

Best Practice – Final Inspections

Date: Revised January 4, 2017

Subject: Final Inspections: Why are they so important?

Problem or Question: Based on recent monitoring, we are still falling short with final inspections. Is there a process, or checklist we can use to help us?

Discussion: The Final Inspector is responsible for assuring that all recommended weatherization items specified in the work order have been completed to WAP standards. The energy audit work order provides the perfect format for final inspections. Date and initial the “Inspected” box for completed items. Use the “Field Notes” box for documentation of measures that were incomplete, poorly done, or missing. Be clear and specific! Check materials actually used. Re-inspect, when noted items are completed, before signing off on the final inspection.

| <i>Measure 15 Install CO detector</i> | | | <i>Components</i> | | | | | | <i>Inspected</i> |
|---------------------------------------|-------------------------|-----------------------------|-------------------|------------|------------------|---------------|-------------------|------------------|-------------------------------------|
| <i>Comment</i> | | | | | | | | | <input checked="" type="checkbox"/> |
| | | | <i>Estimated</i> | | | <i>Actual</i> | | | |
| # | <i>Material / Labor</i> | <i>Description /Comment</i> | <i>Units</i> | <i>Qty</i> | <i>Unit Cost</i> | <i>Total</i> | <i>Qty</i> | <i>Unit Cost</i> | <i>Total</i> |
| 10 | Unspecified | CO Detector | Each | 1 | \$60.00 | \$60.00 | 1 | \$60 | |
| <i>Other Detail</i> | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| <i>Measure Sub Total:</i> | | | | | | \$60.00 | <i>Sub Total:</i> | | |
| <i>Field Notes:</i> | | | | | | | | | |
| | | | | | | | | | |

| <i>Measure 16 Install exhaust fan</i> | | | <i>Components</i> | | | | | | <i>Inspected</i> |
|--|-------------------------|-----------------------------|-------------------|------------|------------------|---------------|-------------------|------------------|-------------------------------------|
| <i>Comment</i> | | | | | | | | | <input checked="" type="checkbox"/> |
| | | | <i>Estimated</i> | | | <i>Actual</i> | | | |
| # | <i>Material / Labor</i> | <i>Description /Comment</i> | <i>Units</i> | <i>Qty</i> | <i>Unit Cost</i> | <i>Total</i> | <i>Qty</i> | <i>Unit Cost</i> | <i>Total</i> |
| 10 | Unspecified | Exhaust fan (+) | Each | 1 | \$300.00 | \$300.00 | 1 | | |
| <i>Other Detail</i> | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| <i>Measure Sub Total:</i> | | | | | | \$300.00 | <i>Sub Total:</i> | | |
| <i>Field Notes:</i> | | | | | | | | | |
| Exhaust fan terminates in attic; VENT TO OUTSIDE | | | | | | | | | |

Final Inspection Key Points: Subrecipients must have a process to ensure all the required measures are installed to the program requirements (SWS/MISM). Utilizing the work order can easily become your checklist. The following is by no means a complete checklist. However, there are several measures that will be specifically addressed.

Air-Sealing:

- Inspect the quality of work: drywall patches, spray foam, weatherstripping, jamb-ups, door sweeps, caulking, hole repairs, etc.
- Blower door test for the final inspection must be set up the same as the pre and mid blower door tests. This final test is:
 - To determine that air-sealing work was successfully effective. Agencies should not finalize a unit until adequate CFM reduction has been achieved. In the rare case, where minimum CFM reduction is not possible or cost-effective, there must be photos and a written explanation as to why documented in the file.
 - What is adequate CFM reduction? The goal is to get as low as possible within program rules and regulations. The Minimum CFM reduction is exactly that—MINIMUM; Subrecipients are encouraged to seal below that as often as possible.
 - Check tubes of caulk, spray foam cans, square feet of sheetrock needed against what you see and what was billed.
 - To verify that we did not leave the client in an unhealthy environment due to air-sealing measures, all homes must be ASHRAE compliant at the completion of work – remember ventilate right so you can air seal tight.

Duct Sealing:

- Inspect the quality of work: mastic, mesh tape, foil tape, duct replacement, and connections.
- Duct testing is performed to verify the results of the duct sealing. Sealing targets, at a minimum, are 12% total leakage and 8% leakage to the outside, but remember, the goal of duct sealing is 0cfms at each and every house.
- Check that air filters are clean and replacements have been left for future changes.
 - You may purchase a dozen air filters (inexpensive kind); install one and leave the rest for monthly replacements by client.

Attics:

Verify the following (as applicable):

- Noted repairs were completed.
- Air-sealing measures were performed in the attic; by-passes, chimneys, penetrations.
- Any electrical issues were properly handled: junction boxes, knob & tube, flags.
- All exhaust fans terminate outside.
- Heat sources are properly vented and properly blocked from insulation; using fire-resistant materials. Flue pipes are properly connected and exhausting outside the structure.
- Baffling of soffit vents and/or adequate venting.
- Attic access hatch is insulated to the same R-value as the attic and properly air sealed.
- If insulation was performed, check for the following:
 - Depth markers, flags, baffling, blocking.
 - An even blow.
 - Bag tag labels and certification. Don't get FLUFFED!

Walls:

- Any damage noted on work order was performed and completed in a quality manner.
 - Interiors- sheetrock, tape, mud, patching of large cracks or holes.

- Exteriors- replaced siding or trim pieces,; caulked and primed/painted to protect the newly installed materials.
- Verify that wall insulation was installed in all wall cavities. Use an IR camera for this inspection whenever possible. This will allow you to see if the entire cavity was filled.
- Drill a hole into wall cavities to inspect for dense-packing.

Windows/Doors:

- Caulk or spray foam work was neatly performed. If the spray foam is not completed in a manner that you would allow in your grandmother's house, you should not allow your contractor to install it in that manner in a client's home.
- Glaze cracked window panes.
- New windows were installed and trimmed out /sealed properly.
- Any rotten sills were replaced, caulked, and sealed (prime/painted).

HVAC/Appliances:

- CO Tests on all combustion appliances:
 - Furnace(s)
 - Water Heater
 - Cook Top/Stove
- Draft/Spillage Tests on all applicable combustion appliances.
- Do replacement appliances match what is on the work order?
- Any combustion air, venting, or flue issues were addressed.
 - Clearance around flue and sheetrock.
 - Blocking around flue in attic (shouldn't have insulation falling on appliances).
 - Adequate combustion air.
 - Flue pipes should have an upward slope of no less than 1/4" per linear foot in the direction of the outlet, and terminate 1 to 3 feet above the roof line, depending upon the pitch of the roof. Check connections and type.
 - Weatherstripping and latching of CAZ doors.
 - If addressed--water Heater has T&P valve and discharge pipe.
 - Water heaters should be re-insulated to at least R-10 with an external insulation blanket, unless the water-heater label gives specific instructions not to insulate or the water heater is already insulated to R-10. Generally speaking, if the water heater was manufactured after 2004, it does not need additional insulation. Refer to [Texas Mechanical Systems Field Guide for details.](http://www.tdhca.state.tx.us/community-affairs/wap/docs/TXMFG.pdf)

Exhaust Fans:

- All exhaust fans/equipment (bath fans, vent hood, dryers) terminate outside.

Cooling Equipment:

- Verify the size per Heat Load Calculations.
- Matches what is on the work order (proper name, type).
- Condensate lines insulated.
- Correct sizing of return grills.
- Check for condensation/icing of coils or excessive cycling; both are indicators of over-sizing.

Lighting:

- Be sure to install “Energy Star” rated light bulbs (CFLs/LEDs).
- Verify the number and wattage of replacement bulbs.

Health & Safety:

- Verify H&S items were satisfactorily completed.
- Be cognizant of H&S issues possibly created from weatherization work.

SUMMARY:

The authenticity of the final inspection is the Subrecipient’s responsibility. It is recommended that the initial assessment and the final inspection be performed by different people. The final inspection must be performed by a party other than the contractor who completed the work. Final Inspections are the agency’s last opportunity to verify that all work is compliant, complete, authorized, and allowable. Any work that is not on the work order or change order may not be paid for out of WAP funds. Be clear with weatherization crews/contractors that they must have approval from the agency for additional items. Only allowable ECMs, repairs and H&S items may be performed. The key to making the final inspection as easy as possible is to have done thorough work from the beginning of the process: start with a well done and thoroughly documented assessment, that will trigger a detailed work order to the contractor, which should allow the final inspection to go relatively smoothly because there shouldn’t be too many (any) questions from the contractor, limited or no change work orders, and no missed opportunities. If the work is done to high quality from the beginning of the process, the final inspection should be a pretty quick, easy, and painless process.

Check that the materials used on the unit meets WAP standards and match what is called for on the work order. The Work Order should match measure per measure. The total costs of the audit (if applicable), work order, invoices, and BWR should be consistent. If there is a significant positive or negative deviation in these amounts, figure out why.

Finals should not be signed off until all work is acceptable and complete.

As of December 15, 2010, WPN 11-3 went into effect. POLICY REGARDING THE USE OF DOE PROGRAM FUNDS TO PAY FOR CALL-BACK/ADD-ON WORK AFTER REPORTED TO DOE AS A COMPLETED UNIT
Know WPN 11-3; it can be found at:

http://www.waptac.org/data/files/website_docs/government/guidance/2011/wpn%2011-3.pdf

<http://www.tdhca.state.tx.us/ea/wap.htm>