# Maintaining Quality Control

Crew Leader

Learning Objectives

By attending this session, participants will be able to:

* Define quality control (QC) and the role of the crew leader in maintaining it.
* Identify errors and omissions in weatherization installations.
* List diagnostic procedures required for testing in and out of the house.
* Describe the benefit of containment areas.
* Explain the value of documenting inspection points through the use of QC checklists.

Key Terminology

Carbon monoxide (CO)

Combustion appliance zone (CAZ)

Cubic feet per minute (CFM)

EPA RRP

Infrared

Inspection point

Lead-safe weatherization (LSW)

Louvered door

Manometer

Net free area

Parts per million (ppm)

Pascals (Pa)

Pressure pan

Quality control (QC)

Standard work specifications (SWS)

Subgrantee

Zonal pressure diagnostics (ZPD)

Supplemental Materials

Handouts & Resources

“12 Steps to Lead Safety.” WxTV. Montana Weatherization Training Center. <www.wxtvonline.org>.

“A Look Inside a Wall: Dense Packing.” WxTV. Montana Weatherization Training Center. <www.wxtvonline.org>.

Attic Insulation Certificate.

“Blower Door Basics: Part 1 - Prep and Setup.” WxTV. Montana Weatherization Training Center. <www.wxtvonline.org>.

“Blower Door Basics: Part 2 - The Test Process.” WxTV. Montana Weatherization Training Center. <www.wxtvonline.org>.

“Blower Door Basics: Part 3 - The Breakdown.” WxTV. Montana Weatherization Training Center. <www.wxtvonline.org>.

Bohac, David. “Zone Pressure Diagnostics.” Home Energy May/June 2002: 32-37. <www.homeenergy.org>.

Code of Federal Regulations, Title 10 – Energy, Part 440 – Weatherization Assistance for Low-Income Persons (10 CFR 440). <http://www.waptac.org/Rules-and-Regulations/Federal-Regulations.aspx>.

Combustion Analysis Quick Sheet.

CO Probe Locations Illustration.

Cox, Anthony. “Manometer Setup Sheet.”

“DM-2 Mark II Digital Gauge - QuickGuide.” Retrotec. 4 April 2011. <www.retrotec.com>.

Fitzgerald, Jim, Robert Nevitt, and Michael Blasnick. “User-Friendly Pressure Diagnostics.” Home Energy Sept./Oct. 1994. <www.homeenergy.org>.

Indiana Community Action Association. INCAP Daily Safety Test-Out Procedure Summary Sheet. <www.incap.org>.

“IR Basics.” WxTV. Montana Weatherization Training Center. <www.wxtvonline.org>.

Moffatt, Sebastian. “Backdrafting Causes and Cures.” Home Energy May/June 1991.

National Fire Protection Agency. “Combustion Clearance Tables.” <www.nfpa.org>.

Quality Control Checklist handout.

The Energy Conservatory. “Minneapolis Duct Blaster Operation Manual (Series B Systems).” The Energy Conservatory. <www.energyconservatory.org>.

U.S. Department of Energy. Energy Efficiency and Renewable Energy. “Combustion Equipment Fact Sheet.” Oct. 2000.

U.S. Department of Energy. Hot Climate Initiative. Air Sealing.

U.S. Department of Energy. Hot Climate Initiative. Combustion Appliance Safety & Efficiency Testing.

U.S. Department of Energy. Hot Climate Initiative. Dense-pack Sidewall Insulation.

Walker, Iain, and Max Sherman. “An Easier Way to Measure Duct Leaks.” Home Energy Sept./Oct. 2002. <www.homeenergy.org>.

Weatherization Assistance Program Standardized Curriculum. “Blower Door Basics.” Oct. 2011. PowerPoint presentation.

**Online Platform Lessons**

Use these online interactive training modules as prerequisites before students attend the course or as in-class computer lab sessions. Users must first create an account at [www.nterlearning.org](http://www.nterlearning.org) to access the lesson.

a- 2.0 Visual Assessment <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 2.3 Attic Assessment <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 2.4 Basement/Crawl space Assessment <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 2.5 Furnace Inspection <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 2.6 Water Heater Inspection <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 2.8 Gas Leak Detection <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 4.1 Combustion Safety Testing - Gas Range <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 7.2 Room Pressure Tests, Thermal Boundary and Add-a-Hole ZPD Case Study <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 8.2 ASHRAE 62.2 <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 9.1 Measuring Duct Leakage with a Blower Door <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 9.2 Pressure Pan Testing <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 9.3 Dominant Duct Leakage <https://www.nterlearning.org/web/guest/course-details?cid=248>

a- 9.4 Duct-Blower Leak Testing <https://www.nterlearning.org/web/guest/course-details?cid=248>

c- 4.1 Daily CAZ Testing <https://www.nterlearning.org/web/guest/course-details?cid=247>

c- 4.2 Combustion Safety Testing: Water Heater and Furnace/Boiler <https://www.nterlearning.org/web/guest/course-details?cid=247>

i- 3.2 Moisture <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 3.4 Building Envelope, Thermal Envelope, Pressure Boundary & Conditioned Space <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 3.5 House as a System - Part 1 <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 3.6 House as a System - Part 2 <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 7.0 Blower Door Basics <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 7.1.1 Setting up a Blower Door Part 1 <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 7.1.2 Setting up a Blower Door Part 2 <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 7.1.3 Setting up a Blower Door Part 3 <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 7.2 Preparing for a Blower Door Test <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 7.3 Blower Door Test Procedures <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 7.4 Interpreting CFM50 Readings <https://www.nterlearning.org/web/guest/course-details?cid=249>

i- 7.5 Blower Door Guided Air Sealing <https://www.nterlearning.org/web/guest/course-details?cid=249>

**Relevant Standard Work Specifications**

1.200 Combustion Safety Testing

1.400 Moisture

1.500 Radon

1.600 Electrical

3.000 Air Sealing

4.0000 Insulation

5.3002 Equipment Installation

5.3003 Forced Air: Equipment Maintenance, Testing, and Repair

5.3103 Hydronic Heating: Equipment Maintenance, Testing, and Repair

6.6002 Ventilation: Components

6.6003 Ventilation: Fans

6.6004 Ventilation: Appliance Exhaust Vents

6.6102 Supply: Components

6.6103 Supply: Fans

6.6188 Supply: Special Considerations

6.6202 Whole Building Ventilation: Components

6.6203 Whole Building Ventilation: Dehumidifiers

6.6288 Whole Building Ventilation: Special Considerations

7.0000 Baseload

Classroom Props & Activities

Have representative inspection tools on-hand for display and demonstration in class. Include:

* Blower door
* Manometer and hoses
* Pressure pan
* Infrared camera
* Smoke generator
* CO detector/Combustion analyzer
* Fan flow meter

**Class Exercise:** Hand out the sample Quality Control (QC) Checklist and review with the class in conjunction with slides 6 and 7. Use the suggested instructor-led questions as the basis for an interactive session. Record the student responses on the board and ask why they answered the way they did. Provide the correct answers and the reasoning behind them.

There are a number of other instructor-led questions embedded in the speaker notes. Take as many opportunities as possible to keep the class lively and interesting.

**Class Overview**

* Field staff members can grow restless in a lecture setting. Make the class as interactive as possible by encouraging questions and debate about the situations depicted in the slides. As time allows, ask class members to volunteer stories about similar situations they have encountered and what was done. Alternatively, ask attendees in advance to bring QC situations to the session for discussion and resolution. This could enhance learning, as problems would be local.
* Arrange for a display table with specialized QC tools (see examples above). Allow students to handle them during breaks and/or pass them around when appropriate.