Heating Systems

# Weatherization Installer/Technician Mobile Homes

Learning Objectives

By attending this session, participants will become aware of:

* Mobile home heating system characteristics.
* Mobile home heating system components.
* Furnace testing protocols.
* Furnace testing equipment.
* Improvements through cleaning and tuning.
* Furnace replacement criteria.

Key Terminology

Blowers

Cad cell

Carbon dioxide (CO2) content

Carbon monoxide (CO) content

Combustible gas leak detector

Combustion air

Combustion efficiency

Concentric flue

Conditioned air

Digital probe thermometer

Downflow

Draft gauge

Fan-off temperature

Fan-on temperature

Flue gas

Heat exchanger

Heat rise

High limit

Inspection Mirror

Make-up air

Manual J

National Fire Protection Association (NFPA) code

Oxygen (O2) content

Roof jack

Sealed combustion

Smoke tester

Steady-state efficiency

Temperature rise

Supplemental Materials

Handouts & Resources

DOE. EERE. “Combustion Equipment Fact Sheet” Oct. 2000.

DOE Hot Climate Initiative. *Combustion Appliance Safety & Efficiency Testing*.

Greely, Kathy, John Randolph, and Bill Hill. “A Warm Wind Blows South: Virginia's Weatherization Evaluation.” *Home Energy* Jan./Feb. 1992: 15-21. www.homeenergy.org.

NFPA54: National Fuel Gas Code (applicable sections).

NFPA211: Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances (applicable sections, especially Table 2-2.1, “Chimney Selection Chart”).

Scott, Bob, and Lyn M. Bartges. “Weatherizing Mobile Homes.” *Home Energy* July/Aug. 2004. www.homeenergy.org.

US DOE WAP, Midwest Regional Field Office. *Midwest Weatherization Best Practices Field Guide* May 2007: 52-61, 190-191.

Classroom Props & Activities

* A used mobile home furnace or two: Consider contacting a furnace contractor or local weatherization agency and request that they donate one or two used mobile home furnaces that may have been destined for the scrap heap. Leave one intact to show how the major components are integrated.
* Dismantle another used furnace to show its major components, such as the heat exchanger, blower, and gas burner.
* An oil burner that can be dismantled and reassembled.
* A dirty air filter.
* Diagnostic equipment such as:
  + Combustion analyzer: for sampling flue gases.
  + Draft gauge: for testing chimney draft.
  + Combustible gas leak detector.
  + Smoke tester: for testing amount of chimney smoke that serves an oil-burning furnace.
  + Inspection mirror: for looking into constricted spaces.
  + Digital probe thermometer: for testing temperature rise and fan operating temperatures.

**Class Overview**

* Use the presentation, discussion, and handouts to introduce students to the key elements of assessing and improving heating systems:
* Understanding mobile home heating systems.
* Performing visual and diagnostic checks on heating systems.
* Identifying safety and other problems related to comfort and energy efficiency.
* Understanding criteria for furnace replacement.
* Identifying improvements to heating systems.
* Emphasize differences between mobile home and single-family housing heating systems. Show students various components of a mobile home furnace.
* Introduce the concepts of combustion safety with the classroom presentation. Break up the presentation by demonstrating various combustion inspection tools.
* Demonstrate the sensitivity of the gas leak detector by drawing a thick line on a piece of paper with a permanent marker, then showing the detector go off as it approaches the line.
* Refer to the DOE “Combustion Appliance Safety & Efficiency Testing” document when discussing proper testing locations for CO, efficiency, draft, and clearance to combustibles on various appliances.
* If a mobile home furnace is not available, go through the functions of the combustion analyzer to demonstrate CO, O2, flue gas temperatures.