



Arizona
Department
of Housing

ADOH Guidance on New Weatherization Standards for OOHR Housing Rehabilitation

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Compliance with the new ADOH Weatherization Standards will require coordination between a BPI Certified Building Analyst or Energy Auditor (BPI Certified Professional) and the Rehabilitation Specialist. The Weatherization Professional will conduct both a pre-construction energy audit and a **post construction compliance inspection on those weatherization standards items included in the rehabilitation scope of work**. The energy audit utilizes pressure diagnostics, infrared cameras and other equipment to identify air leaks, duct leaks, insulation deficiencies, inefficient appliances, venting problems and other energy issues. Deficiencies identified in the energy audit, **related to the specifications listed below**, should be included in the rehabilitation Scope-of- Work and corrected during the rehabilitation whenever possible. **Items identified in the energy audit not related to the specifications listed below may be corrected at the discretion of the Rehabilitation Specialist**. Work must be done in accordance with the *ADOH Owner Occupied Housing Rehabilitation Weatherization Standards*. In most cases it would be preferable to have the BPI Certified Professional conduct the more complex weatherization work, such as air sealing the attic, though it can be done by any contractor knowledgeable of weatherization practices.

It is not necessary that all energy related subcontractors (HVAC, Insulation, etc) have BPI Certification but all trades must adhere to the *ADOH Owner Occupied Housing Rehabilitation Weatherization Standards*, as determined through a post construction final inspection conducted by the BPI Certified Professional. The Rehabilitation Specialist must inform all subcontractors of the *ADOH Owner Occupied Housing Rehabilitation Weatherization Standards* in advance so that proper installation can occur. A list of Weatherization Professionals is provided at the following websites:

<http://www.azhomeperformance.com/index.html>

http://www.bpi.org/tools_locator.aspx?associateTypeID=CTR&accreditedSearch=N

Weatherization work is a matter of doing a few things well and understanding the house as a system. Weatherization concentrates on the following items.

1. Getting the home air tight (air sealing)
2. Insulating the home right (focus on insulation performance not just R-value)
3. Dealing with sunlight (shade screens and reflective coatings)
4. Correctly installing efficient equipment (duct sealing, pressure balanced, air flow, sizing and charge)
5. Base loads (refrigerators, CFL)

The traditional Department of Energy (DOE) funded Weatherization programs limit the scope of work to less costly items that meet strict DOE Savings-to-Investment Ratios (SIRs). The Scope-of-Work for owner occupied housing rehabilitation (OOHR) is not bound by the same DOE requirements and includes much more than weatherization work. However, SHF recipients that wish to use DOE funding for the weatherization component of their OOHR projects must comply with DOE rules for the weatherization portion of the OOHR.

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A home previously weatherized through another program such as the weatherization program funded the U.S. Department of Energy (DOE) is not exempt from ADOH Owner Occupied Housing Rehabilitation Weatherization Standards.

The result of previous weatherization work should be a sealed house and attic, sealed duct work, a functional balanced HVAC system and adequate insulation (both size and installation). New rehabilitation work will typically include items such as new HVAC, re-wiring, re-plumbing and new windows. This new work will disturb insulation, create new attic penetrations and generally undo much of the previous weatherization work. This will change the conditions upon which the previous post construction compliance inspection was based, rendering it invalid. New rehabilitation work will require, at a minimum, a new post-construction compliance inspection.

Rehabilitation Scope of Work Priorities and Mandates

To facilitate inclusion of weatherization standards into rehabilitation, ADOH has set a priority ranking for rehabilitation activities. The activities or rehabilitation items to be address thru OOHR projects are prioritized in order as follows:

1. Code Violations
2. Issues of Health and Safety
3. Weatherization Standards/ Energy Efficiency
4. Improvements of a Cosmetic Nature

Likewise, the weatherization specifications listed below have been prioritized. Budget and ADOH maximum investment per unit considerations may not allow for following the order of priority, however rehabilitation specialists should attempt to address the highest priority weatherization standards whenever possible. In all cases, rehabilitation specialists should consult the BPI Certified Professional when finalizing the scope of work prior to bid to ensure that weatherization standard items included in the scope will not adversely affect the energy performance in the home.

Finally, ADOH has established a list of weatherization standards which are mandated if included in the scope of rehabilitation. The mandates are established as an “if” you repair/replace item A “then you must” meet the specified standard for item A. For example *if* you replace windows, *then you must* meet the minimum requirements for IECC 2009 codes per the climate zone the home is located in. Mandated standards follow the weatherization standards priorities.

Owner Occupied Rehabilitation Weatherization Specification Priorities

The specifications below constitute the ADOH Owner Occupied Housing Rehabilitation Weatherization Standards listed in order of priority.

1. **Duct Leakage/ HVAC Static Pressure**
 - a. All accessible joints, seams and connections in the duct system must be sealed using UL 181 approved duct mastic.
 - b. All Boot-Sheetrock gaps must be sealed.
 - c. All supply or return ducts on the roof that are exposed to direct sunlight must be painted with white elastomeric paint after they are sealed.
 - d. Static Pressure tests should be taken after all work is complete and the pressures must not exceed manufacturer’s specifications
 - e. A/C systems should all be verified to have proper charge and airflow by a licensed AC technician.

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2. **Air / Thermal Barrier (properly installed insulation) and Room Pressure Balancing**

- a. The Thermal Barrier must be installed in complete contact with an effective **air barrier**, and to IECC 2009 installation standards and levels specific to the climate zone the home is in as defined by IECC Climate map. <http://energycode.pnl.gov/EnergyCodeReqs/?state=Arizona>.
- b. No room in the home shall exceed +/- 3Pa of pressure. In the case where passive return or a live return system must be installed to correct these issues, the goal should be to accomplish as close to a 0.0Pa of pressure as possible.

3. **Lighting**

- a. Light bulbs that are typically used for a minimum of 2 hours per day or more (limit 10) must be replaced with Energy Star Rated CFL or LED light bulbs with equivalent or better Lumen output.

4. **Other**

Other standards included below are not listed in priority order and can be addressed as budget or ADOH maximum investment per unit allows:

a. **HVAC**

- 1) A Manual J must be completed and followed reflecting any of these listed measures that will be done to that home and the report submitted to the rehab specialist for any new Air Conditioning replacement.

b. **Duct Replacement**

- 1) In the case of a comprehensive duct System replacement in conjunction with an AC replacement, a Manual D report must be followed and a copy of that report given to the Rehab Specialist.

Owner Occupied Housing Rehabilitation Mandated Standards

As previously stated the following standards are mandated for the corresponding Scope of Work activities addressed through the rehabilitation. If you are replacing/repairing any of the following items then you must meet the corresponding standard for the item.

1. **Windows**

- a. Any replacement windows must meet the minimum requirements for IECC 2009 codes per the climate zone the home is located in.

2. **Roofing**

- a. Whenever a roof replacement is scoped that involves removing the existing decking, the new decking must have a factory installed radiant barrier surface. (Climate zones 2,3,4).
- b. When replacing shingles, special consideration should be given to 'high reflectivity and high emissivity shingles' in Climate zone 2.
- c. All powered attic ventilation fans must be removed (including solar powered).

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3. Appliances

- a. All appliances should be replaced with Energy Star approved appliances.

4. Hot Water System

- a. When replacing an electric water heater in a garage with a home occupancy of no less than 4 people, a Hybrid Heat Pump water heater must be used. (Climate Zone 2 only)
- b. Low flow faucet aerators and shower heads (1.5GPM shower head) must be installed in all faucets and showers.

CAZ Tests

If the home is occupied during the rehab process a CAZ test must be completed pre-construction and post construction. Post construction results shall not exceed BPI maximum CAZ depressurization limits.

Weatherization Standards Process

ADOH recommends that rehabilitation specialists follow the step by step process outlined below or a similar process to ensure compliance with ADOH Weatherization Standards.

1. Energy Audit

A whole home energy audit should be conducted prior to development of the scope of work and must be performed by a BPI Certified Building Analyst or Energy Auditor (BPI Certified Professional). Rehabilitation Specialists can request that the BPI Certified Professional include a priority ranking of energy items to be addressed in their report. This is not mandatory but can be useful when determining which weatherization standards can or should be addressed in the rehabilitation.

2. Scope of Work

Rehabilitation Specialist develops scope of work following the priorities established by ADOH:

- a. Code Violations
- b. Issues of Health and Safety
- c. Weatherization Standards/Energy Efficiency
- d. Improvements Cosmetic in Nature

Rehabilitation Specialist, considering budget and ADOH maximum investment per unit, should include as many weatherization standards in the scope as possible and consider addressing those items in order of priority.

3. Consultation with BPI Certified Professional

Before finalizing the scope of work for bidding purposes, the Rehabilitation Specialist should consult with the BPI Certified Professional by allowing their review of the scope of work. This will ensure that weatherization standards selected to be covered in the rehabilitation scope of work do not adversely affect the energy efficiency and performance of the home. A helpful tool to identify and write up specifications for scope of work in the bid package can be found at: <https://sws.nrel.gov/>. This web based tool allows for a search of energy related items specific to climate zone.

4. Bid Process

After scope of work is finalized, rehabilitation specialists can go out to bid for construction. When reviewing submitted bids, be sure they verify that bidders have included the required weatherization specifications in their quote.

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5. Construction

During construction, Rehabilitation Specialists should include the BPI Certified Professional in interim inspections where compliance with weatherization specifications will be reviewed.

6. Post Construction Compliance Inspection

At completion of the construction the BPI Certified Professional must inspect all scope of work items that were required to meet ADOH weatherization standards. These items must all pass inspection before the housing unit rehabilitation will be considered to be in compliance. Failing items should be addressed by the contractor or subcontractor responsible for proper installation. The BPI Certified Professional will reference the NREL Standardizes Work Specifications found at: <https://sws.nrel.gov/> when determining Pass/Fail of installed weatherization measures.

Monitoring of Compliance with Weatherization Standards

ADOH staff will monitor for compliance with weatherization standards by reviewing the scope of work for all energy related work done on the housing unit and matching those with the post construction compliance inspections done by the BPI Certified Professional. All BPI post construction inspections must have an outcome of "Pass."