



*Weatherization  
Works*



# KENTUCKY WEATHERIZATION PROGRAM MANUAL (WXPM)

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## Introduction

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The Weatherization Assistance Program (WAP) is administered by Kentucky Housing Corporation (KHC). The program is designed to increase the energy efficiency of low-income eligible dwellings at or below 200 percent of poverty, reduce heating costs, and improve the health and safety of the dwelling. Services include but are not limited to an evaluation of the dwelling, heat systems, and a computerized energy audit. Benefits include but are not limited to repair/replacement of a heating system; testing for gas leaks, carbon monoxide, and other health and safety issues; checking combustible appliances such as stoves, furnaces, and water heaters; installing insulation; refrigerator replacement; sealing air infiltration; installing smoke and carbon monoxide detectors, and energy savings devices.

The source of funding for the program includes an annual allocation from the U.S. Department of Energy (DOE) and the Kentucky Cabinet for Health and Family Services (CHFS) for Low Income Home Energy Assistance Program (LIHEAP).

The Weatherization Program Manual (WXPM) was developed to provide specific guidelines that must be followed by KHC and by any organization that has entered into a subcontract to operate the WAP in a defined geographic area within Kentucky. All such organizations are referred to as service providers throughout this manual.

KHC works with Community Action of Kentucky (CAK) to provide Weatherization services to each county in Kentucky through partnerships with local Community Action Agencies (CAA) or other eligible entities. Each local agency will provide weatherization program information to eligible households in their service area and ensure that those who want to apply have an opportunity to do so.

All authorized changes to the WAP and WXPM will be made in the form of a written Program Notice (PN) via eGram. It is the responsibility of the service provider to familiarize themselves with and implement said updates within their WAP.

**Please note:** Federal and state regulations will not be part of this manual but are incorporated by reference. In the event of a conflict between the Federal and State regulations and this WXPM, the more stringent shall prevail. Agencies are encouraged to visit [www.nascsp.org](http://www.nascsp.org) to stay current on federal changes to the program.

As the Grantee for the WAP, KHC is responsible for administrative oversight and management of the program. The WAP is administered at KHC out of two departments. The technical aspects (training and technical monitoring) are undertaken by the Design and Construction Review department, which employs Quality Control Inspector (QCI) certified building specialists. The program administration (contract monitoring, financial management, and reporting) is performed by the Housing Contract Administration (HCA) department. KHC serves as the contact point for all service providers regarding all aspects of program development, policy, technical assistance, training, and program monitoring.

## Chapter 1: Getting Started with WAP

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KHC will allocate Weatherization funds to Community Action Kentucky (CAK) and local Community Action Agencies (CAA) via third-party grant agreements. Any new service providers will be selected based upon required state and federal procedures, which will include a Request for Proposal (RFP). Any new or replacement service provider will meet the criteria outlined in the WAP Grant Agreement and must follow all DOE and KHC program policies and procedures.

Service providers are notified of funding availability for weatherization activities within their respective service areas for the upcoming Program Year. In the notice of funding availability, service providers are advised of the allocation by funding source, the maximum administration by funding source, and the training allocation.

### 1.1 Subcontract Execution Process

KHC will develop and issue a subcontract for both funding sources for service providers via e-mail. The grant agreement must first be executed by the designated signee at each service provider before being returned via e-mail to KHC for final execution. KHC will return a copy of the executed grant agreement to the service provider via e-mail and will retain a copy in service provider files.

### 1.2 Subcontract Amendments

Proposed amendments to a subcontract must be made in writing to cover any changes in the scope of work or allocation, which includes the following:

- Changes in contract objectives.
- Increase or decrease in funding.

Written requests must be submitted to KHC through the Performance Draw Management System via waiver request, and it should include justification for the amendment request. Requests for amendments will be reviewed by KHC to analyze justification. All approved amendments are to be maintained by KHC in the service provider grant agreement folder for future audit purposes.

### 1.3 Waiver/Modification Procedures

General waivers and modifications can be submitted via [HCA Project Modification/Waiver Request](#). Each request will be reviewed by staff who will analyze justification to determine if it is an allowable request. Once a determination on the request has been made service providers will be notified via email. Reasons for a waiver/modification request range from any budget modification, project design, site plan, etc. If service providers are not sure a waiver/modification request needs to be sent, please contact the [HCA Help Desk](#).

### 1.4 Financial Audits

Service providers shall be responsible for complying with the audit requirements of 2 CFR 200. All service providers shall, for audit purposes, keep sufficient programmatic and financial records and documentation to support expenditures and shall be responsible for assuring that audits are performed according to contract terms.

Service providers shall accept responsibility for any audit exceptions and for corrective actions

necessitated by administrative findings arising from failure to comply with the terms of the contract or any laws and regulations applicable to federally funded activities.

A copy of each service provider's draft and final audit reports shall be forwarded to:

**Kentucky Housing Corporation  
Housing Contract Administration  
1231 Louisville Road  
Frankfort, Kentucky 40601**

Service providers are responsible for providing a copy to CAK.

### **1.5 Required Client File Documents**

1. WX 800 Client Application with all sections completed and signed.
2. Proof of income and/or zero income for each household member age 18 or over.  
**Note:** An entire household declaring zero income must have **notarized** zero income declarations for each member age 18 or over.
3. Proof of homeownership by homeowner, including Landlord if applicable.
4. Heating and electric costs for the past 12 months.
5. Agency/Landlord Agreement, WX Rental, if applicable.
6. NEAT/MHEA Generated Work Order for Regular Weatherization, including in-house estimate, bidding copy for contractors, if applicable, crew copy, and actual costs/work measures.
7. NEAT/MHEA Generated Work Order for Energy Systems, (Health and Safety Measures), including in-house estimate, bidding copy for contractors, if applicable, crew copy, and actual costs/work measures.
8. NEAT/MHEA Generated Client Completion Report
9. Heat System Inspection Form, (WX 900 G, WX 900 E, WX 900 SF, WX 900 OIL), as applicable with all sections filled out and signed as applicable.
10. WX 710 with all sections filled out and signed as applicable.
11. WX 910 Request to Exceed/Fuel Change Request, if applicable.
12. WX BLR: Base Load Record.
13. WX Mold Assessment and Release Form.
14. Documentation to prove Lead Safe Work Practices were performed, when applicable.
15. Documentation showing usage of an EPA approved Lead Paint Testing Kit, or Written Certification of Assumption of Lead Paint presence in the home completed by a Certified Renovator, when applicable.
16. Written evidence the client has received a copy of EPA's "Renovate Right" pamphlet.
17. Written evidence the client has received a copy of EPA's "A Brief Guide to Mold, Moisture, and Your Home."
18. Written evidence the client has received any other required Health and Safety Client Education documents as applicable listed in Chapter 7, section 7.5, step 1, item # 11.
19. Section 106 Project Review Form.
20. A complete NEAT/MHEA printout of recommended work measures, including SIRs for each work measure.
21. WX 14 Agency/Contractor Agreement, if applicable.
22. WX 15 Contractor Change Order, as applicable.
23. WX 16 Contractor's Notice of Completion, as applicable.

24. WX 16A Deficiency Notice, as applicable.
25. WX 17 Private Contractor's Invoice, as applicable.
26. Written evidence to show Worst-Case Scenario/CAZ testing has been performed, as applicable.
27. Supporting documentation to verify all material and labor costs reported on the WX 710, including but not limited to: vendor invoices, payroll records, contractor invoices, inventory records, etc.
28. WX 800a Client Screening Questionnaire.
29. Hold Harmless Statement.
30. Multifamily documents as outlined in 2.4 including but not limited to WX Rental, WX 800
31. Client application status notification(s).
32. Client notification of right to appeal and of the agency grievance process.
33. Documentation and work sheets showing compliance with ASHRAE 62.2-2016, including dwelling mechanical ventilation requirements calculations and method used for selecting proper sizing and type of mechanical ventilation used.
34. Photographs saved either electronically or hard copy of the home interior and exterior, including all areas that will be receiving weatherization work before and after weatherization work has been performed.
35. Infrared camera video/picture scans taken at each client home before and after weatherization work is performed should be printed or electronically saved.
36. An electronic version of the NEAT/MHEA audit for each weatherization job that is readily available for export to KHC monitors for review as required.
37. Clients having insulation installed as part of their participation in the WAP must receive a contract or receipt for the insulation installed containing the information required in 16 CFR, Part 460, Labeling and Advertising of Home Insulation, Section 460.17. There must be documentation demonstrating the client received this information in the file.
38. KHC Client Education Checklist completed and signed.
39. KHC Client Health and Safety Screening Questionnaire completed and signed.
40. Client Release of Information Form – See Section 2.13.

### **1.6 Conflict of Interest**

The provision of any type or amount of weatherization assistance may not be conditioned on an individual's or family's acceptance or occupancy of housing owned by the sub-recipient. No sub-recipient may, with respect to individuals or families occupying housing owned by the sub-recipient, or any parent or subsidiary of the sub-recipient, carry out the initial evaluation required under 10 CFR Part 440. For the procurement of goods and services, the sub-recipients must comply with the codes of conduct and conflict of interest requirements under 2 CFR Part 200. Sub-recipients must disclose all real, potential, or perceived conflicts of interest to KHC as outlined in 2 CFR Part 200, as applicable, regarding the receipt of, assistance provided with, or expenditure of KHC funds. All conflicts of interest must be disclosed and resolved prior to providing weatherization assistance to the household. For additional guidance on Conflict of Interest requirements, refer to the Compliance section of the [HCA Help Desk](#).

Potential conflicts of interest may arise from many situations. Some of the more common examples are:

- Requests for program assistance from employees, families of employees or board

members, or families of board members of recipients or sub-recipients

- Recipients or sub-recipients contracting with or procuring materials from employees, families of employees or board members, or families of board members of recipients or sub-recipients.

### **1.7 Data Breach**

In the event of a data breach, recipient will notify KHC in the most expedient manner possible, and without unreasonable delay, but in no event later than seventy-two (72) hours from the determination of a security breach relating to the data in recipient's possession. Recipient agrees to comply with all provisions of KRS 61.932, including that recipient shall implement, maintain, and update security and breach investigation procedures which are appropriate to the nature of the information disclosed, at least as stringent as the security and breach investigations procedures and practices in KRS 61.932(1), and reasonably designed to protect the data from unauthorized access, use, modification, disclosure, manipulation, or destruction. On the event of recipient committing an unauthorized disclosure of data listed in KRS 61.932(1)(a) through (f), recipient shall provide to KHC a copy of all reports and investigations relating to such investigations or notifications that are required by federal law or regulation.

## **Chapter 2: Eligible Clients and Dwellings**

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### **2.1 Eligible Clients**

To be eligible for weatherization assistance, an applicant must fill out an Application and Prioritization for Weatherization Services (WX 800), provide required documentation of income, homeownership, and documentation of prior 12 months' energy usage for the home to be weatherized, and meet the following income eligibility criteria:

Total income of the family residing in the dwelling to be weatherized must be at or below 200 percent of poverty determined in accordance with criteria established by the Director of the U.S. Office of Management and Budget. Program Notices from DOE will indicate an effective date of any revised poverty guidelines.

If the applicant household contains a member who has received cash payments under Title XVI (SSI) of the Social Security Act or KTAP at any time during the twelve (12) month period preceding the determination of eligibility, the applicant is categorically eligible.

This does not mean that if the client is earning disability social security income that they are to receive assistance automatically. These individuals may have disability income plus other income that exceeds income limits, thereby removing their eligibility.

The ruling means that if the client has received Title IV or Title XVI assistance (welfare assistance); they are already disabled, but very low-income.

Application intake workers must carefully determine which Title the social security is awarded under before determining eligibility.

## **2.2** *Income Definitions and Proof of Income*

For purposes of this program, income is determined as follows:

Income means cash receipts earned and/or received by the applicant before taxes during applicable tax year(s) but not the income exclusions listed in the guidance. Cash receipts includes regular payments from social security. The income exclusions include Federal non-cash benefit programs such as Medicare, Medicaid, Food Stamps, school lunches, and housing assistance. Therefore, the service provider would have to include all social security payments but exclude all Medicare premiums.

### **Income Determination Requirements**

#### **2.2.1** *Income Computation*

The gross income, including any irregular income, of all current household members must be computed and verified for the month prior to application. For instance, for any application taken in November, the gross income for October of all persons residing in the household on the date of application would be considered. If an application is taken in December, then November's income is considered.

Irregular income is income received all at one time or in lump sum payments such as for the sale of agricultural products, payments for contract work, Christmas Bonuses, etc. Any irregular income received in the month prior to application must first be pro-rated, on a monthly basis, over the period it is intended to cover before it is added to the household's income. For example, the profit from the sale of a crop could be a one-time payment for the entire year and the monthly income would be calculated as 1/12 of the entire profit. Contract labor or income that is received in one lump sum for work performed over a period of months would be divided by the number of months in the contract, or worked, before it is added to the household's income.

#### **2.2.2** *Instructions regarding employment wages (or any forms of income that are received weekly)*

Low-Income Home Energy Assistance Program (LIHEAP) income eligibility is based on the household's prior month's income. Since many forms of income are distributed weekly, CAA staff should convert cumulative weekly pay into monthly pay to determine eligibility for the program. One month of gross income is used to determine eligibility. Four weeks does not equal one month. Two bi-weekly pay periods also do not equal one month. If the customer is working regularly, collecting pay stubs is the best option to determine eligibility. If an employee is paid weekly OR bi-weekly, collect all pay stubs received in the prior month and use the appropriate formula below.

Formula for Regular Hours (use this formula if the employee works a set number of hours each week that do not change)

**(Hourly Wage) X (# of hours worked in a week) x 52 divided by 12= gross monthly income.**

#### **Formula for Inconsistent Hours**

Collect all pay stubs received from the previous month.

Add up all the stubs and divide by the number of weeks covered during those pay stubs. This equals the **average weekly gross** income received during the previous month.

Multiply this amount x 52 and divide by 12. This equals the Gross Monthly income.

*\*When Not to Use Formula: The exceptions for using either formula occurs when an employee was hired or terminated mid-month. If this is the situation, the applicant's income will be the gross amount of income that the applicant received during the month prior to applying for LIHEAP.*

#### **2.2.3 Countable Income**

Countable income includes both earned and unearned income but is not limited to:

- Non-recurring lump sum payments; (i.e. vacation pay, sick leave pay, or bonuses)
- Wages or tips;
- Statutory benefits such as VA Pensions; Black Lung Payments; Railroad Retirement; Social Security Retirement; Disability or Survivorship Benefits;
- Farm earnings;
- Rental, including room or boarder earnings;
- Self-employment earnings;
- Kentucky Temporary Assistance Program (KTAP);
- Supplemental Security Income (SSI);
- Alimony
- Unemployment Compensation
- Private pensions
- Worker's Compensation
- Royalties
- Support from an individual(s) outside the household including contributions, personal loans, etc.

#### **2.2.4 Excluded Income**

Excluded Income shall be:

- Child support payments received by the household are not counted as income for WAP;
- Payments received by the household from a state, federal, or local agency designated for a particular purpose and which the consumer must use for that purpose, such as payments for Kinship care payments, VA Aid and Attendance, Incentive Payments, Pell Grants;



- Any payments made by the Division of Protection and Permanency for child foster care, or subsidized adoption.
- Payments made to others on the household's behalf, such as Medicaid, or vendor payments;
- Loans;
- Reimbursements for expenses (Example: Reimbursement to K-TAP recipients for transportation expenses);
- Incentive payments or income normally disregarded in KTAP (Example: Ready to Work Program);
- Federal payments or benefits which must be excluded according to federal law (LIHEAP, Food Stamps);
- Supplemental Medical Insurance payments and reimbursements.
- Income Tax refund;
- Wages of students in primary, middle or high school;
- Wages of senior employment programs such as Title V;
- AmeriCorps;
- Capital gains;
- Any assets drawn down as withdrawals from a bank;
- Money received from the sale of a property, house, or car;
- One-time payments from a welfare agency to a family or person who is in temporary financial difficulty;
- Gifts, loans, or lump-sum inheritances;
- Resources from grants, scholarships, fellowships, and educational loans;
- One-time insurance payments or compensation for injury;
- Non-cash benefits, such as the employer-paid or union-paid portion of health insurance;
- Employee fringe benefits, food, or housing received in lieu of wages;
- The value of food and fuel produced and consumed on farms;
- The imputed value of rent from owner-occupied non-farm or farm housing;
- Federal non-cash benefit programs such as Medicare, Medicaid, Food Stamps, school lunches, and housing assistance;
- Combat zone pay to the military;
- Assistance payments based on need supplied by the State or other entity;
- Work expenses of the blind;
- Handicapped income required for an approved program if self-support, and black lung disability.

**\*Note About Child Support:** Child Support payments, whether received by the Payee or paid by the Payer, are not considered Sources of Income for the purposes of determining applicant eligibility.

### **2.2.5 Income Verification**

Verification of income is required of all households making application for assistance. The applicant should be advised that verification of all income of all household members is required to determine eligibility and that all information will be held confidential.

The primary responsibility for obtaining verification will be with the applicant. The applicant should be made aware of this responsibility but assisted, as needed, in obtaining verification.

1. **Unearned Income:** Verify unearned household income, as appropriate, from one or more of the following:
  - K-TAP, or Kinship Care;
  - Most recent DCBS award letter for K-TAP or Kinship Care;
  - Social Security award letter\*;
  - Pension statement;
  - Internal Revenue Service records;
  - Veterans Administration records;
  - Railroad Retirement records;
  - Court support records;
  - Union records;
  - SSA verification forms;
  - College financial aid award documents;
  - Contracts for sale of property;
  - Bank statements for interest income only\*\*
  - Statement from absent parent or copy of checks from absent parent for support payments; and
  - Statement from individual providing income to the applicant.

\*In situations where a client has an overpayment from Social Security or SSI taken directly out of their check, agencies should count the gross income, which is the amount of income BEFORE any overpayment deductions.

\*\***Bank Statements should not be used to verify Social Security or SSI benefits.** In this case, the applicant should provide the agency with the Social Security award letter or a proof of income letter from the Social Security Administration.

2. **Earned Income:** Verify earned household income, as appropriate, by one or more of the following:
  - Pay stubs;
  - Employer statement or contract;
  - Records maintained by individual on self-employment income;
  - Contracts;
  - Current income tax return; and
  - Records of income and expenses on farm and /or rental income.

### ***2.2.6 Proof of Eligibility***

Sub-grantees are reminded that proof of income eligibility must be included in the client file. Income eligibility verification begins at the time the WX 800 is completed and signed by the client. Further income eligibility verification continues and is required if the WX 800 becomes greater than 12 months old and weatherization services have not commenced **or** if the client's household income changes after the

time of initial completion of the WX 800, and before weatherization services have commenced.

1. **Availability of Supporting Documentation:** For purposes of review and audit, each file must contain an application, (WX 800) from the client that contains the required demographics and income for the entire family living in the residence.

The file must also contain evidence provided by the sub-grantee that the client is eligible to receive WAP services.

This evidence may include but is not limited to the following: copies of proof of income documents, a memorandum from a third-party certification office stipulating the income levels of the family and source documentation for each income source listed on the application.

All documents must be clear and legible.

2. **Eligibility Determined by Outside Agency/Program:** If income eligibility is determined by an outside agency or program, i.e. Low-Income Home Energy Assistance Program (LIHEAP) or the U.S. Department of Housing and Urban Development (HUD), any document used to determine eligibility, such as a copy of LIHEAP eligibility or a copy of the HUD building list, will suffice as evidence of client eligibility. This document and any related documents must be retained in the client file.
3. **Self-Certification:** After all other avenues of documenting income eligibility are exhausted, self-certification is allowable. However, evidence of the various attempts at proving eligibility must be contained in the client file, including a notarized statement signed by the potential applicant indicating that he has no other proof of income.
4. **Clients claiming zero income** must sign a declaration of zero income, and all declarations of zero income must be notarized if the entire household is declaring zero income.

### ***2.2.7 Re-Certification of Eligibility***

An applicant must be re-certified when eligibility lapses due to the length of time the applicant was waiting to receive weatherization services. As a reminder, re-certification of eligibility must occur at least every 12 months.

After an applicant has been determined income eligible for assistance, the Weatherization Program Director or Executive Director must sign the WX 800 certifying eligibility before any work can be done to the dwelling.

At the time of income eligibility determination, the applicant shall be given a written notice of his/her rights and method to file a complaint. An eligible applicant's notice must include the priority point total and the priority point range at the time of

application. If the applicant is ineligible, the notice must explain why they are not eligible. The WX 800b can be utilized for the required notification.

An applicant will remain eligible for weatherization services for 12 months from the date of verified eligibility.

If weatherization work is expected to begin between 12 and 15 months from the date of verified eligibility, the household must show continued eligibility.

A signed declaration of income statement for the previous three months may be used to update application if necessary. If weatherization work has not begun after 15 months from the date of application, the household must recertify in full.

Weatherization work begins on the date of initial energy audit.

### **2.3 Annualization of Income**

Where an applicant receives Income for a part of the applicable tax year, their partial income may be annualized to determine eligibility. (Example: Applicant A received income during January, February and March. The method of annualizing income to determine eligibility could be multiplying by four the amount of income received during those three months).

- The Annualization of Income method can only be used for the current calendar year household income an applicant is receiving at the time a weatherization application is created.
- Please note that the Annualization of Income method is not allowed to be used if the 12 months prior to the application date is used to determine income eligibility. In that case, actual household income for each month in the 12-month period preceding the application date must be used to calculate an applicant's income and complete verifiable documentation.

### **2.4 Eligible Dwellings**

To be eligible for weatherization services, a dwelling must be occupied by an eligible household, which meets the criteria in Section 2.1, and approved by the service provider. Shelters and multifamily units are also eligible households for assistance and are referenced in Section 2.4. Assistance is applied to the dwelling, not the family. Therefore, if a previously assisted family moves to a new dwelling, the family may apply for assistance again.

#### **Re-Weatherization**

A service provider shall not use contract funds to install weatherization materials or otherwise provide weatherization services to a dwelling unit previously serviced with weatherization contract funds unless one of the following conditions is met:

- The dwelling unit has been damaged by fire, flood, or act of God and repair of the damage to weatherization materials is not paid for by insurance. Such dwellings shall be reported as re-weatherized.
- It is determined by a designated KHC representative that appropriate and/or sufficient materials were not originally installed in the dwelling. Written prior approval must be received from KHC before additional materials are to be installed. The additional cost documentation must be in the client file. These homes shall not be reported in the monthly activities report as new completed homes for the reporting period.

- Eligible dwelling units previously weatherized on or before September 30, 2012 and utilizing LIHEAP funds may receive further assistance. *No DOE funds may be used to re-weatherize units which were weatherized on or after September 30, 1994.* These dwellings must receive an entirely new dwelling needs evaluation/energy audit and are eligible for the full range of services. They should be reported as a re-weatherized completion for LIHEAP funding.

#### **2.4.1 Owner Occupied**

1. If the applicant can be verified as the sole owner by a deed, certificate of title, (for manufactured housing), or a will, the dwelling shall be considered owner occupied.
2. If the applicant is occupying a dwelling for which he/she is making mortgage payments or for which he/she has signed a land contract or entered into a lease with the option to purchase, the property shall be considered owner occupied.
3. KHC recommends (however does not mandate) that the land contract or the lease with option be legally recorded. This action would help protect the client as well as help ensure the funds are being used correctly on the property served.
4. If the applicant applying for assistance has a legal fractional or limited interest in the property and pays no rent, such property shall be considered owner occupied.

#### **2.4.2 Shelters**

A dwelling unit or units whose principle purpose is to house on temporary basis individuals who may or may not be related to one another are shelters and are eligible to receive services. Nursing homes, prisons, or similar institutional care facilities are not eligible. For determining the number of eligible dwelling units within a shelter, count each 800 square feet or each floor of the shelter, whichever creates the greater unit count as a dwelling unit.

A written narrative must be submitted to KHC for approval prior to initial inspection of the shelter. The narrative must include the following:

- Shelter name
- Shelter address
- Shelter square footage
- Target population
- Maximum capacity per night
- Shelter eligibility criteria (must serve low-income eligible dwellings as identified under Chapter 3 Eligible Clients and Dwellings)
- Client services
- Need for weatherization assistance

Once approved, CAA's will issue a Public Notice in the largest local newspaper and/or on their website. The Public Notice must be published a minimum of two weeks prior

to the Dwelling Needs Assessment completion. Charges for the advertisement cost may be charged to Program Support (see Chapter 6).

### **2.4.3 Rental Units**

Any occupant of a rental unit is eligible for weatherization service provided the occupant's household meets the income guidelines established by the DOE. Not less than 66 percent (50 percent for duplexes and four-unit buildings, and certain eligible types of large multi-family buildings) of the dwelling units in the building must be income eligible dwelling units or must become eligible dwelling units within one hundred eighty (180) days under a federal, state, or local government program for rehabilitating the building.

Additionally, the owner(s) of the dwelling must agree to the conditions set forth below and enter into an Agency/Landlord Agreement (WX Rental) with the landlord(s). Before any weatherization services are provided, including inspection of rental unit(s), ownership of the unit(s) must be clearly established. Legal ownership, including fractional or limited interests, must be verified by a copy of the legal title (deed). A copy of the title shall be kept on file with the agency overseeing the weatherization project.

- If the applicant applying for assistance has no legal interest (including fractional or limited interest) in the property being occupied, such property is considered a rental regardless if rent is paid or not.
- If the applicant applying for assistance has a legal fractional or limited interest in the property but pays some sort of rent to one or more of the other fractional or limited interest owners such property shall be considered a rental.
- If the applicant applying for assistance does not legally own the property but pays no rent and no other entity pays rent on his/her behalf, such property shall be considered a rental.

#### **2.4.3.1 Owner(s) Of Rental Units**

For any rental unit to receive weatherization service the occupants must meet the current income eligibility guidelines. Once eligibility (per WAP federal guidance for single and multifamily) is confirmed, the owner(s) of the housing unit(s) must agree to following:

1. To not increase the rent on any living unit weatherized for a period of 18 months from the date of the final inspection as documented by the WX-710, Completed Dwelling Report. Furthermore, the owner shall not alter any other rental agreement that is in place for an 18-month period beginning with the date of the final inspection. For example, rent that includes utilities shall not be altered during the 18-month period unless it can be demonstrated in writing that such an alteration shall be in the best interests of the tenant occupying the rental unit. The service provider, as well as Kentucky Housing Corporation (KHC), shall reserve the right to accept or deny such alterations on an individual basis.

2. To enter into an Agency/Landlord Weatherization Agreement for Rental Property (WX Rental). This document shall be signed by the agency and owner and kept on file with the agency overseeing the project.
3. To not sell the rental unit(s) for a period of 18 months, and;
4. To reimburse the Kentucky Housing Corporation (KHC) Weatherization Assistance Program (WAP) the full cost of all weatherization funds in the event that unforeseen circumstances shall necessitate the sale of any and all rental units served within the 18-month period beginning with the date of the final inspection.
5. To inform all tenants about the scope and type of work that will likely be performed on their dwelling(s). This shall take place in conjunction with the program's routine client education component.

#### **2.4.3.2 Tenant(s)**

For any rental unit to be considered an eligible unit the occupants must meet the current income eligibility guidelines. Once eligibility is confirmed the tenant(s) of the housing unit(s) must agree to the following:

1. To abide by all conditions set forth on the WX-800, Weatherization Application Form, including providing access to their dwelling for the contractor or work crew, representatives of the service provider, and KHC staff, as the dwelling is being weatherized.
2. To report to the service provider representative and KHC any increase in rent or other alteration in their rental agreement with the owner for an 18-month period beginning with date of the final inspection.

#### **2.4.3.3 Service Provider Requirements for Rental Units**

For any rental unit to receive weatherization service the occupants must meet the current income eligibility guidelines. Furthermore, the service provider shall establish clear ownership of the property including all parties with fractional and limited interest. A WX-800 Weatherization Application Form shall be completed for each living unit to be served as well as the following:

1. The service provider shall educate the occupant(s) about the weatherization work that will likely be performed on their dwelling.
2. The service provider shall oversee the project. As such, the service provider will assist as needed in every aspect of the job: scheduling, inspecting, special arrangements if any, resolving disputes, and obtaining all needed signatures and documentation.
3. The service provider shall ensure that all households in weatherized units have a direct means of communicating with its representatives during both

the weatherization work and the ensuing 18-month rental control phase.

4. The service provider shall inspect, document, and develop work specifications for each living unit using accepted inspection processes and appropriate energy audit software. The service provider shall perform and document a final inspection which all parties involved must sign to verify completeness of and satisfaction with, all work performed.

Additionally, the service provider shall:

- Educate the occupant(s) about the weatherization work that will be performed on their dwelling.
- Oversee every aspect of the job including: scheduling, inspecting, resolving any disputes, obtaining all required signatures and documentation and handling any special arrangements, if needed.
- Ensure that all households which have been weatherized have a direct means of communicating with its representatives during both the weatherization work and the ensuing eighteen (18) month rental control phase.
- Inspect, document, and develop work specifications for each dwelling unit using accepted inspection processes and appropriate energy audit software (see Chapter 7).
- Perform and document a final inspection using post inspection procedures (See Chapter 9) where all parties involved must sign WX 710 to verify the completeness of and satisfaction with all work performed.

## **2.5 Program Guidance on Multifamily Weatherization**

Multifamily rental projects must adhere to all the policies for rental units under Section 2.4.3.

Multifamily buildings are eligible if 66 percent of the dwelling units in the building (50 percent if fewer than five) meet WAP's income eligibility requirement for a family unit whose income is at or below 200 percent of the poverty level determined in accordance with criteria established by the Director of the Office of Management and Budget. Certain pre-screened properties from the DOE/HUD have already been determined to meet this requirement and need no further income documentation (WPN 16-5 and WPN 16-6) Each property will be assigned a Priority Point number. This number will be determined by combining all priority points per eligible household and dividing that number by the total number of income eligible households that the property contains. This "Average" will be the number that is used to rank that property for the purposes of receiving Weatherization services. For the purposes of certifying a complex as eligible for Weatherization, all information will be current as of the date of initial application by the Landlord and verified by the service provider. Subsequent move-outs by tenants after this time will not affect the eligibility of the complex. However, after a period of one year has elapsed, the multifamily complex will need to be recertified. Multifamily properties on the list published by DOE are presumed to meet WAP income eligibility requirements but are not given any preference over properties not on the list with respect to eligibility or place in queue.



Income data needs to be collected on these properties in order to give them an accurate priority point number (WPN 16-5 and WPN 16-6.)

Service providers are not allowed to weatherize more than 33 percent of annual projected units in the multi-family categories without prior written approval by KHC. KHC reserves the right to consider large multifamily projects that exceed the limitations described above and allow such projects to go forward provided the following:

- The service provider can show such projects are a best use of its resources for the area that it serves; and
- Equitable service will be maintained in its service area.

Maximum expenditure for a multifamily unit cannot exceed the total number of income eligible units multiplied by the DOE. For example, in 2019, if 66 units of a 100-unit complex are occupied by income eligible tenants, the total allowable budget including administration, support and eligible measures (NEAT verified SIR of  $\geq 1$ ) for the project would be  $66 \times \$7,541 = \$497,706$ . Health and Safety (H&S) percentages as outlined in the State Plan are applicable to multifamily rental projects. Likewise, the same calculation can be applied to the LIHEAP funding to braid dollars in units.

Each unit will be invoiced on a separate WX 710. Shared costs that are common to each building will be divided up equally among the multiple WX 710s for that building. However, measures that are completed for specific units that are not common to the rest of the complex will be applied to those units only. All units in the building can be served, and all units should be reported. Vacant units should also be weatherized and reported as completions.

### ***2.5.1 Multifamily WX Process***

Any occupant of a rental unit of any kind is eligible for weatherization service provided the occupant's household meets the income guidelines set by the Department of Energy (DOE). Additionally, the owner(s) of the dwelling must agree to the conditions previously stated and enter into a Landlord/Tenant Agreement with the tenant(s). Apart from these conditions the following restrictions apply to weatherizing rental housing units:

1. No service provider shall weatherize more rental units than one-third (33%) of its planned completions for a contract year without written approval from KHC. In seeking such approval, the service provider must explain how exceeding this cap will benefit the clients that it serves and that in doing so equitable service shall be maintained throughout its entire service area.
2. No owner, developer, or landlord shall receive weatherization service for more than 25 rental units under its ownership (full or in partnership) with any individual service provider in a contract year, without written approval from KHC.

3. KHC reserves the right to consider large multifamily projects that exceed the limitations described above and allow such projects to go forward provided the service provider can show that such projects are a best use of its resources for the area that it serves, and equitable service will be maintained in its service area.
4. Service providers must contact KHC to request approval to pursue a multi-family building or complex prior to any review of the complex/building begins.
5. All rental weatherization projects shall be prepared and completed in accordance with the appropriate DOE approved energy audit software, local ordinances, state weatherization assistance program policy and prevailing building codes.
6. Multi-family buildings or complexes may be chosen through a variety of strategies, including but not limited to, HUD/USDA lists, advertising, or cold calls.
7. Service providers that wish to serve multifamily buildings or complexes (under one owner), with over 24 units per year must advertise in local media, i.e., newspapers, community cable channels, websites, etc. the opportunity for all area owners/landlords/developers to have their properties weatherized by the WAP. For such projects, KHC reserves the right to allow or deny service based on the written justification provided by the service provider, all other conditions described in this section, and assurance that all Equal Opportunity requirements with respect to contracting (if applicable) are met. Preference shall be given to owners/landlords/developers that make financial contributions towards the weatherization of their properties through buydowns or matching contributions.
8. If service providers want to pursue weatherization services for buildings they own (in full or in part), they must advertise in local media (e.g. newspapers, community cable channels, websites, etc.) to inform the community and provide a public comment period.
9. Service providers may do an initial "walk through" of the building prior to any applications or energy audits to determine that weatherization measures can be installed (if and when they are identified).
10. No undue or excessive enhancement to the value of the dwelling units is allowed. Only weatherization measures generated from the approved audit software, that is appropriate to the type of structure, may be installed. All Health and Safety measures must be in conformance with the Health and Safety section of this plan.
11. Project files should include but are not limited to the following:
  - WX Rental (Agency/Landlord Agreement) signed by the agency and owner/ or agent.
  - Legal deed of property showing proper ownership.

- WX 800 filled out for each tenant at the complex.
  - WX 800L filled out for the complex.
  - Income Verification documents for each resident (as applicable).
  - Utility information for each resident (as applicable).
  - Photocopy of Social Security or other accepted documentation for legal non-residents must be attached to each application (as applicable).
12. CAAs will need to prioritize those properties that were interested in participation in the WAP. After the deadline for enrollment has passed, properties interested that did not apply but are interested in receiving weatherization services will need to wait until the enrollment period reopens. This date will be determined by KHC and be subject to available funds.
  13. After each property has been assigned a priority number, the waiting list is established, and properties will be completed in that order. At this time, CAAs should not proceed with the project until they have received approval to move forward from KHC.
  14. After a multifamily complex is selected to receive service, service providers will set up a meeting with the landlord/or agent to discuss the weatherization process, details of the program, energy audit procedures, tenant notification and schedule of events. During this meeting, owners will be informed that they can contribute financially to Weatherization in order to have some measures, that otherwise do not model as energy saving, completed by the service provider. This process is known as “buying down measures”.
  15. Example of “buying down measures”: Owner at Cambridge Station would like to replace the existing 15-year-old heat pumps at his complex. Under NEAT, this replacement isn’t justified at the three thousand dollars per unit replacement cost. Owner is willing to contribute one thousand dollars per heat pump replacement to bring the total cost to two thousand dollars making the new SIR at least 1:1. This measure can now be completed using Weatherization funds.
  16. Evaluators/energy auditors will conduct a dwelling needs assessment including an energy audit and prepare a list of the most cost-effective energy conservation measures and prepare a project scope of work. Measures must have a Savings to Investment Ratio of .8 or higher for the use of LIHEAP funds. Only measures that have an SIR of .8 or higher at the initial energy audit or that have a .8 or higher on the client completion report (after work is completed) may be paid for with LIHEAP funding. No DOE funds may be used to pay for measures below an SIR of 1.0. If an owner has expressed interest in having other measures completed and is willing to contribute financially, the evaluator/energy auditor can prepare a list of those measures and the amount that the owner would need to contribute.

17. Local CAAs will review Scope of Work with property owners and initiate weatherization work.
18. After completion of Weatherization work agency evaluators/energy auditors will conduct test out procedures to verify performance and proper installation of energy measures.
19. Building owners/ or agents are required to sign off on final inspection.
20. Each individual unit will be invoiced separately on a WX 710.
21. All multifamily rental projects must comply with programmatic notices available on WAPTAC and WAP regulations.

## **2.6 Priority Point System**

Priority shall be given to identifying and providing weatherization assistance to families whose annual household income does not exceed 200% of the poverty level. Once this has been established, the household will be prioritized according to its occupancy with preferences given to those households containing an individual who is elderly, a young child (children at/or below the age of 6) or disabled. Households with a high energy burden, (meaning a low-income household whose residential energy expenditure exceeds the median level of energy burden for all low-income households in the State per WAP 10 CFR 440, part 440.3) are factored into the priority ranking.

After non-rental applicants have been certified as income eligible for WAP assistance the application is to be prioritized using the points obtained on the back of the application. The service provider shall advise the applicant at the time of intake that it is the client's responsibility to promptly notify the service provider of any change in his/her status (such as income, age, health, etc.) which could affect the client priority rating.

### **2.6.1 Assigning Points**

#### **Household Points**

Elderly or disabled occupants = 10 points each. For example, a two-person household in which both occupants are elderly and disabled will be awarded 20 points.

#### **Income Points**

100%-150% of Poverty Level = 1 Points

75%-99% of Poverty Level = 2 Points

< 75% of Poverty Level = 3 Points

#### **Fuel-Type Points**

Electric = 8 Points

Coal \* = 2 Points

Propane = 6 Points

Wood \* = 4 Points

Oil = 4 Points

Gas = 3 Points

*\* If household contains only Elderly or Disabled, add (4) points for heating with wood and (6) points for heating with coal.*

### Energy Burden Points

$$\frac{\$0.00}{\text{Total Energy Cost}} / \frac{\$0.00}{\text{Annual Income}} = \%$$

\*Zero income = 15 Points

0-5% = 2 Points

6-14% = 4 Points

15-21% = 6 Points

22-28% = 8 Points

29-33% = 10 Points

> 34% = 15 Points

Anything above 15% of income is considered high energy burden.

Households with children at or below the age of six will receive an additional 5 points. Households that are eligible and have children identified by the Department for Community Based Services' (DCBS) local office as being at risk of being removed from the home if the home conditions are substandard and are in need of weatherization, will be red flagged as priority and will receive service immediately. DCBS will make the referral to the service provider using a DPP1299, Referral for Emergency Weatherization Program. The local agency shall inform the local DCBS office of the status of the applicant by completing the information on the bottom of the DPP1299 and returning to the local office.

Applications are taken throughout the contract period and maintained until services are provided. The service providers are required to re-prioritize applications on a regular basis. If the application is on file longer than twelve (12) months, the agency must contact the client to re-verify the information given at the time of application before service is provided. If the family size or source of income has changed, a new application must be processed.

The service provider must review and prioritize all WX 800s (single-family) on a regular basis, at least once every six (6) months, in order to ensure that those applicants with highest priority ranking are served first. Applicants not receiving sufficient priority ratings for the period reviewed will be annotated and will remain eligible for the following period. Service providers have the option of prioritizing applications by county or for the entire service area, whichever helps the service provider utilize the work crews/contractors in the most cost-efficient manner.

It will be the responsibility of each service provider to ensure that major political subdivisions of its service area receive the same outreach and intake opportunities relative to their share of eligible household population. Each service provider must have the capacity to find and identify eligible households throughout its service area. KHC will monitor each service provider's files on a routine basis to ensure that sufficient applications are being taken throughout its service area.

#### ***2.6.2 Documenting Disability for Priority Points***

Guidance: 10 CFR Part 440.3 Definitions:

*Persons with Disabilities* means any individual (1) who is a handicapped individual as defined in section 7(6) of the Rehabilitation Act of 1973, (2) who is under a disability as defined in section 1614(a)(3)(A) or 223(d)(1) of the Social Security Act or in section 102(7) of the Developmental Disabilities Services and Facilities Construction Act, or (3) who is receiving benefits under chapter 11 or 15 of title 38, U.S.C.

Applicants must provide proof of disability before being eligible for priority points awarded to persons claiming a disability during the application prioritization process. A Social Security disability award statement or the attached "Verification of Disability" form is acceptable documentation.

## 2.7 Exclusions and Limitations

While verifying client and unit eligibility, the following exclusions and limitations should be considered:

- No service provider shall weatherize more rental units than one third (33 percent) of its planned completions for a contract year without prior written approval from KHC. In seeking such approval, the service provider must explain how exceeding this cap will benefit the clients that it serves and how equitable service shall be maintained throughout its entire service area;
- No owner, developer, or landlord shall receive weatherization service for more than twenty-five (25) rental units under its ownership (full, partial, or in partnership) with any individual service provider in a contract year;
- KHC reserves the right to consider large multifamily projects that exceed the limitations described above and allow such projects to go forward provided; a) the service provider can show that such a project is the best use of its resources for the area that it serves, and b) that equitable service will be maintained in its service area;
- All rental weatherization projects shall be completed in accordance with the appropriate DOE approved energy audit software or prescriptive list; local ordinances; prevailing building codes and state weatherization assistance program policy;
- Local agencies who wish to serve multifamily structures larger than stand-alone four-plex units must advertise (in local media, e.g. newspapers, community cable channels, websites, etc.) the opportunity for all area owners/landlords/developers to have his/her properties assessed for weatherization services by the WAP. For such projects, KHC reserves the right to allow or deny service based on the written justification provided by the service provider, all other conditions described in this section, and assurance that all Equal Opportunity requirements with respect to contracting (if applicable) are met. No owner-occupied residence shall be weatherized if it is being offered for sale;
- No renter-occupied residence shall be weatherized if it is being offered for sale, unless both of the following apply:
  - It can be demonstrated that the residence will continue to be occupied by eligible tenants; and
  - Weatherization work performed is not incorporated into the sale price.
- No institutional buildings (university, nursing home, hospital, motel, etc.) are to be weatherized;
- If a local agency wishes to weatherize an emergency shelter, or transitional units, the local agency must have prior written approval from KHC.

## 2.8 *Fund Restrictions and Exceptions*

DOE has placed the following restrictions on the use of Weatherization funds:

1. No funds shall be used to install or provide materials for a dwelling unit previously weatherized (re-weatherization) unless:
  - The dwelling unit has been damaged by fire, flood, or act of nature and repair of the damage to the weatherization materials is not paid for by insurance.
  - The dwelling unit was weatherized prior to September 30, 1994. Each dwelling unit weatherized prior to September 30, 1994 must receive a new energy audit, which considers any previous energy conservation improvements to the dwelling. LIHEAP funds may be used on eligible households/units which were weatherized on or before September 30, 2012. No DOE funds may be used to re-weatherize units which were weatherized on or after September 30, 1994.
  - The service is to provide eligible low-cost/no-cost weatherization materials.
2. No funds will be used to improve the value of units designated for acquisition or clearance by a federal, state, or local program within 12 months from the date weatherization of the dwelling unit would be scheduled for completion.
3. No funds will be used to weatherize dwellings defined as Recreational Vehicles(s) (RV) (s) and/or Camper(s), and these dwellings are not eligible for any services provided by the Weatherization Assistance Program. RVs or Campers means a trailer, semitrailer, truck camper or motor home primarily designed and originally constructed to provide temporary living quarters for recreational, camping, or travel use. These vehicles have temporary utility hook up capability and are designed to be transported on a regular basis with or without licensure or permit. Some manufacturers of these vehicles have identification designations that describe them as a mobile home but a manufacturer's designation does not qualify for proof of eligibility status.
4. No agency/sub-contractor of the WAP may weatherize the home of anyone who is related in any form to employees and/or contractors of the WAP unless all client and dwelling eligibility criteria of the program have been met, the priority point system strictly followed, all program protocols strictly followed, and no preferential treatment is given. There must be a statement retained in the client file from the Executive Director stating they are aware of this activity.

## 2.9 *Historic Properties*

Local agencies that undertake weatherization work with funding from KHC must ensure that properties listed on or eligible for the National Register of Historic Places abide by the Secretary of the Interior's Standards for Historic Preservation as required in 36 CFR 800 and the National Historic Preservation Act (NHPA) of 1966.

KHC has entered into a Memorandum of Agreement with the Kentucky Heritage Council regarding rehabilitation and repairs on units being assisted with Weatherization funds. In agreement with KHC, the Heritage Council has decided that the following activities are exempt:

- **Interior Work:** Electrical, plumbing or mechanical repairs, replacements, or installations limited to interior spaces; interior weatherization or energy conservation activities including insulating attics, floors, and walls.
- **Roof Work:** Replacing asphalt roof shingles or other composite materials; installation of jacks/vents or flues if not located on a primary roof elevation or visible from the public right-of-way; repairing or replacing gutter system to match existing.
- **Exterior/Doors/Windows:** Painting exterior surfaces in a matching or complementary color; repairing or replacing missing or damaged glass panes, caulking, weather-stripping, and installing thresholds and storm windows or doors in a manner that does not harm or obscure historic windows or trim; replacement of HVAC units where exterior components are similar in size or smaller compared to existing components, and located in the same place as existing units; installing insulated exterior replacement doors where the openings are not altered and they cannot be viewed from the public right-of-way.
- **Foundations:** Underpinning and ventilating crawl spaces if materials are set at least 2 inches behind the outer face of piers or foundations on the front façade; installing foundation vents, if painted or finished to match the existing foundation material.
- **Site Work:** Repair or replacement of existing site features like wheelchair ramps, driveways, parking areas, and walkways, sewer lines, water lines, and drain connections in a manner that does not disturb historic exterior building or landscape materials or features.
- **Projects completed by qualified contractors in accordance with the Secretary of the Interior’s Standards for the Treatment of Historic Properties (Standards) and in accordance with appropriate National Park Service Preservation Briefs, limited to the following activities:** Power-washing exterior masonry; repairing masonry, including repainting, and rebuilding chimneys and installing chimney flue liners; replacing roofing to closely match the historic materials and form or with materials that restore the documented original feature in a manner that does not alter the roofline; conducting Lead-based Paint Abatement or “Management in Place” activities.

The service provider must complete the Section 106 Project Review Form at the time of initial inspection, for each unit inspected and maintained in the service provider’s client file.

If the proposed project includes work not considered exempt by the Heritage Council, then the service provider must contact KHC via [wxadmin@kyhousing.org](mailto:wxadmin@kyhousing.org) to receive further guidance.

Failure to comply with this policy may result in disallowed costs.

### **2.10 Lead-Based Paint**

All local agencies must comply with the requirements of the Environmental Protection Agency (EPA) Final Rule, 40 CFR Part 745, Subpart E, Residential Property Renovation, Pre-Renovation Lead Information Rule (Also see amendments in 8/5/11 Federal Register) and Lead Safe Weatherization (LSW) requirements implemented by the Department of Energy (DOE).

A lead hazard information pamphlet and written notification of the scope, location, and expected starting and completion dates of proposed work will be provided to owners and tenants of homes and multifamily housing built prior to 1978. If a determination is made in



accordance with applicable EPA rules that lead-based paint is not present in the areas affected by the proposed work, a copy of the determination must be included with the notice.

- Local agencies will provide the EPA pamphlet, *Renovate Right* or reproductions of it when copied and presented in full before renovation activities begin.
- Notification will be provided in the native language of the client if EPA has made non-English versions of the pamphlet available. If a pamphlet in the client's native language is not available, the English version shall be presented.
- Notification by certified mail must be provided no more than 60 days and no fewer than seven days before renovation activities begin. The notification requirement applies even if only common areas, and not individual dwelling units, will have worked performed.

Local agencies must secure written acknowledgement that the owner has received notification. If the property is a rental, local agencies must obtain written acknowledgment from the tenant head of household. See the *EPA Small Entity Guide to Renovate Right*.

If local agencies are unable to secure written acknowledgement from an adult occupant, the local agencies must comply with one of the following:

- Certify in writing that notification has been delivered to the dwelling and that the local agency has been unsuccessful in obtaining a written acknowledgment. See the Future Sample Pre-Renovation Form as found in the EPA pamphlet, *Renovate Right*.
- Obtain a certificate of mailing at least seven days prior to the renovation.
- Please reference all other lead base paint sections of this WXPM.

## 2.11 Client Privacy

Local agencies will maintain the privacy of client personal information.

1. Personal information collected, used, or acquired in connection with the Weatherization Program shall be used solely for the purpose of providing weatherization services. Local agencies agree not to release, reveal, publish, transfer, sell, or otherwise make known to unauthorized persons a client's personal information without his or her express written consent or as required by law. Written consent must include what client information may be shared and to whom or which agencies/businesses. Release of Information. Local agencies must acquire signed client releases enabling Weatherization Program access to utility and other energy vendor billing records and account information, including account number, the name to which the account is billed and verify the billing address is accurately recorded for all clients. Account information must be gathered for all energy vendors, both electric and the primary heating source, and must include both consumption and expenditure data.
2. Local agencies agree to implement physical, electronic, and managerial safeguards to prevent unauthorized access to personal information. Personal information includes information that would identify an individual's health, education, business, use or receipt of governmental services, name, address, age, telephone number, social security number, driver's license number, and finances including financial profiles, credit card numbers, or other identifying numbers.
3. KHC reserves the right to monitor, audit, and investigate the use of personal information collected, used, or acquired by local agencies. Not properly maintaining

clients' confidential information could result in termination of a contract or subcontract.

4. Local agencies agree to indemnify and hold harmless KHC, the State and its officers, employees, and authorized agents for any damages related to local agencies' unauthorized use of personal information.
5. Local agencies shall include this client privacy policy in all subcontracts. In addition, local agencies shall include in subcontracts a clause stating that subcontractors agree to indemnify and hold harmless local agencies, the State and its officers, employees and authorized agents for any damages related to subcontractors' unauthorized use of personal information. Local agencies are responsible for monitoring the use of personal information collected by subcontractors.

## **2.12 Dispute Resolutions**

Local agencies have the responsibility to resolve all client complaints, including applicant denials, project deferrals, and work quality issues. Agencies shall establish a clear, objective, and prompt dispute resolution process. If the internal procedures fail to remedy a complaint, the resolution process must include mediation and arbitration.

Clients must be informed at time of application of their right to file a grievance. Agencies will also be responsive to requests for information regarding the dispute resolution process. Clients may withdraw a grievance at any time with the understanding that they may re-enter the process at the point they withdrew if a complaint is not resolved.

The following model is an example of a resolution process. The model can be modified to meet an agency's structure and approach. Remember to carefully consider on a case-by-case basis client grievance that cannot be easily or quickly resolved.

1. A grievance must be filed in writing for a local agency to take action, except when a client complaint can be resolved quickly.
2. Local agencies' process must include the following client rights:
  - a. Have a representative speak on behalf of the client – including an interpreter if needed.
  - b. Review and obtain copies of the client's file.
  - c. Present oral and written statements.
3. The client will be informed of a decision to the resolution process within 10 working days of complaint receipt.

Local agencies must:

  - a. Document each step of a grievance proceeding, including communication with the client.
  - b. If a grievance is slated for mediation or arbitration CAK will serve as the mediator. The agency will need to document this process and inform KHC.
  - c. Inform KHC of final resolution due to mediation or arbitration.
  - d. Make all compliant and grievance documentation, including all resolutions, formal and informal, available to KHC for review upon request.
  - e. If the client wishes to appeal any decision resolution, these will be sent to KHC to resolve.
4. KHC role and responsibilities:
  - a. Approve local agency's dispute resolution process.
  - b. Monitor local agency's use of approved process.

- c. Be available for technical assistance and consultation.
- d. Process any appeals.
- e. Review complaints that KHC receives and determine if client has gone through all steps of approved dispute resolution process. If not, refer client back to local agency to complete approved process.

KHC recommends coordinating with the local dispute resolution center and professional arbitration services when crafting a dispute resolution process. The service provider must make every attempt to resolve the grievance/complaint prior to referring the client to KHC. If the service provider fails to obtain resolution, they may contact CAK for additional assistance. KHC will get involved only after being assured by the service provider that all means to resolve the grievance/complaint have been exhausted. If KHC is unable to resolve the issue, and funded through LIHEAP, the client issue may escalate to the ombudsman at Cabinet for Health and Family Services.

### ***2.13 Client Property Damage***

It is the responsibility of the service provider to handle any complaints received from clients regarding personal property damage resulting from weatherization services provided by the service provider.

The service provider shall promptly investigate any complaints received and determine if the complaint is warranted and make restitution to the client, if applicable.

**Note:** Any costs incurred by the service provider in repair of damages to client property cannot be charged against the weatherization contract, including staff time involved in making repairs.

It is the sole responsibility of the service provider to maintain adequate liability insurance to cover any damages to persons or property in connection with weatherization activities performed by the service provider or its representative. This cost should be charged to the agencies liability insurance budget line item in the planning forms.

### ***2.14 Client Utility Cost Calculations***

When gathering electric and fuel cost/usage information, obtain these costs and usage for the most recent 12-month period preceding the date the WX 800 is filled out and signed by the client. Applicants do not have to establish a 12-month residency before application. It is allowable to annualize partial energy usage information to complete the application. Every effort should be made to obtain any available information about past usage. But, if only partial data is available, file documentation of what the annual calculation was based on, is all that is necessary.

Also note that minimum usage fees charged to the client even when there is no actual usage must also be included in the total cost of electric and fuel for the client. This must be accounted for when performing utility cost calculations and priority point calculations on the WX 800. If applicable, this must also be noted on the WX 710 and WX 800 when applicable in the comments section.

Minimum usage fees must also be taken into account when setting up utility costs in the NEAT/MHEA cost and setup libraries.

## ***Chapter 3: Private Sector Contracting***

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### ***3.1 Sub-Contracting Option***

KHC allows all service providers the option of subcontracting regular weatherization or health and safety measures of eligible dwellings with private sector general contractors. An approved contractor of an agency may not sub-contract any weatherization work with another contractor unless that contractor is an approved contractor on the agency's own approved contractor list and has met all the requirements to work as an approved contractor in the WAP with the agency.

Service providers must certify annually that neither the organization nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in a weatherization contract with KHC by any federal department or agency as part of the General Weatherization Work Plan. Service providers are prohibited to enter into contracts with parties that are suspended or debarred, or whose principals are suspended or debarred. Service providers must ensure that all subcontractors meet the same minimum criteria. Documentation found at [www.sam.gov](http://www.sam.gov) must be maintained in all subcontractor files.

### ***3.2 Creation of an Approved Contractor's List (ACL)***

To establish and maintain an annual approved contractor's list, the following process is required and must be performed with proof documented in the agency's records;

1. The service provider shall place a legal advertisement in all local newspapers of the geographical areas served. The advertisement shall solicit licensed (if applicable), insured, contractors to perform Energy System repairs or replacements and/or regular weatherization. The advertisement should give notice of an orientation meeting for interested contractors. This meeting should briefly explain the WAP including inspection procedures, work procedures, form requirements, bidding procedures, suspension criteria and reimbursement policy. Other topics may be included as necessary per individual agency. This meeting can be performed by the service provider staff. An agency may elect to post a contractor solicitation on the agency website in lieu of newspaper advertisement. This solicitation should remain on the website throughout the year.
2. A Weatherization Contractor Application (WX10) and the Non-Financial Agreement (WX12) must be completed by the contractor and returned to the service provider. The WX10 is to be closely reviewed and all information verified in writing by the service provider using the Contractors Work Reference (WX11). The following proof of

insurance minimums, proof of training/certifications, etc... are required and apply to contractors performing regular and/or health and safety weatherization work:

- a. Certificates of Insurance for General Liability and Comprehensive Coverage for general contractors performing work must meet the minimum coverage requirements in the amount of \$800,000 or greater if annual contractual requirements change.
  - b. HVAC contractors must have minimum Certificates of Insurance in the amount of \$500,000.00 general liability and \$300,000 property damage or greater if annual contractual requirements change.
  - c. Electrical contractors must have minimum Certificates of Insurance in the amount of \$500,000.00 general liability or greater if annual contractual requirements change.
  - d. Plumbing contractors must have minimum Certificates of Insurance for General Liability in the amount of \$250,000 or greater if annual contractual requirements change.
  - e. Proof of compliance with workers compensation and unemployment insurance laws of the Commonwealth of Kentucky.
  - f. Contractors must have EPA certified RRP firm status as applicable.
  - g. Contractors must have proof of all required training listed in the state plan.
  - h. Contractors must have proof of non-debarment
3. If the contractor meets all the criteria, the WX12 must be signed by the appropriate service provider staff. At this time, the service provider should notify the contractor in writing to acknowledge approval or disapproval. If disapproved, the service provider will document the reason(s) in the letter.
  4. Once an Approved Contractor's List has been developed, a procedures meeting must be scheduled by the service provider for all participating contractors. KHC Weatherization staff will also be notified in advance. KHC reserves the right to attend such meetings. The program policies and procedures will be explained in detail and all applicable forms and manuals will be discussed as needed. All contractors shall attend this meeting regardless of their experience. Certificates of Insurance shall be kept on file by the service provider to insure coverage on an annual basis. Notice of changes in coverage must be mailed directly from the insurance company to the service provider. Any approved contractor who has a lapse in insurance coverage will not be allowed to work in the program until insurance coverage is re-instated and in force.
  5. Service providers must allow private contractors an opportunity to apply at least on an annual basis. Advertisement in local publication(s) (newspaper), and on the agency Web site, must be posted for the purpose of public awareness. However, agencies may add contractors to the ACL anytime during the year if the service provider encounters an additional need for contractors. KHC requests that all service providers maintain an open contractor list so new contractors can be added at any time.
  6. The service provider can remove a contractor from the ACL for reasons covered under the non-financial agreement, bidding procedures, suspension criteria, or other related service provider policies. The contractor must be notified in writing of the removal and be given an opportunity to respond.

### **3.3 Formation of Bidding Procedures**

The Service provider shall maintain a description of the bidding procedures that includes the following:

1. Compliance with all applicable program manuals;
2. Criteria for measurements, quantities, locations, and change orders;
3. Methods for resolving discrepancies between the dwelling needs evaluation/energy audit and the contractor's interpretation of the measure descriptions;
4. Procedure for completing the contractors bid;
5. Starting dates, extensions, change orders, inspections, and completion dates;
6. How bids will be awarded; and,
7. Posting of a spread sheet in a conspicuous place to provide documentation of the winning bid after bids are opened.

### **3.4 Preparation and Award of Bids**

1. The service provider will perform the dwelling needs evaluation/energy audit to determine the specific needs of the dwelling; perform an energy audit, and cost estimate/bid specifications. Bid packets shall contain:
2. Letter of invitation to bid, including NEAT/MHEA generated work orders, bid forms, and all other applicable forms, will be mailed to all approved contractors. The deadline for returning bids shall be included.
3. The contractors are required to submit bids on the NEAT/MHEA generated work order and bid form.
4. The service provider shall compare its in-house estimate with the contractors bid. In order to be eligible, the contractors bid must fall within a range of 10 percent, plus or minus, of the in-house bid for each project. From the pool of eligible bids, the service provider will determine the lowest or best bid.
5. The bids can be awarded individually or in packets. If all bids exceed the 10 percent range of the estimate they shall be returned to the contractors for a re-bid. If the second attempt also exceeds the estimate, the work order shall be reviewed by the responsible dwelling needs evaluator/energy auditor and program coordinator for possible errors or omissions and a decision made either to award the best bid or if a re-bid must occur. Agencies must insure cost reasonableness.
6. The winning contractor shall be notified and the Agency/ Contractor Agreement (WX14) for each individual dwelling signed by both parties. The WX14 form then becomes a part of the Non-Financial Agreement.

### **3.5 Change Orders**

If during the work process any changes, additions, or deletions are needed that change the scope of work from the original work order and related contract, WX-14 Agency-Contractors Agreement, the service provider, contractor, and client must agree upon the change and sign a WX-15 Change Order.

For any major alteration to a contract, the Evaluator /Energy Auditor must visit the work site to ensure that a Change Order is necessary and reasonably priced. Some minor change orders can be allowed without a work site visit if the service provider clearly understands the nature of the repair. Either way, the change order should be signed by all parties, thereby recognizing the contract amount has been revised. In some instances, the change order will decrease the contract amount due to the elimination of a certain measure. Nonetheless, a completed WX-15 must be on file reflecting that action.

All change orders become part of the final WX-17 Private Contractors Invoice.

### **3.6 Final Inspection/Reimbursement**

1. The WX-16 Contractors Notice of Completion and Approval will be sent by the Contractors to the service provider when the job has been completed. This form must be signed by all applicable parties.
2. The service provider will schedule a post inspection/quality control inspection.
3. If work meets program standards, the reimbursement process shall begin.
4. If the job does not meet program standards, the service provider shall list the corrections needed on a WX-16A Deficiency Notice and allow the contractor sufficient time to correct all deficiencies. Upon completing the RE-WORK, the contractor shall notify the service provider to perform a RE-WORK inspection. If the RE-WORK inspection meets the program standards, the job will be approved, and the service provider shall start the reimbursement process.
5. The WX-17 Private Contractors Invoice will be sent to the service provider when the job has been post-inspected and the WX 710 Completed Dwelling Report has been completed and signed by the post inspector/quality control inspector.

Note: On-site, in-progress inspections shall be performed as necessary. Only work that has documentation of being inspected and accepted may be invoiced.

### **3.7 Contractor Training Session Fees Incurred**

Training and Technical Assistance (T&TA) funds may also be used to train contractors at the sub-grantee level participating in the program. In making the determination to pay for contractors' training, Sub-grantees should secure a retention agreement in exchange for the training. The retention agreement should require that contractors will work in the program for a specific amount of time and must align with the cost of the T&TA provided. Examples of contractor/agency retention agreements can be found on EERE's website under **WPN 10-1**.

A contractor who incurs training session fees directly related to required weatherization training sessions mandated by KHC will be reimbursed only for the training session fees incurred for each required training session. Costs associated with training contractors who work with the weatherization program may also be charged to T&TA.

### **3.8 Dwelling Needs Evaluations/Energy Audits**

Private contractors who provide Dwelling Needs Evaluation (DNE)/Energy Auditor and Post Inspection/Quality Control Inspector services are subject to the same requirements as stipulated and applicable in Chapter 3, Sections 3.1, 3.2, 3.3, and 3.9 of this manual. In addition, all private contractors providing DNE/Energy Auditor and post inspection/quality control inspection services for the weatherization assistance program must comply with all applicable chapters and sections of this manual regarding requirements for the DNE/Energy Audit and the Post\_Inspection /Quality Control Inspection process contained in, but not limited to, Chapters 6, 8, and 10 of this manual.

### 3.9 *Required Training for all Contractors/Sub-Contractors*

#### **Training and Certification Requirements for Sub-Contractors (HVAC, Electrical, Plumbing and General Weatherization)**

Contractors performing general weatherization work (and their employees) must attend comprehensive training for their job duties, i.e. installer staff must attend Retrofit Installer Technician training, crew leaders must attend Crew Leader training, etc.

Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)

Lead Safe Work Practices (required for crew members)

Certified Lead Renovator (RRP) (required for Crew Leaders, QCIs, DNE/EAs)

Lead Safe Firm certification

CPR certification

General First Aid certification

#### **Technicians (Service Provider Staff or Sub-Contractors):**

All technicians are required to be licensed in their respective discipline (HVAC, Electrical, etc.) Technicians shall maintain their professional licenses in accordance with KRS 227A.010-150 for electric, KRS 198B.650-689 for HVAC, and meet all requirements regarding fees and continuing education.

## ***Chapter 4: Inspection, Monitoring, and Training Procedures***

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### ***4.1 Local Agency Inspection of Weatherization Work***

#### **Policy**

1. Local agencies must have defined, written internal monitoring procedures to perform regularly as a means for quality control, compliance assurance, and risk assessment. Such procedures must include written inspection procedures that ensure comprehensive and consistent inspections of all units weatherized.
2. No dwelling will be reported to KHC as completed until the local agency has performed a final inspection/quality control inspection and certified that appropriate work has been completed in a quality manner. A WX 710 Completed Dwelling Report signed by an inspector/quality control inspector without a proper inspection performed will be considered a fraudulent act.
3. Inspections shall take place within 30 days of completion of work on the residence.
4. Any unit weatherized with DOE funds shall be inspected by a trained, qualified, and Building Performance Institute (BPI)-certified Quality Control Inspector (QCI).



- a. Must be certified as a DNE/Quality Control Inspector by KHC/BPI.
- b. Training and testing will be provided by KHC.
- c. Newly hired inspectors must have work reviewed by a KHC certified DNE/Quality Control Inspector until such time they become certified.

### **Procedure**

Client files must include signed and dated documentation of all inspections and final approval. All forms should be completed in their entirety before parties sign them. Clients and inspectors should sign forms on the day of the inspection.

#### **Restriction:**

Service provider personnel who are an assigned DNE/Energy Auditor or a Post Inspector/Quality Control Inspector on any weatherization project that is paid for with DOE/LIHEAP funds shall not provide labor for installation of any work measure that is paid for with DOE/LIHEAP funds.

### **4.2 KHC Monitoring Procedures**

KHC is responsible for on-site monitoring of all WAP service providers. On-site monitoring activities conform to 10 CFR 440.12(b)6 and involve at a minimum, one annual on-site monitoring visit to the service provider's office location and on-site visits to a selection of client homes that received weatherization services.

Previous monitoring findings and recommendations will also be reviewed (via emailed photo documentation or follow-up onsite visit) to evaluate the success and appropriateness of all corrective actions implemented by the service provider.

An exit interview with the service provider's weatherization director and other appropriate staff will be held at the conclusion of the monitoring visit to present and discuss all observations, concerns, findings and recommendations. Agencies shall be informed at the exit interview of all areas of non-conformity identified during the monitoring visit.

A written monitoring report will be provided for the service provider within thirty (30) days of the exit interview. If follow-up meetings or additional documentation are necessary to complete the assessment of work or determine appropriate corrective actions, the written report will be issued within thirty (30) days of such meetings or receipt of requested documentation. The report will contain a description of the monitor's findings and, if necessary, recommendations for corrective action. A response to the monitoring report with a corrective action plan, when requested, must be submitted to KHC within the time frame specified on the monitoring report cover letter. Agencies identified as having administrative or technical problems may be referred to CAK for additional assistance. Agencies working under a Corrective Action Plan will be monitored closely for signs of improvement.

#### **4.2.1 Technical Monitoring**

- Inspecting a representative sample of the dwellings completed by the service provider to ensure that all work and work quality meets WAP standards, work quality is satisfactory, all prescribed work is completed, all work complies with and follows NEAT/MHEA or EA-QUIP audit priorities and expenditure maximums and performance of diagnostic procedures;

- Performing blower door tests, health and safety tests, and other tests deemed necessary;
- Reviewing NEAT/MHEA or EA-Quip cost and setup libraries for accuracy and completeness;
- Reviewing client files and related forms/documents of dwellings inspected to ensure that all required forms and documents are included and that they are accurate and complete;
- Reviewing program operations to ensure proper administration of allocated funds; and adherence to all programmatic protocols and regulations;
- Evaluating service providers for achieving performance standards based on criteria set forth by KHC;
- Determining training and technical assistance needs; and,
- The monitor may also look at the WX 10 Contractor Application; WX 11 Contractor's Work Reference; the approved contractor list, and the Completed Dwelling Report, WX 710.

The monitor will compare the evaluation, work procedure and post inspection/quality control inspection performance results with the prescribed standards defining the requirements for each area. Corresponding applicant files for each inspected dwelling will be reviewed for completeness, accuracy, appropriate documentation and eligibility.

KHC will also monitor NEAT/MHEA audit library set up costs during the annual onsite technical review. The service provider is responsible for updating the approved audit software library. Any service provider found to be paying substantially more for job materials than other service providers in their geographical area will be required to rebid those materials and/or services. KHC reserves the right to approve or deny any inputs that appear to not be cost effective.

A service provider shall not use program funds to correct identified deficiencies of a monitored dwelling unit previously serviced with weatherization contract funds when it has been determined by KHC's monitor that work quality is substandard. These units will be identified on the monitoring report as RE-WORK's.

Monthly, KHC Weatherization staff will review invoices, WX 702 Invoice and WX 710 Completed Dwelling Reports, for accuracy and compliance with Weatherization Program Policy. When there are discrepancies, KHC will contact the service provider for an explanation and either approve or disapprove the cost.

KHC reserves the right to request and review a pre-determined sample of electronic NEAT/MHEA client files containing the audit, work order, client completion report, and setup/supply libraries of completed jobs that have been submitted to KHC as completed units. A hard copy of the WX 710 Completed Dwelling Report will also be requested for review. The review will consist of the following:

1. Verify that all home information, including heating system, cooling system, building shell, ducts/infiltration, base load, health and safety, and other relevant data has been correctly and completely entered into the audit per program requirements.

2. Verify that all recommended energy conservation measures generated by the audit have an individual and cumulative estimated SIR value of .8 or higher if using LIHEAP funds and 1.0 or higher using DOE funds.
3. Verify that all work measures being paid for with funds other than DOE/LIHEAP have been clearly segregated and reported in the audit, work order(s), and client completion report.
4. Verify that the audit and work order(s) contain only allowable and program compliant work measures generated by the audit.
5. Verify that material/labor unit prices/costs agree with estimated quantities and material/labor unit prices/costs in the audit.
6. Verify that ACTUAL quantities and material/labor unit prices/costs in the work order(s) and client completion report(s) are within 10% of estimated quantities and material/labor unit prices/costs.
7. Verify that sufficient details are contained in the work order(s) for each work measure to adequately explain and document what materials are installed, how they are installed, and where they are installed.
8. Verify the number of hours reported for performing the DNE/energy audit, computer data entry, post-inspection, installing work measures, and travel/pickup activities are accurate, reasonable, and within applicable limits as determined and mandated by KHC.
9. Verify that the final SIR of each Energy Conservation Measure (ECM) as reported and the cumulative final SIR of all combined ECMs, is .8 or higher for ECM's paid for with LIHEAP funds and 1.0 or higher for ECM's paid for with DOE funds.

**Note: No ECM will be paid for by KHC if the SIR is less than .8 for LIHEAP funding or less than 1.0 for DOE funding.**

10. Verify that final billed costs reported on the WX 710 Completed Dwelling Report and submitted to KHC for reimbursement agree with ACTUAL costs reported on the client completion report and work order.
11. Verify that all required documentation and proof of following required program protocols pertaining to equipment replacement(s) has been provided.

#### ***4.2.2 Contractual/ Administration/ Fiscal Monitoring***

Service providers will also undergo a Contractual/Administrative/Fiscal Review conducted by KHC compliance staff. This review is primarily concerned with the contractual, administrative and accounting aspects of program operations and does not include a field review. Compliance staff schedules these reviews independently and while some areas will overlap, this form of monitoring is not the same as a technical monitoring which is based largely on field work evaluation.

For fiscal and contract performance monitoring, KHC weatherization monitors will verify compliance with and documentation of these fiscal requirements: expenditures, source and application of funds for expenditures, access to and retention of fiscal records, previous contract audit, cost, other resources, invoicing, liability insurance policy, equipment purchase approval and property inventory maintenance. KHC

weatherization staff will monitor the invoices and expenditures monthly for expenditures to the appropriate funding source.

For contractual monitoring, the KHC compliance officer will verify compliance with and documentation of these contractual requirements: disallowed cost reimbursements, reporting, personnel policies, record confidentiality, conflict of interest and nepotism, client and dwelling eligibility, availability for required training, purchase bidding, listed assurances and certifications and record retention.

### **4.3 Training Criteria**

All service provider weatherization staff assigned evaluation or quality control inspection activities as any portion of their job duties must successfully complete training as outlined in Section 7.1 of the WXPM, and other training as deemed necessary by KHC.

Additionally, all on-site staff, including private contractors, shall attend and successfully complete and maintain basic CPR/First Aid certification as provided by the Red Cross or other recognized, legitimate organizations such as local fire departments or the National Guard.

All WAP field staff and participating private contractors must meet the training requirements identified in Chapter 7 of this manual. Training shall be provided by KHCs training staff or by KHC approved training entities. All training must be completed before performing any work.

Failure of a service provider staff member or private contractor to meet the training criteria will result in that individual or private contractor being prohibited from performing the assigned or contracted activities on client dwellings. Participation in, and the successful completion of advanced, refresher, and other related training is required to remain qualified to perform program activities. KHC will make every effort to assist the service provider personnel with attaining the required skill levels.

To better enable the CAAs to identify qualified contractors available to assist them with Weatherization efforts, KHC will permit contractors who have not yet received the required CPR/First Aid and Lead Safe Work Practices (LSWP) training to begin weatherization work, as long as they stipulate that they will obtain the CPR, First Aid and LSWP training within 90 days from the date they start the work. All other training and certification requirements must already have been met; the 90-day exception only applies to CPR/First Aid and LSWP training. However, no contractor may work on a lead-positive dwelling prior to completion of the LSWP and/or RRP training requirement regardless if they are within the 90 day exception window.

KHC understands it is conceivable that a contractor might initially agree to the 90-day period in order to begin working, then complete the work before the 90 days is up and at that point refuse to obtain the training. KHC acknowledges that the CAA would have no realistic way to force the contractor to obtain the training if such a scenario were to happen. KHC recommends that CAAs consider taking steps to ensure compliance such as retaining remittances to the contractor(s) until the training is completed, and/or if the contractor is working on multiple properties and hasn't completed all the properties when the 90 days lapse, instructing the contractor to cease work on the remaining properties

until the training has been completed. During this grace period, contractors must not work on homes where LSWP have been prescribed in the work write up.

KHC will approve otherwise satisfactory work performed by a contractor who failed to complete the training as long as the CAA took meaningful steps to encourage such compliance.

KHC will provide training and technical assistance to all service providers as follows:

1. **Routine Technical Assistance:** Technical assistance covering work quality issues or installation of work measures can be provided during monitoring visits or at any time the service provider encounters a problem. Agencies may request technical assistance or training by contacting the REE training staff. If the monitor identifies major problems, more extensive technical assistance will be scheduled in the immediate future following the monitoring visit. Technical assistance related to the actual installation of weatherization measures will be provided by experienced staff.
2. **Programmatic Technical Assistance:** Technical assistance covering programmatic aspects of operations will be provided by KHC's Housing Contract Administration (HCA) staff as necessary. Agencies may request technical assistance for programmatic issues by contacting the HCA department.
3. **State Training:** REE offers a continuous training schedule to address the training needs of the KY WAP network. Appropriate service provider staff and private contractors may register for trainings at any time during the program year by contacting REE.
4. **Field Training:** The REE training facility has sufficient training labs to provide hands-on reinforcement of classroom training. However, field training sessions may be scheduled at the discretion of REE training staff when deemed necessary.

**Note:** While each service provider is allocated sufficient funds to attend trainings and conferences, prudent use of the training funds is expected. Service providers are required to maintain information in their files to document that all expenses for training are both reasonable and necessary for implementation of the weatherization program. Expenses for out of state trainings shall include documentation showing why a similar training could not be accessed in Kentucky. Training and Technical Assistance (T&TA) funds allocated to agencies cannot be used to pay for EA/QCI training/testing in excess of three times per staff person. Additional trainings/testing for that person's EA/QCI certification must be covered by another funding source.

## Chapter 5: Providing Weatherization Services

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KHC provides weatherization services based upon the house-as-a-system approach integrating advanced weatherization technologies into service delivery. This approach includes data collection, testing, assessments, and education for all eligible clients. Services include an energy audit, a complete visual assessment, assessment of electric base load measures (water heaters, refrigerators, compact fluorescent light bulbs, lighting fixtures, and space heaters), diagnostic tests, energy-related health and safety assessment, client health and safety/conservation education, appropriate low-cost measures, applicable weatherization-related repairs, and a thorough consideration of the client and residence.

### 5.1 Dwelling Needs Evaluations/Energy Audits

#### Policy

1. All homes must receive a comprehensive, on-site dwelling needs evaluation, also called an energy audit, prior to receiving weatherization services. (See Chapter 7) The cost of this evaluation must be included in the average cost per home.
  - a. Only a Kentucky WAP-certified DNE may conduct the dwelling needs evaluation.
  - b. All final post inspections must be performed by a BPI-certified Quality Control Inspector (QCI) if any DOE funds have been invested in the unit.
  - c. **Restriction:** Only one person may perform a dwelling needs evaluation per home. KHC will not reimburse a service provider for more than one person performing an energy audit on a home.  
**Exception:** One DNE trainee approved by KHC for field training (conditional DNE status) may accompany the DNE for a limited number of inspections that are pre-approved by KHC.
  - d. **Restriction:** Any person who performs a dwelling needs evaluation on a DOE/LIHEAP funded weatherization project may not perform any installation of work measures paid for with DOE/LIHEAP funds if that same person performs the post inspection on those work measures. KHC will deem any material and labor costs for such work measures installed by that person to be unallowable costs and will not reimburse the agency for such costs. **Exception:** If a person performs a dwelling needs evaluation on a DOE/LIHEAP funded weatherization project but does not perform the post inspection on any work measures paid for with DOE/LIHEAP funds, that person may perform installation of such work measures, and the associated labor and material costs will be allowable costs and reimbursable to the agency.
2. Guidance for oversight of work hours

Below are guidelines for assessment of worker efficiencies. Based on a survey of Kentucky service providers, these are suggested maximum times it should take evaluators and inspectors to perform duties on a typical job.

Onsite client education during the evaluation process.	1 hour
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Onsite house evaluation (this does not include client education time).	5 hours
Office time preparing audit, work write up, file documentation and bid docs.	6 hours
H&S Post inspection for heat system work.	1 hour
H&S Post inspection for heat system work involving gas and oil appliances.	2 hours
Final Post inspection.	4.5 hours
Call back inspection due to failing at final or heat system post.	1 hour

While these times are suggested maximums, a service provider could reasonably expect the average time for these activities to be less, except for client education. It is also important to note that travel time to and from the home is not included in these times; however, travel time will be evaluated for reasonableness.

3. Evaluators in conditional DNE status must have work reviewed by a KHC-certified DNE until such time that they become fully certified.  
NEAT and MHEA Version 8.6 has been adopted as the authorized energy audit tool to be used in the WAP for single-family houses and mobile homes. Other audit software will be reviewed for use in other dwelling applications when applicable. KHC requires local agencies to calculate and maintain current costs for materials, labor, and fuels to be used in the NEAT/MHEA auditing process. All audit cost estimates must be within 10%, of actual job costs for each job. NEAT/MHEA fuels and materials costs must be verified by the agency at least semi-annually and updated as necessary to ensure accurate job cost calculations. Electronic copies of all jobs utilizing NEAT/MHEA must be available for export to KHC monitoring staff for review as required.
4. Service providers are responsible for ensuring that all staff performing computerized energy audits maintains proficiency using the most currently released and approved version of NEAT/MHEA.
5. The most cost-effective measures as determined by the NEAT/MHEA software will be installed subject to funding availability.
  - a. Measures not included in the NEAT/MHEA generated work measures list will result in disallowed costs.
  - b. When using NEAT/MHEA, individual measures and the total package (except for health and safety measures) must have an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.  
Leveraged funds may be used to reduce the measure cost to bring the SIR to .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
6. Service providers will review evaluation findings and a weatherization-specific scope of work with all clients receiving weatherization services.
7. Service providers will obtain client/property owner's signatures authorizing the installation of weatherization measures prior to work commencing. The client's

signature will be obtained on the WX800 application. If the unit is a rental, the property owner's signature will be obtained on the WX Rental form.

8. Lead Paint testing with an EPA approved lead paint test kit must be performed on all homes determined to have been built prior to 1978 or assume lead is present. If testing is performed, all areas of the home that will be disturbed by weatherization work measures shall be tested. Evidence of lead testing must be retained in the client file.
9. Photographs of the interior and exterior of the home must be taken during the pre- and post-inspection process. Photos are not required to be printed but must be retained as a permanent part of the client record.
10. If a DNE/Energy Auditor encounters obstructions/debris in any interior/exterior part of the home that would impede the DNE/Energy Audit process and/or the process of installing prescribed program work measures, the client must be asked to remove such obstructions/debris before commencing with the DNE/Energy Audit and/or the prescribed work measures. If the client refuses or is unable to provide clear access to all necessary areas of the home, the unit must be deferred.

## ***5.2 Restrictions on Window and Door Repair and Replacement***

### **Policy**

Service providers may repair or replace exterior windows and doors as an Energy Conservation Measure (ECM) only. Windows and doors must be entered as a standalone measure not incidental to another measure. Leveraged funds may be used to buy down the cost of door and window replacements in order to reach an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.

### **Procedure**

1. Client files must include the following documentation:
  - Verification that installed measure has an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds if repair or replacement is based on energy efficiency.
  - Photos of existing windows and doors.
  - All necessary measure-specific justification.
2. See Chapter 7, *Allowable Costs*.

## ***5.3 Heating System Replacement***

### **Policy**

1. Service providers may replace home heating systems if at least one of the following conditions is met:
  - a. Existing heating system is beyond repair.
  - b. Existing heating system can be repaired but only at greater cost than replacement.
  - c. Absence of a permanent, central heating system.
  - d. When an evaluation of cost-effectiveness determines the SIR is .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds based on NEAT/MHEA or other approved energy audit software.
  - e. Health and safety.



2. Service providers shall inspect and test the heating system(s) in each dwelling unit for safe operation prior to delivering weatherization services.
3. Test all combustion heating systems for safety before and after weatherization work.
4. Secondary heating systems must be checked for safety, and any hazards corrected.
5. Funds other than DOE may be used to buy down the cost of the measure to achieve an SIR of 1.0 or higher.
6. Replacement furnaces/space heaters, water heaters, and heat pumps will not be allowed based solely on a unit being at the end of its estimated life expectancy, but they can be replaced if they model out as an ECM with an SIR of at least .8 for LIHEAP funds and 1.0 for DOE funds.

### **Procedure**

1. Programmatic
  - Client files must include the following documentation:
    - a. Verification the installed measure has an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds if it is based on energy efficiency. Written justification for replacement and photographs of the heat system being replaced must also be included.
    - b. Written justification and photographs if replacement is health and safety-related.
    - c. A narrative clearly explaining the condition of the heating system prior to weatherization.
    - d. A clear record of who analyzed or worked on the heating system, when, and what was done.
    - e. A clear record of duct assessment, sealing, and insulating for forced-air systems.
    - f. Estimated repair costs used to justify replacement.
    - g. Paid invoices for all work contracted out or done by an outside heating technician.
    - h. All necessary measure-specific justification.
    - i. Proof of delivery to client the following documents: owner's manuals, operating and maintenance instructions for all new equipment/appliances installed in the home.
2. See Section 5.8, Fuel Switching.
3. See Chapter 6, Allowable Costs.
4. Required Installation Standards and Materials Specifications
  - The current approved Field Guide, all applicable NFPA codes, and other applicable codes/regulations must be strictly followed.

### **5.4 *Repair and Replacement of Solid Fuel Burning Appliance Systems* Policy**

1. Repair or replacement of solid fuel burning appliance systems is an allowable cost. Service providers may replace solid fuel burning appliance systems if it is more cost-effective to replace the unit or system than it is to perform necessary repairs.

An audit for solid fuel burning appliance systems must be completed prior to repair or replacement.

2. If a Service provider chooses to include repair or replacement of solid fuel burning appliance systems in its weatherization program, the following must be in place:
  - a. All applicable restrictions and code regulations must be met.
  - b. Service provider must have appropriate liability insurance.
  - c. Qualified personnel must perform all installations, maintenance, and inspection. All work must be post- inspected.
3. Service providers must provide consumer education on safe operation, proper maintenance, and clean and efficient burning techniques.
4. All solid fuel repair and/or replacement must meet the following required standards
  - a. Certification and labeling by the National Fire Protection Association under NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances. The local fire marshal or building inspector will have the most current information on the standard.
  - b. Certification by the Underwriters Laboratory for systems with electrical parts (<http://www.ul.com/>).
  - c. Environmental Protection Agency emission standards or local standards if they are stricter (<https://www3.epa.gov/>).
  - d. The following apply for mobile homes:
    - Systems that are certified and labeled for mobile homes.
    - Installation in accordance with manufacturer's recommendations and local codes.
    - Additional Requirements for Solid Fuel Burning Appliance Systems  
Solid fuel burning appliance systems shall be provided with combustion air ducted directly to the appliance. Combustion air shall be provided as recommended by the manufacturer's specifications.
5. If the number of air changes per hour (ACH) is greater than .35, solid fuel-burning appliances shall be installed in a location and manner to provide ventilation and combustion air supply to allow proper combustion of fuel, chimney draft, and maintenance of safe temperatures.
6. Where buildings are so tight that normal infiltration does not provide the necessary air, outside air shall be introduced.  
Combustion air may be supplied to the room in which the solid fuel appliance system is located in lieu of direct ducting, in an existing home, provided that:
  - a. The appliance system is not designed for directly connected outside air;
  - b. The existing construction prohibits the introduction of outside combustion air directly to the appliance system; and
  - c. The combustion air source shall be located as close to the solid fuel burning appliance system as possible, shall be provided with a back-draft damper, and shall be no less than six inches in diameter.

#### ***Allowable Costs***

Repair and replacement of solid fuel burning appliance systems are allowable costs under DOE. These measures fall within the total health and safety measures

and repairs limits (See Section 5.11 *Health and Safety Measures and Repairs*). See Chapter 6, *Allowable Costs*, for allowable expenditures.

### Procedure

1. Programmatic
  - a. Client files must include the following documentation:
    - NEAT/MHEA audit.
    - Clear record of who analyzed or worked on the heating system, when, and work performed.
    - Inspection approval.
    - Paid invoices for all work contracted out or performed by an outside heating technician.
    - All necessary measure-specific justification.
    - Proof of Delivery of owner's manuals/instructions consumer conservation education.
  - b. Service provider files must include the following documentation:
    - Necessary permits.
    - Liability insurance.
  - c. See Chapter 6, *Allowable Costs*.
  - d. See Chapter 11, *Energy Systems Policies*.
2. **Required Installation Standards and Materials Specifications**

The current approved Field Guide, all applicable NFPA codes, and other applicable codes/regulations must be strictly followed.

## 5.5 *Repair and Replacement of Space Heaters*

### Policy

1. Service provider may repair and/or replace space heaters under one of the following conditions:
  - a. Energy efficiency: If the total cost is justified using an evaluation of cost-effectiveness where the SIR is .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
  - b. Client health and safety.
2. Service provider must follow these general requirements for repair and replacement:
  - a. **Incidental repairs**

Make incidental repairs to space heaters as necessary to address health and safety issues.
  - b. **Provisions for working smoke detectors**

Inspect to ensure that a working smoke detector is installed on the same floor as the space heater. The cost of smoke detectors may be charged to Health and Safety Costs.
  - c. **Other safety hazards**

Check to ensure that no obvious building/NFPA code violations or other safety hazards related to the space heater are evident, for example electric wiring and heater vent pipe.
  - d. **Permits and inspections**

Secure building permits where required and have qualified inspections made before any heater is put into operation. The cost of permits may be charged to Program Costs.

e. **Consumer education**

Provide consumer education on safety hazards and the proper operation of equipment, proof of delivery of owner's manual/operating instructions for replacement units installed, including the operation, testing, and battery replacement of smoke detectors.

3. Service provider must follow the specific requirements listed below for space heater and fuel types.

a. Space heater type: Portable, Stand Alone Electric

- Repair, replacement or installations are not allowed on portable, standalone electric space heaters. Removal of portable, standalone electric space heaters is recommended per DOE WPN 11-6.
- DOE WPN 11-6 requires checking the circuitry to ensure adequate power supply for each existing portable, standalone electric space heater in the home.
- DOE WPN 11-6 also requires that the client must be informed of hazards and a signed waiver must be obtained if removal of portable, standalone electric space heaters is not allowed by the client.
- The following types of electric heaters are not defined as portable, standalone electric space heaters and the restrictions and requirements of section 3 (a) above do not apply:
  - Baseboard units permanently attached and code-compliant wired to the home and home electrical wiring system.
  - Zoned heating system components.
  - Other permanently installed electric heating units.

b. Unvented combustion space heaters

- In homes with unvented space heaters, local agencies will determine if a vented space heater can be installed to carry the major heating load. If the unvented space heater must remain the primary heating source, the service provider may not weatherize the house. See specific fuel types below for further direction. Refer to Chapter 11, Energy Systems Policies.
- When service providers replace unvented space heaters with vented ones as the primary heat source, they must advise the owner and tenant of the inherent dangers of the old heaters and they should strongly advise the party that owns the unvented heater(s) to permanently remove them from possible future use.
- When service provider cannot weatherize a house because of unvented space heaters, they should verify that such use is in accordance with the manufacturer's instructions and Underwriter's Lab listing (<http://www.ul.com/>). If in doubt, the local Fire Marshall must be contacted for assistance. The client must be advised of the proper operation of the heater and the safety hazards inherent in using unvented heaters.

c. Vented combustion space heaters

- Oil-fired space heaters (always vented), vented kerosene space heaters, and vented gas space heaters should be treated as if they are furnaces.
  - Service provider may perform tune-ups and clean heater units, vents, and ducts.
  - See the following information on fuel types for the repair and replacement of vented gas and kerosene space heaters.
- d. Fuel type: Gas
- Unvented gas space heaters are prohibited as a primary heat source (secondary only).
  - Repair of vented gas heaters is allowed, provided that the following concerns are addressed and documented in the client file:
    - Cost benefits of repair vs. replacement.
    - Methods to deal with health and safety concerns for the occupants.
    - Identification of, and compliance with, applicable codes.
    - Consumer education on the proper use and maintenance of the equipment.
  - Replacement of a gas space heater is only allowed when the existing unit is in poor mechanical condition or poses health and safety risks for other reasons.
    - Gas space heaters may not be installed in bedrooms or bathrooms or comparable areas of shelters and group homes. Exception: refer to BTU limitation in NFPA 54, chapter 9.
    - Replacement should be with another gas heater.
- e. Kerosene
- Unvented kerosene space heaters are prohibited.
  - Repair of vented kerosene space heaters is allowed, provided that the following concerns are addressed and documented in the client file:
    - Cost benefits of repair vs. replacement.
    - Methods to deal with health and safety concerns for the occupants.
    - Identification of, and compliance with, applicable codes.
    - Consumer education on the proper use and maintenance of the equipment.
  - Repairs to existing vented kerosene heaters may be considered when they are the only source of heat and no reasonable alternative exists.

**Allowable Costs**

Repair and replacement of space heaters are allowable costs under DOE. See Chapter 6, *Allowable Costs*, for allowable expenditures.

**Procedure**

1. Programmatic

- a. Client files must include the following documentation:
- Verification the measure has an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds if it is based on energy efficiency.
  - Written justification and photographs, if health and safety-related.
  - All necessary measure-specific justification.

- Smoke detector installation as applicable.
  - Copies of mechanical permits where required and results of inspections.
  - Delivery of consumer education, and proof of delivery of owner's manual/operating instructions for replacement units installed
- b. See Chapter 6, Allowable Costs.
  - c. See Chapter 11, Health and Safety/ Energy Systems Policies.
2. Required Installation Standards and Materials Specifications  
The current approved Field Guide, all applicable NFPA codes, and other applicable codes/regulations must be strictly followed.

## **5.6 Water Heater Repair and Replacement**

### **Policy**

1. Service providers must consider repairing water heaters, including replacement of elements, wiring, and thermostats.
  - a. Service provider may replace a water heater if the cost of repair exceeds the cost of replacement or if the broken water heater is more than 10 years old. Agencies must provide documentation to substantiate that a repair cost estimate has been obtained.
  - b. Water heater replacements should first be considered as an ECM if an SIR of at least .8 for LIHEAP funds and 1.0 for DOE funds is obtained through the NEAT/MHEA audit.
2. Local agencies may replace water heaters under one of the following conditions:
  - a. Energy efficiency if the total cost is justified using an evaluation of cost-effectiveness where the SIR is .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
  - b. Client health and safety. Requires written approval from KHC before proceeding with the replacement. The agency must provide and submit documentation to prove that a replacement is justified in the following manner: photographs of the existing water heater and a detailed narrative explaining why the existing water heater is creating a health and safety problem that can only be eliminated by replacing the unit.
3. If a gas water heater is installed, a worst-case depressurization test must be performed after installation of the unit.

### **Allowable Costs**

Water heater repair and replacement are allowable costs under DOE. Unless health and safety related, repair and replacement must be included in the SIR calculation for all funding sources and in the DOE per home expenditure average. See Chapter 6, Allowable Costs, for allowable expenditures.

### **Procedure**

1. Programmatic
  - a. Client files must include the following documentation:
    - Verification of the installed measure has an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds if it is based on energy efficiency.
    - Written justification and photographs if health and safety-related.

- Worst-case depressurization test results as applicable.
- Cost comparison documentation.
- All necessary measure-specific justification.
- Proof of delivery of owner's manual/operating instructions for replacement units installed.

## 5.7 Refrigerator Replacement

### Policy

1. Service provider may replace refrigerators with weatherization funding when the demonstrated SIR is .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
  - a. Service provider must use KHC approved methods to determine the SIR. These methods include:
    - NEAT/MHEA or another approved energy audit software program.
    - Data logging of existing refrigerator.
    - All refrigerators built before 1993 must be metered a minimum of 2 hours with an approved metering device and the results logged on the Base Load Record.
    - Refrigerator serial numbers can also be entered to the NEAT/MHEA audit to aid in determining efficiency if included in the NEAT/MHEA data base of refrigerators.
  - b. Leveraged funds can be used to bring the SIR of a marginally cost-effective measure to .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
  - c. All units in an eligible multi-unit project may receive a replacement refrigerator if the SIR is .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
2. Replacement refrigerators must meet the following criteria:
  - a. Energy Star or better energy efficiency. A non-Energy Star refrigerator may be installed provided the SIR for the non-Energy Star model is demonstrated to be higher than the SIR for the Energy Star model.
  - b. Top-mount freezer (two door models).
  - c. Models with no extra features such as door ice, through door water dispensing, or automatic icemakers. A like-for like replacement refrigerator may be installed if it still meets the SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds. This is to include the cost of disconnect and reconnection of existing water supply only.
3. Prior to replacement by the service provider, residents must agree via a written agreement to the removal of the old refrigerator and all non-functioning, unused, or underused refrigerators.

The old refrigerator must be removed from the property and disposed of properly per Section 608 of the 1990 Clean Air Act, as amended by 40 CFR 82, Subpart F, 1995. See *Specifications for the Low-Income Weatherization Program* for proper disposal methods. Written documentation proving the old unit was disposed of properly is required.

Ownership of the replacement refrigerator falls to whomever owned the refrigerator that was replaced, either the owner/occupant, property owner, or renter.

### **Allowable Costs**

Refrigerator replacement, including costs associated with CFC disposal, is an allowable cost under DOE. Refrigerator replacement must be included in the SIR calculation for all funding sources and in the Average WX Costs. See Chapter 6, Allowable Costs, for allowable expenditures.

### **Procedure**

1. Programmatic
  - a. Client files must include the following documentation:
    - Verification installed measure has an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds using proven methods.
    - All necessary measure-specific justification.
    - Client approval.
    - A photograph of the new refrigerator installed.
    - Ownership status of the replaced refrigerator.
    - Copies of the manufacturer's warranty and client's signature indicating receipt of original warranty.
    - Proof of delivery of owner's manual/operating instructions for replacement units installed.
    - Refrigerator disposal method.
    - Reclaimed refrigerant disposal method.

## **5.8 Fuel Switching**

### **Policy**

1. KHC does not permit the general practice of non-renewable fuel switching when replacing heating systems and hot water tanks.
2. Service provider must submit a WX-910 Request to Exceed/Fuel Change Request to their technical monitor if they propose to switch fuels as part of their weatherization services. The request must include clear justification for switching with photographs.
3. The new fuel source unit cannot exceed the cost of replacement using the existing fuel source unless the difference comes from fuel source costs.
4. When switching from electric to oil or gas, all costs associated with the installation of a gas heating system or water heater, and all required elements of the new heating system (providing a new supply line, flue, chimney, ducts, etc.), must be considered as part of the total cost.

### **Allowable Costs**

Fuel switching is an allowable cost under DOE with prior KHC written approval. See Chapter 6, Allowable Costs, for allowable expenditures.

### **Procedure**

Programmatic

1. Submit written application, WX 910 Request to Exceed/Fuel Change Request to assigned KHC field representative. Include supporting documentation.



2. Client files must include the following documentation:
  - a. Copy of written notification submitted to KHC.
  - b. A complete cost analysis justifying the work.
  - c. Justification for health and safety replacement.
  - d. All necessary measure-specific justification.

## 5.9 *Closed Wall Cavity Insulation*

### **Policy**

All closed wall cavities that can be insulated shall be insulated by means of dense-pack insulation methods at a density of 3.5 pounds per cubic foot unless the wall covering will not sustain pressures of insulating. Installed measure must have an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.

### **Allowable Costs**

Closed wall cavity insulation is an allowable cost under DOE. The measure must be included in the SIR calculation for all funding sources and in the Average WX Costs. See Chapter 6, Allowable Costs, for allowable expenditures.

### **Procedure**

Programmatic

Client files must include the following documentation:

1. Verification the installed measure has an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
2. All necessary measure-specific documentation.

## 5.10 *Energy-Efficient Lighting*

### **Policy**

1. Retrofit of lighting fixtures, replacement of incandescent screw-in bulbs with compact fluorescent screw-in bulbs (CFLs) or LED screw-in bulbs, and replacement of halogen or incandescent torchiere lamps with CFL torchieres are allowable weatherization measures under the following provisions:
  - a. Eligible Units
    - Owner-occupied dwellings.
    - Rental units where tenants pay electric bills.
      - Do not install lights in locations where the building owner pays the electric bills, such as common areas or master-metered buildings except when building owner is a nonprofit organization.
      - Retrofit of lighting fixtures and replacement of halogen or incandescent torchiere lamps with CFL torchieres are allowable if costs are justified with an SIR calculation of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
      - All measures must directly benefit low-income tenants.
      - All incandescent screw-in bulbs can be replaced with compact fluorescent screw-in bulbs (CFLs) or LED screw-in bulbs.
2. Every effort should be made to arrange cost sharing with utilities and use utility funds first.
3. Local agencies must provide residents with information on the following:
  - a. CFL features

- b. Potential savings
- c. Proper use and care
- d. Use and replacement limitations
- e. Where to purchase replacement bulbs

**Allowable Costs**

Retrofit of lighting fixtures, replacement of incandescent screw-in bulbs with compact fluorescent or LED screw-in bulbs and replacement of halogen or incandescent torchiere lamps with CFL torchieres are allowable costs under DOE funds.

Retrofit of fixtures and replacement of halogen or incandescent torchiere lamps with CFL torchieres must be included in the SIR calculation for all funding sources and in the Average WX Costs. See Chapter 6, Allowable Costs, for allowable expenditures.

**Procedure**

Programmatic

1. Client files must include the following documentation:
  - a. Receipts or inventory reduction paperwork.
  - b. For lighting fixture retrofits and replacement of halogen or incandescent torchiere lamps with CFL torchieres, verification that installed measures have an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
  - c. All necessary measure-specific justification.
  - d. Delivery of consumer education.
  - e. See Chapter 6, Allowable Costs.

**5.11 Health, Safety Measures, and Repairs**

**Policy**

1. Energy-related health and safety hazards identified prior to, or as a result of, the installation of weatherization materials must be addressed (see Section 12.1, Health and Safety Plan). Energy-related health and safety measures and repairs are intended to protect building occupants. See Section 5.1, Home Energy Audits and Section 5.11, Health and Safety Issues, for additional information. Agencies must inform clients of any health and safety hazards that may be beyond the scope of the weatherization program. In addition, the agencies must provide written documentation and obtain signatures that provide proof the client has been educated and fully informed about any Health and Safety issues/problems discovered in their home by the DNE/Energy Auditor. The following categories must be addressed:
  - a. Knob-and-tube inspection and minor electrical repair.
  - b. Indoor Air Quality (IAQ) assessment and diagnostic testing.
  - c. Combustion safety testing, including unsafe heating/energy systems defined by applicable safety codes.
  - d. Lead Paint.
  - e. Asbestos awareness.
  - f. Mold and moisture awareness.
  - g. Radon.

- h. Fire hazards.
  - i. Building Structure and Roofing.
  - j. Code Compliance Issues.
  - k. Electrical, other than Knob and Tube wiring.
  - l. OSHA and crew/contractor safety, including injury prevention.
  - m. Biological and unsanitary conditions.
  - n. Pests and pest removal.
2. The cost of LSW (labor, material, and related costs) is a health and safety cost.
  3. Installation of mechanical ventilation to meet the requirements of ASHRAE 62.2 (most current edition in force) is a health and safety cost.

**Allowable Costs**

Energy-related health and safety measures and repairs are allowable costs under DOE funds.

**5.12 Testing for Excessive Carbon Monoxide (CO)**

**Policy**

1. All homes with combustion appliances must be tested for combustion safety before, during and after weatherization work.
2. No weatherization work can be done unless the CO levels are acceptable.
3. If CO is above acceptable levels, weatherization funds may be used to clean, and repair appliances owned by low-income occupants.

**Allowable Costs**

Combustion safety testing and appliance cleaning and repair are allowable costs under DOE. These measures fall within the total health and safety measures and repair limits. These measures do not need to be included in the SIR calculation for all fund sources or in the Average WX Costs.

**Procedure**

Programmatic

1. Client files must include the following documentation:
  - a. Results of pre- and post-weatherization combustion safety report for every appliance tested.
  - b. Receipts or invoices for any corrective work.

**5.13 CO Detectors, Smoke Detectors, and Fire Extinguishers**

**Policy**

1. Service providers must install Carbon Monoxide (CO) alarms and smoke alarms in dwelling units where these devices are nonexistent or non-functioning.
  - a. CO alarms must be, UL listed, installed in accordance with the manufacturer’s recommendations and located in compliance with the Kentucky Weatherization Field Guide (KWFG) Chapter 1 Section 1.2 and Standard Work Specifications. Installed CO alarms must have the capability to accurately detect and display low levels of carbon monoxide to 10 ppm and comply with other program requirements. Electric plug-in CO alarms must have battery backup.

- b. CO alarms designed for the “hearing impaired” must be installed when the client is “hearing impaired”.
  - c. Smoke alarms must be installed in accordance with the manufacturer’s recommendations, listed in accordance with UL 217, comply with NFPA 72 and accordance with the KWFG Chapter 1 Section 1.3.
  - d. Smoke alarms designed for the “hearing impaired” must be installed when the client is “hearing impaired”.
2. Where multiple smoke alarms are installed interconnection is required. Actuation of any one smoke alarm shall activate all of the alarms in the individual unit. Hard wiring and interconnection is not required in existing areas provided:
- a. The alteration or repair does not cause the removal of wall or ceiling finishes exposing the structure, and
  - b. No attic, crawl or basement is available which can provide access for hard wiring and interconnection without the removal of interior finishes.
3. Smoke alarms/detectors must be located:
- a. In every sleeping room.
  - b. Outside of each sleeping area in the immediate vicinity of the bedrooms.
  - c. On each additional story (including basements).
  - d. In split-level dwellings where an intervening door is located between the adjacent levels. However, in split-level dwellings without an intervening door, a smoke alarm installed on the upper level shall suffice for the adjacent lower level, provided that the lower level is less than one full story below the upper level.
  - e. Near every combustion zone. This alarm can serve the requirements of the above stipulations, where feasible.

Providing fire extinguishers is allowed only when solid fuel is present. Fire extinguishers must be installed according to the manufacture’s recommendations, be type ABC, UL listed, ≤ 10 lb. and with a permanently affixed wall bracket to receive the extinguisher. The client must sign a written agreement to allow a fire extinguisher to be installed in the home within sight of the solid fuel burning heat system when standing at the unit. Service provider must discuss and provide information on the use and upkeep of the extinguisher to the client.

4. Service provider must provide the occupant(s) of the dwelling unit with verbal and written information regarding the following:
- a. Dangers of CO and smoke.
  - b. How to operate and reset the CO and smoke alarm.
  - c. How to read the CO alarm.
  - d. How to respond to CO levels above 10 ppm.
  - e. How to change the batteries of CO and smoke alarm.

***Allowable Costs***

Carbon monoxide and smoke alarm installation is an allowable health and safety cost under DOE. This measure falls within the total health and safety measures and repairs limits. These measures are not included in the SIR calculation or in the Average WX Costs.

## **Procedure**

### **Programmatic**

1. Client files must include documentation of the following:
  - a. CO and smoke alarm installation.
  - b. Detector location(s).
  - c. Detector model type.
  - d. Delivery of consumer education.
  - e. Proof of delivery of owner's manual/operating instructions for replacement units installed
2. Service provider must keep a copy of CO and smoke alarm model specifications for all models installed in agency files.

## **5.14 Diagnostic Tests and Air Sealing**

### **Policy**

1. Service provider must perform diagnostic tests prior to installment of weatherization measures and upon completion of each project based on the following:
  - a. Type of residence
  - b. Site conditions
2. Service provider must perform air sealing where it is determined by a weatherization audit to be effective based on one of the following considerations:
  - a. Health and safety (between attached garage and living space)
  - b. Building durability
  - c. Energy efficiency if the total cost is justified using an evaluation of cost-effectiveness where the SIR is .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.

### **Allowable Costs**

Diagnostic tests and air sealing are allowable costs under DOE. Both must be included in the SIR calculation for all fund sources and in the Average WX Costs.

## **Procedure**

### **Programmatic**

1. Client files must include the following documentation (tests must include the name(s) of the tester(s) and test dates):
  - a. Pre- and post- weatherization blower door test results, including the location of the doorway where tests were taken.
  - b. Pre- and post-measurements for the following:
    - Duct pressure pan
    - Dominant duct leakage
    - Pressure differential
    - Duct tester readings
  - c. Reason(s) air sealing target not attained, if applicable.
  - d. Paid invoices for materials, measures, repairs, or modifications.
  - e. Verification the installed measure has an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds if it is based on energy efficiency. All necessary measure-specific justification.

### 5.15 *Deferral Standards*

Deferrals, commonly referred to as a Walk Away is a dwelling that has been inspected by a qualified person who has determined that conditions are present which prohibit rendering service (See Chapter 12, Health and Safety for additional guidance). At a minimum in order for a dwelling to be given Walk-Away status, the dwelling must receive a walk-through visual inspection of the interior and exterior of the home. If it is determined after this process that conditions exist in the home that will not allow weatherization services to be provided, the Dwelling Needs Evaluator/Energy Auditor may stop the process and no further evaluation labor is required.

#### **Policy**

1. It is the role of the Dwelling Needs Evaluator/Energy Auditor to weigh all factors and decide whether to proceed or not.
2. Deferring weatherization work does not mean assistance will never be available, but that any work must be postponed until problems can be resolved and alternative sources of help are found, as necessary.
3. In the event the Dwelling Needs Evaluator/Energy Auditor determines the dwelling is a Walk Away, the following procedures shall apply:
  - a. The Dwelling Needs Evaluator/Energy Auditor is required to verbally inform the client why Walk-Away status has been given. The client shall also be informed in writing (via certified mail or agency must obtain a signed document acknowledging receipt of deferral notice) as to why the dwelling cannot be weatherized. If there are conditions that the client must correct before service is provided, those conditions must also be stated in writing. A copy of the client deferral letter must be retained in the client file.
  - b. Service provider is encouraged to refer the client to any alternate program such as home rehab, if one is available in the area. A copy of the referral letter must be retained in the client file.
4. A Walk Away is not a completion. Reimbursements for a Walk Away shall be obtained through the normal monthly invoicing process, see Chapter 6.3 Invoicing. Service provider must provide a status explanation in the comments section of the WX 710 Completed Dwelling Report and the electronic invoicing system.
5. Installation of CO and/or smoke detectors is prohibited.
6. Material costs are ineligible for reimbursement.
7. KHC will only reimburse the agency for the actual Dwelling Needs Evaluator's/Energy Auditor's Labor spent traveling to and from the client's home and for actual time spent at the client's home performing the walk-through inspection. WX Labor costs will automatically be displayed on the 702 Invoice as Program Support, see Chapter 6.3 Invoicing.
8. Service provider must develop deferral guidelines and a standardized form.
  - a. Deferral guidelines may include, but not limited to the following:
    - The client has known health conditions that prohibit the installation of insulation and other weatherization materials.
    - The building structure or its mechanical systems, including electrical and plumbing, are in such a state of disrepair that failure is imminent, and the conditions cannot be resolved in a cost-effective manner.

- The house has sewage or other sanitary problems that would further endanger the client and the weatherization installers if weatherization work were performed.
  - The house has been condemned or electrical, heating, plumbing, or other equipment has been "red tagged" by a local or state building official or utilities.
  - Mold and Moisture problems are so severe they cannot be resolved under existing health and safety measures and minor repairs.
  - Dangerous conditions exist due to high carbon monoxide levels in combustion appliances and cannot be resolved under existing health and safety measures.
  - The client is uncooperative, abusive, or threatening to crew, auditors, inspectors, contractors, or others who must work on or visit the house.
  - Lead-based paint is determined to be in the home. The extent and condition of lead-based paint in the house would potentially create further health and safety hazards.
  - Asbestos anywhere on the interior or the exterior of the dwelling would require deferral of weatherization services if any weatherization work measure would disturb the asbestos. Asbestos cannot be handled, altered, disturbed, cut, drilled, sanded or be subjected to any other action that would create a danger to the homeowner or any weatherization staff/contractor.
  - Flea/pest infestation within the dwelling or in any area outside of the dwelling where weatherization staff/contractors would have to work (Pests include but are not limited to: fleas, roaches, rodents.).
  - In the judgment of the Dwelling Needs Evaluator/Energy Auditor, conditions exist which may pose a risk from fire, falling, poor sanitation, endanger the health and/or safety of the work crew/contractor or limit access for evaluation or measure installation. Work should not proceed until the condition is corrected.
- b. Standardized Deferral Form should include the following:
- Evaluation date
  - Reason for deferral
  - Date issue must be resolved, if applicable
  - Contact information
9. Service provider must actively pursue all alternative options on behalf of the client, including referrals, and use good judgment in dealing with difficult situations.

### **Deferral Documentation**

#### Programmatic

1. Service provider must provide clients with deferral documentation. If the property is a rental, property owners must receive a copy.
2. Client files must include a copy of deferral documentation including pictures.
3. An example of deferral documentation would include: a certified letter on service provider's letterhead stating the reasons for the deferral, including

referrals to other possible programs or agencies who can offer assistance when feasible.

### **Corrected Deferral Conditions**

1. If a client has subsequently corrected issues/problems identified that constituted a deferral at the time of the dwelling needs evaluation/energy audit or the initial application/screening process, the following process will apply:
  - a. The items identified that caused the initial deferral determination must be verified as having been corrected. Verification may take the form of a document specifically listing all items that caused the deferral, and a description of the actions taken that corrected the problems/issues. This document must be signed/dated by the client and once verified, signed/dated by the weatherization director and or a Certified Dwelling Needs Evaluator/Energy Auditor. The method of verification must also be disclosed on this document, i.e.: on site verification at the client's home, etc.
  - b. An applicant will remain eligible for weatherization services for 12 months from the date of verified eligibility. In addition to step 1, eligibility must also be reassessed and verified again by examining the WX 800 Application and Prioritization. In the event a unit is deferred, and if the client corrects the deferral reason within 12-15 months of deferral, the client may be served after continued eligibility is confirmed. A signed declaration of income statement for the previous three months may be used to update the WX 800 Application and Prioritization, if necessary. If weatherization work has not begun after 15 months from the date of eligibility, the household must reapply in full.
  - c. Once items 1 and 2 have been satisfied, the client application will be allowed to be moved to the top, the next to be served, on the prioritization list.

#### **5.16 Low Flow Showerheads**

**Required:** Low flow showerheads are an allowable cost of the program and they must be considered when inputting house data into the NEAT/MHEA audit.

## **Chapter 6: Allowable Costs**

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### **6.1 General Standards for Allowable Costs**

Service provider files must contain all required expenditure documentation. See Chapter 5, Providing Weatherization Services, for allowable weatherization measures and fund source limitations and allowances.



### 6.1.1 Allowable weatherization costs must meet the following criteria:

1. Be reasonable for the performance of the contract and of benefit to the program for which the funds are provided.
2. Be allocated to the contract under these policies.
3. Conform to any limitations or exclusions set forth in these policies or in the contract as to type or amount of cost of items.
4. Be consistent with policies and procedures that apply uniformly to other activities of the organization and are accorded consistent treatment.
5. Be in accordance with generally accepted accounting principles. See "The Yellow Book" (OMB Circular A-123) issued by the federal Office of Management and Budget (<https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2016/m-16-17.pdf>).
6. Be adequately documented.
7. Be in accordance with the terms and conditions of the DOE rules published in 10 CFR 440 and in 10 CFR 600.

### 6.1.2 State and Local Taxes

1. Charge applicable state and local taxes on purchases to the same budget category and funding source as the purchased item or service.
2. Local agencies making weatherization improvements under the weatherization program for low-income homeowners or renters are eligible for exemption from state sales tax and use tax. See Kentucky State Department of Revenue regulations. Purchases of qualified materials must be accompanied by a *Buyers' Retail Sales Tax Exemption Certificate*.

### 6.2 General Standards of Fiscal Accountability

1. Method of Compensation: KHC will reimburse service providers for all allowable costs upon receipt of authorized requests for reimbursement as directed by KHC.
2. Accounting and Auditing: service provider is responsible for complying with all applicable guidelines and procedures, demonstrating responsible management of cash flow, inventory control, equipment purchase, and administrative costs. Accounting and bookkeeping activities must comply with Generally Accepted Accounting Principles and applicable Federal/State laws and regulations.
3. Subcontracting: Service providers must select contractors using competitive procedures among potential bidders for weatherization services.
4. Record-keeping:
  - a. Local agencies must keep records that fully disclose the following:
    - Amount and disposition of funds received.
    - Total cost of a weatherization project.
    - Source and amount of funds used from all funding sources.
    - Records must be retained for three years from the last financial audit or the completion of the length of commitment, whichever is later.
    - The fiscal records for all dwelling unit expenditures must be traceable. Costs charged to each funding source must have purchase orders,

- invoices, inventory records, time sheets, and other source documents for identifying funding sources.
- b. Reports: Local agencies will provide reports or answers in writing to specific questions or surveys requested by KHC or its funding sources by the specified deadline.
5. Inventory Control: Local agencies are required to maintain an inventory of materials and non-expendable tools and equipment. Inventory and related records must be made available to KHC or DOE monitors upon request.
- a. All nonexpendable property that has a useful life of one year or more, and with an acquisition cost of \$5,000 or more shall be tagged by KHC.
  - b. All nonexpendable property purchased with weatherization contract funds, whether tagged or newly purchased but not yet tagged by KHC, is to be reported on the Equipment Inventory Count Sheet required as part of the contract closeout. Information to be included on the Equipment Inventory Count Sheet include but are not limited to the following:
    - Funding source
    - Location (city and county)
    - Condition (good, fair, not usable)
    - Description (simple description of item: power saw, power drill, etc.)
    - Tag number
    - Manufacturers serial number, if available
    - Purchase price
    - Date of purchase
  - c. When items of nonexpendable property are stolen, a police report must be obtained by the service provider which details each stolen item by tag number or, in the case of untagged equipment, manufacturers serial number (if applicable).
  - d. Inventory and Separation of Materials and Supplies: A separate inventory system for DOE funds must be in place to ensure that materials and supplies are properly charged to the correct program. This system must track material and supply purchases and also track their use on specific job locations. All purchases shall require supervisory approval and shall be made in accordance with policies and procedures outlined in the WXPM.
6. Reversion of Property: For all nonexpendable property with a value of \$5,000 or more and with a life expectancy of at least one year, the service provider should reach out to the network to see if any other service provider has a need for the equipment. If they do, the two service providers should work together to transfer the equipment internally and inform KHC of the transfer. If they do not, the service provider should contact KHC and work with KHC on a process to dispose of the equipment.
7. Authorized Expenditures: 2 CFR 200 and 10 CFR 440 are used as general guidelines for determining which weatherization costs are allowed.
- a. Exceptions exist where costs conform to specific categories in the applicable contract, policies and procedures, weatherization budget, state law, or local ordinance.

- b. KHC determines the proper interpretation of the federal or state procedures as they relate to costs allowed or prohibited under this program.

### **6.3 Invoicing and Reporting Procedures**

Reimbursement of expenditures incurred by service providers shall be requested monthly using the web-based invoicing system. Expenditures may be reported using an accrual or cash basis accounting system.

Service providers are required to submit one invoice per month to KHC for prior month expenditures. At no time should more than 60 days lapse between submissions of invoices. Invoice submission shall include, but not limited to, submission of an electronic copy of the 702 Invoice, all WX 710 Completed Dwelling Reports for Completed and Deferred units,

Section 106 Historic Preservation Review forms for Completed units, and additional documentation as required. The service provider will submit the Weatherization 702 Invoice for reimbursement of contractor's and/or crew-based service costs. Service costs should be divided between materials and labor as shown on the WX 710.

KHC approval for the service provider invoices will be contingent on a thorough review of all supporting documentation submitted and reconciliation of costs back to the 702 Invoice. Where KHC identifies a significant difference in program operations costs requested on the 702 Invoice and the total of such costs on the Completed Dwelling Reports, or any costs not justified by proper supporting documentation, KHC may deny these costs until the service provider submits acceptable justification to KHC. In the instance where a draw is denied, a revised 702 Invoice and/or corrected supporting documentation will be required before approval can be granted.

#### **Invoice reconciliation**

All costs invoiced must be reported on the 702 Invoice. Program Support/Indirect (overhead) Costs will not be assigned to the Health and Safety categories on any 702 Invoice. Program Support/Indirect (overhead) Costs will not be assigned to Regular WX on the WX 710 Completed Dwelling Report. Program Support will only be reported in an aggregate amount on the 702 Invoice as WX Program Support. Labor costs billed on the job level for Walk Away units will automatically be recorded on the 702 Invoice in the WX Program Support Monthly column.

All material and labor adjustments to previous monthly entries must be entered on the Job level within the electronic invoicing system and must be done within the quarter the draw was marked complete. The units that are being adjusted must be identified by providing an updated WX 710, in addition to the WX 710 from the time the job was marked complete.

Service costs for material and labor must be listed with the job they are incurred. All material purchased and inventoried must be listed in the Section 3 WX Inventory and/or Section 4 H&S Inventory sections of the electronic invoicing system and detailed on each job as they are used, in the appropriate (H&S or WX) "Materials Used from Warehouse" rows.

**Note:** KHC reserves the right to request the service provider provide supporting documentation during random draw audits throughout the program year. Service providers must retain the documentation in their files for auditing purposes.

## **6.4 Cost Categories**

DOE WAP allows expenditures in the following seven categories: Administration, Training and Technical Assistance, Program Operations, Health and Safety, Vehicles and Equipment, Liability Insurance, and Financial Audits. The Kentucky State Plan for WAP details specifically what categories are allowed each year. The following sections describe eligible costs and documentation required for such costs to be in compliance with the existing state plan.

### **6.4.1 Administration**

KHC will retain no more than 5 percent of available funds for administrative purposes, of which a portion will be made available to CAK for their administrative assistance. The service provider will receive at least 5 percent administrative funds. KHC will work to get more administrative funds in the DOE state plan if available and applicable. In determining the amount of additional administrative funds, if any, that may be allocated to qualified service providers up to the DOE maximum, the administrative burden of each of the service providers in administering the weatherization program will be considered.

At the decision of KHC and based on the amount of the overall allocation of weatherization funds, an additional 5 percent may be allocated to service providers if the following conditions are met:

- The service provider is not administering the program under any sanctions or a corrective action plan and;
- The service provider received less than \$350,000 of new DOE funds to administer the program.

#### **Allowable Costs**

Administrative costs are costs associated with those functions of a general nature not clearly identifiable with a program. These functions include planning, budgeting and accounting, and establishment and direction of local agency policies, goals, and objectives.

Allowable administrative costs include costs associated with functions, such as:

- General board/committee meetings
- Executive Director
- General staff meetings
- Office management
- Accounting, auditing, and budgeting
- Corporate legal services
- Personnel management
- Purchasing and distribution of supplies
- Insurance and bonding

- Receptionist, switchboard, mail distribution, filing, and other central clerical services
- Word processing and computer services
- Computer equipment used for administrative functions
- Organizational and procedure studies
- General record keeping
- Office space/facilities lease or rental – including outstations
- Utilities in the office space/facilities
- Postage
- Duplicating/copying
- Telephone equipment and services
- Administrative staff training
- Applicable state and local taxes

### **Methods of Distributing Costs**

- Charge direct supervision of program services to the services billing category, not to administration. Personnel typically identified as administration may relate, at times, more directly to program activities than to administration. Even some hours of “management staff” may be properly allocated to program operation costs, but only if the positions are not included in an indirect cost pool.
- Cost Allocation Plans: The service provider auditor must approve plans used to spread central administrative costs across local agency programs.
- Indirect Rates
  - Local agencies may apply a federally approved indirect cost rate to charge administrative costs only if both of the following conditions are met:
    - The agency has an approved indirect cost agreement with a cognizant federal agency.
    - The indirect cost agreement precludes the application of the indirect rate to direct client benefits in this program.
  - The application of indirect cost charges may not result in exceeding applicable contract budget limits.

### **Cost Documentation**

Local agency files must include the following documentation:

- a. Description of agency subcontracting process and copies of pertinent contracts.
- b. All necessary records that disclose fiscal accountability.
- c. Expenditure documentation as described in 2 CFR 200.

#### ***6.4.2 Training and Technical Assistance***

Expenditure of contract funds awarded specifically for Training and Technical Assistance (T&TA) purposes are subject to the following conditions:

- a. Training must have direct application and benefit to local agency weatherization programs and assigned staff. If the training is not strictly for the benefit of the weatherization program staff, local agencies must document how other programs will share the training costs.
- b. Priority is to be given to direct training opportunities for staff, crews, and subcontractors.
- c. Agency service provider staff salaries while attending training, providing training, traveling to and from training and participating in on-the-job training is an allowable expense if identified in the agency budget as such. Equipment and materials related to training may also be purchased with these funds.
- d. Contractor Retention Agreements: Before sending a contractor to training, agencies must have a signed Contractor's Training Commitment Agreement form on file for each requesting contractor. The contractor must commit to participation in the program for a period of 24 months. If the contractor fails to honor the retention agreement or if they are removed from participation for cause, the contractor must repay the training session fee costs of training to the WAP.
- e. Meal Reimbursement from T&TA: Meal reimbursement must follow internal service provider policies related to travel.
- f. Training Cost Reimbursement Policy for Private Contractors: Private Contractors will only be reimbursed for training session fees, travel costs, meals and lodging.

Local service provider files must include all applicable expense documentation used to create a request for reimbursement.

### ***6.4.3 Program Operations***

Program operation costs are costs that can be clearly identifiable with a program. Program operation costs include material and labor costs associated with installing weatherization measures, making weatherization-related repairs, and other costs necessary to operate a weatherization program (often referred to as "program support").

Required: Estimated Regular Weatherization Service costs computed on the NEAT/MHEA audit and related work orders for each home receiving weatherization services must be within 10% of ACTUAL total service costs of each home receiving weatherization services paid with DOE funds.

Allowable program costs may include:

1. Materials allowed per program regulations, either purchased directly by the service provider or charged by an approved subcontractor. (See Section 6.4)
2. Storage or warehousing of allowed weatherization materials.
3. Payment of staff involved in purchasing, inventory management, and distribution of allowed weatherization materials.
4. Payment involved in fabricating allowed materials.
5. Costs charged by a subcontractor.
6. Local agency weatherization crew costs.
7. Direct supervision of program services and other direct program management/oversight responsibilities.

8. Intake and outreach staff labor.
9. Weatherization audit and inspection.
10. Transportation of materials, crews, tools, and equipment to and from the storage and weatherization sites (includes maintenance and insurance of vehicles).
11. Printing when associated with materials used in energy conservation education or outreach.
12. Office space and utilities as a percentage of the area used for direct applicant services.
13. Office space and utilities used by program support personnel in program support functions.
14. Telephone calls when documented as used for direct applicant services.
15. Copying when copied materials are given to an applicant.
16. Postage for material mailed to prospective or current applicants.
17. Equipment and tool purchase and maintenance—including computer and other electronic equipment and software used by weatherization program activities.
18. Payments permitted under the federal Workforce Investment Act (formerly JTPA) to supplement wages paid to training participants and public service employment workers under that program.
19. Securing building permits when necessary for the installation of weatherization measures.

## **Weatherization Materials**

### **Materials Installed**

The costs of the purchase and delivery of Regular Weatherization materials that will be or have been installed in eligible dwellings, including any delivery charges, itemized as follows:

- All DOE materials purchased by the service provider and installed by its employees shall be itemized by type, unit price, units installed, total unit costs and total costs for each dwelling that receives service.
- All DOE materials installed by subcontractors of the service provider shall be itemized by unit of work or by type and quantity, depending on the measures being performed, total unit costs and total costs for each dwelling that receives service.

### **Materials Specifically Not Allowed**

- a. Low-flow toilets are specifically not allowed using DOE funds.
- b. Vinyl siding is not considered an air barrier and therefore it is specifically not allowed as an air infiltration measure using DOE funds.
- c. Carbon monoxide/smoke detectors installed in a dwelling that has received a Walk-Away/Deferral status at the time of a dwelling walk-through inspection.
- d. KHC will make the final determination on whether costs of other materials not specifically addressed in this manual are allowable.

There is an expectation that service providers will use inventory on hand in a reasonable amount of time, therefore, limiting the amount of carryforward each year.

## **Weatherization Labor**

Labor shall refer to the total of all documented labor costs associated with work on and at the job site. Excluded from Labor is down time due to weather, leave, and any other costs not attributable to actual work on a dwelling. These labor costs are considered Program Support.

Service provider labor costs for work performed shall be documented on all dwellings for each priority measure completed. Labor is the product of employee hours attributed to a specific unit including pre-evaluating, delivering materials, installing materials, inspecting, and travel time. Staff time must be reflected in time sheets, or equivalent, that identifies the job being charged.

Labor for private contractors shall be documented for each itemized unit of materials installed.

**Note:** Labor cost(s) related to repairing client property damage caused by agency staff is a **non-allowable** labor cost(s) that cannot be charged to the Weatherization Assistance Program. Also refer to section 2.13 of this manual.

### **Program Support**

Costs associated with the direct provision of Weatherization services (traced to a specific unit address), excluding administration, materials and labor, shall be allowed for the items listed below:

- **Staff Wages:** Wages for personnel such as weatherization program directors, field supervisors, evaluators, inspectors/energy auditors/quality control inspectors, intake staff, inventory control personnel and other similar positions with duties related to the direct provision of regular weatherization services. Fringe benefits such as FICA, retirement, health, life, unemployment insurance, and Workmen's Compensation for program support staff. Wages paid for duties in support of the program such as down time due to weather, leave, and any other costs not attributable to actual work on a dwelling are also considered program support
- **Transportation:** Any travel using privately owned vehicles for the purpose of pickup and delivery of materials, transporting of work crews to work sites, or for other service delivery activities.
- **Storage:** Rent, utilities, and insurance for storage facilities.
- **Vehicle Costs:** Gasoline, oil, filters, tires, batteries, plugs, belts, all repair parts and labor, insurance and license tags for vehicles used for weatherization service delivery activities.
- **Purchase of Tools and Equipment.**
- **Maintenance of Equipment:** Parts and labor related to repairing tools and equipment.
- **Miscellaneous:** Program support costs not covered by any other line item. Budgeting funds in this line item must have prior approval of KHC.

#### **6.4.4 Health and Safety**

REQUIRED: ESTIMATED Health and Safety costs computed on the NEAT/MHEA audit and related work orders for each home receiving weatherization services



must be within 10% of ACTUAL total service costs of each home receiving weatherization services paid with DOE funds.

### **H&S Materials**

#### Health and Safety Material Costs

The costs of the purchase and delivery of Health and Safety materials that will be or have been installed in eligible dwellings, including any delivery charges:

- All DOE materials purchased by the service provider and installed by its employees shall be itemized by type, unit price, unit installed, total unit costs and total costs for each dwelling that receives service.
- All DOE materials installed by subcontractors of the service provider shall be itemized by unit of work or by type and quantity, depending on the measures being performed, total unit costs and total costs for each dwelling that receives service.

### **H&S Labor**

Health and Safety Labor shall refer to that portion of labor associated with providing Health and Safety Service associated to a particular unit.

Costs associated with the direct provision of Health and Safety measures at the dwelling site and shall include:

- Staff Wages: Wages paid to crew leader, energy systems technicians and crew laborers.
- Staff Fringes: Fringe benefits such as FICA, retirement, health/ life, and unemployment insurance, and Workmen's Compensation paid for staff budgeted in labor. May include any items purchased that are used on the job by crew workers but remain in their possession when terminating their employment.
- Private Contractors: Labor costs charged by private contractors for installation of health and safety measures.

### **6.4.5 Vehicles and Equipment**

Equipment and Vehicle Purchases: KHC will approve and monitor all vehicle purchases by service providers with DOE funds. Agencies must have a written Procurement Policy, which follows 2 CFR §200 requirements for procurement.

All purchases of equipment with values exceeding \$5,000 require KHC written approval.

Requests for vehicles purchased with DOE funding require prior written DOE approval. In addition, the following requirements and conditions apply:

- Request vehicle from KHC through memo template found on the HCA Help Desk.
  - Secure quotes according to the Agencies written Procurement Policy.
  - Ensure that 2 CFR §200 is followed.
  - State in the memo reason for replacement and what will happen to the current vehicle(s).

- Include with request the specifications sent for the quotes (or other procurement policy documentation).
- KHC will request permission from DOE and apply allocation formula of DOE and LIHEAP funds to the purchase.
  - DOE needs purchase request, identifying grantee/sub-grantee.
  - Describe where and how the vehicle will be used, specify full- or part-time use in WX.
  - Identify funding sources to be used for purchase.
  - Statement of replacement or ramp-up.
    - Address trade-in value.
    - Indicate DOE/WAP cost-sharing.
  - Follow agency procurement and 2 CFR §200 (i.e. 3 quotes)
  - KHC will provide the breakdown on braiding of funding for DOE/LIHEAP.
  - Sub-grantee will pro-rate costs per funding source over a 3-month (or otherwise prescribed by KHC) to program support per funding stream and allocable percentage.
  - See WPN 17-6 for additional guidance.
- All vehicles obtained with weatherization contract funds will remain the property of KHC and shall be used exclusively for weatherization purposes. Personal use or use of vehicles for purposes other than weatherization program purposes is strictly prohibited. Vehicles may not be used for commuting purposes to and from an employee's home.
- Liability and comprehensive coverage, minimum of \$1,000,000 must be maintained on all vehicles purchased with Weatherization funds.
- The service provider must maintain a vehicle record (log) including, but not limited to the following: vehicle number (serial number), description, tag number, mileage, and purpose of use.
- All warranty requirements of the vehicle must be followed and after termination of warranty period, proper maintenance and care must be provided by the service provider.
- Disposition: For guidance in disposing a vehicle, contact the [HCA Help Desk](#).
- Title of Vehicle: The title of the vehicle will be registered in KHC's name only. All vehicles will be included in the KHC Inventory System. KHC will need the following to Tag the new vehicle:
  - Copy of Title
  - Purchase Order Number and Copy of Invoice
  - License Number
  - Vehicle Identification Number (VIN)
  - Funds used to purchase vehicle
  - Location (where vehicle will be used)
  - Identity of Custodian

So that the vehicle may be included in the Inventory System, copies of the Certificates of Title and Registration are to be forwarded to:

[wxadmin@kyhousing.org](mailto:wxadmin@kyhousing.org).

Securing KHC's Interest in Motor Vehicles, Equipment, and Fixtures: Service providers are responsible for ensuring KHC's financial interest in motor vehicles, equipment, and fixtures with purchase values of \$5,000 or more, purchased under KHC contracts.

#### **6.4.6 Liability Insurance**

DOE allows general personal liability and property insurance to be charged to the liability line item of the contract. CAK and KHC will pay for pollution insurance separate from the liability insurance allocation to sub-grantees.

#### **6.4.7 Financial Audits**

DOE allows general financial audits for WAP, only, to be charged to the financial audit line item of the contract. Charge direct supervision of program services to these functions not to administration.

### **6.5 Leveraged Funds**

1. When non-DOE funds (such as utility company funds) are combined with DOE funds on a weatherization project, DOE's share will be the minimum amount necessary to complete the weatherization work after funds from the other sources are used.
2. DOE funds for weatherization must not be used to supplant other funds or programs.
3. Any and all materials used on a weatherization Job or placed into Weatherization inventory that is not purchased by DOE or LIHEAP funds.
4. Assigning a value to the DSM or Donated materials should reflect current market value at the time of the installation.
5. Service providers shall document costs associated with providing weatherization services on an individual dwelling, report period and cumulative basis following the procedures in this section.
6. Agencies can use leveraged resources when determining whether certain measures to be installed in a dwelling unit are cost-effective and meet the program requirements that the SIR is at least .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.

This guidance is specifically designed to address the DOE investment in eligible dwelling units weatherized by the Program. All associated health and safety costs incurred on a dwelling unit are generally treated outside the SIR when determining cost-effectiveness. On the other hand, all energy-related repair costs associated with weatherizing the dwelling units are a part of the SIR when determining cost-effectiveness.

When performing the energy audit on an eligible dwelling unit, the total costs associated with the installation of eligible measures can be discounted by the amount of non-Federal resources leveraged for that particular measure in determining the SIR. The types of non-Federal resources that could be used would include, but are not limited to: landlord contributions, utility funds, donations from private sources, and/or state resources that supplement other similar funds. It is KHC's intent to allow agencies some flexibility in calculating the SIR for a specific measure when other funds can be used to offset some of the costs, thereby reducing the federal investment and raising the SIR to 1.0 or greater on the remaining investment.

The cost-effectiveness of the WAP will still be calculated on the total DOE/LIHEAP investments used to weatherize the property. It is not KHC's intent to create projects that are not cost effective in design and installation. KHC expects that all agencies will use this SIR calculation allowance only when the cost effectiveness for the entire investment in the property can still be substantiated. Further, it is not KHC's intent to "leapfrog" measures that are already cost-effective in order to accommodate a measure that is included in the package of measures as a result of utilizing the provisions of this guidance. All measures that were cost-effective after the initial energy audit is conducted would remain a part of the list of measures to be completed on the unit.

**Note:** For the purpose of meeting the SIR requirement by using other resources to reduce the investment in a material or measure, no federal resources or funds may be used to offset the total installation cost. This includes State designated funds which are actually federal-based funds such as LIHEAP, CDBG, etc., may not be used for this purpose. No exceptions will be granted to this provision.

Agencies utilizing this guidance will need to conduct an initial energy audit of the building to determine the cost-effectiveness of the federal investment, including measures that are not cost-effective without leveraged resources. Those agencies that have non-Federal resources for use in the building will need to run the energy audit a second time with the necessary resources for any specified measure(s) to ensure the total package of measures remain at least with an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.

Agencies will also be required to complete a summary of all costs associated with the weatherization of the building, including any or all non-Federal resources to be used. This summary will become part of the building's customer file along with the inputs and results of both energy audits.

## **6.6 Average Costs**

### **DOE-Specific Limits**

When weatherization services are provided with DOE funding, the cost per weatherized dwelling unit may not exceed an average limit established by DOE. DOE adjusts that average limit annually. Those adjustments appear in KHC's annual DOE state plan. Additionally, KHC establishes a maximum average cost for abating health and safety hazards. Those limits also appear in KHC's annual DOE state plan.

Each service provider shall maintain and monitor its costs on an average basis for Health and Safety, and Regular Weatherization per Completed Dwelling, so as to identify total average costs. **Completed Dwellings shall refer to those dwellings that have received regular weatherization and health and safety services and have been inspected by a certified Dwelling Needs Evaluator (DNE) /QCI and reported as completed in compliance with the WXPM by the DNE/QCI and service provider.**

Average costs shall be calculated based on the procedures in this Section.

### **Average Regular Weatherization Costs**

Average Regular Weatherization Costs equal all Regular Weatherization Materials, plus Regular Weatherization Labor, plus all Program Support, plus all Vehicle and Equipment line costs, divided by completed and re-weatherized units.

### **Maximum Service Cost on a Single Dwelling**

Maximum costs for Health and Safety and Regular Weatherization on any single dwelling shall not exceed set maximum allowable average costs, unless the service provider has requested and received prior written approval utilizing the WX-910 Request to Exceed/Fuel Change form.

These requests will be submitted to the agency's designated monitor/trainer. The narrative must address the agency's current average cost per dwelling and demonstrate why the amount requested is justified over the average level of service other clients receive in their service area. Along with the request the agency will export a complete NEAT/MHEA audit and work write up to the monitor/trainer.

Keep in mind that approvals to exceed maximum service costs on a single dwelling will ultimately affect agency's year end averages. Agencies are reminded to maintain projected goals and average costs by year end, regardless of exceed approvals from KHC staff. All clients should receive the same level of (NEAT/MHEA audit allowed) services, regardless of when they were assisted in the contract year

## **6.7 Federal Rules for Use of Recycled Insulation Materials**

1. KHC and local agencies must comply with Environmental Protection Agency (EPA) regulations regarding the use of recycled materials (40 CFR 247.12, Comprehensive Procurement Guideline for Products Containing Recovered Materials ([www.epa.gov/](http://www.epa.gov/))).
  - a. Local agencies are required to make good faith efforts to procure insulation products that contain recycled materials.
  - b. Exceptions to this policy may be made only if the following conditions can be documented:
    - Inability of the product to perform its intended purpose.
    - Unavailability of the product at a reasonable price.
    - Inability to obtain the product within a reasonable period of time.
    - Inadequate number of vendors for obtaining and verifying estimates of recovered materials content to insure a satisfactory level of competition at the time of procurement.
2. In addition to meeting procurement specifications, local agencies must establish an affirmative procurement program consisting of four items.
  - a. Preference program for purchasing designated items.
    - EPA regulations provide three general approaches:
      - Minimum content standards that identify the minimum content of recovered materials that an insulation product must contain.
      - Case-by-case procurement, allowing competition between insulation products made of new materials and those with recovered materials.
      - An alternative approach that accomplishes the same objectives as a) and b).
    - EPA regulations recommend that the procuring agency use minimum content amount for commercially available insulation products that may contain recovered materials. These include:
      - Cellulose, loose fill, and spray-on (75 percent post-consumer recovered paper by weight).

- Perlite composite board (23 percent post-consumer recovered paper by weight).
- Rock wool (50 percent recovered materials).
- b. Promotion program.
- c. Procedures for obtaining estimates and certifications of recovered materials content and for verifying the estimates and certifications.
- d. Annual review and monitoring of the effectiveness of the program.

## **Chapter 7: Dwelling Needs Evaluation/Energy Audit**

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### **1.1 Personnel Qualifications Standards**

#### **Dwelling Needs Evaluator/Energy Auditor**

All staff assigned dwelling needs evaluation/energy audit activities as any portion of their job duties must successfully complete the following trainings. Evidence of successful completion of training requirements must be maintained in agency files.

There are two education/credentialing tracks available to those who perform dwelling needs evaluation in Kentucky:

- 1) Kentucky Dwelling Needs Evaluator (DNE) certification track; or
- 2) BPI Energy Auditor certification track.

#### **Dwelling Needs Evaluator (DNE) Certification Track:**

Dwelling Needs Evaluator course

NEAT/MHEA, EA-Quip Audits

Leakage, Envelope and Ducts training class

Combustion Appliance Zone (CAZ) Safety

Zonal Pressure Diagnostics

ASHRAE 62.2-2016 Ventilation Standards (or most current year in force)

Infrared camera use

Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)

Lead Renovator Certification (RRP)

CPR certification

First Aid certification

Successful Field Shadowing

**Energy Auditor Certification Track:**

BPI Energy Auditor certification

REE Heat Systems class

KY WAP Policies and Procedures class

NEAT/MHEA, EA-Quip Software

Leakage, Envelope and Ducts (LED) class

Combustion Appliance Zone Safety (CAZ) class

Zonal Pressure Diagnostics (Zonals) class

ASHRAE 62.2-2016 class

Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)

Lead Renovator Certification (RRP)

CPR certification

First Aid certification

Successful Field Shadowing

After successful completion of all training requirements in the candidate's selected credentialing track, s/he is awarded "Conditional Status." An evaluator in Conditional Status may not perform solo work, they must be monitored by the agency's fully-certified evaluators and administrative staff to ensure quality. Once an evaluator in Conditional Status is ready for Field Shadowing, the agency must contact its KHC Technical Monitor to schedule the shadowing visit. Field Shadowing must be scheduled no later than six (6) months from the date the candidate achieved Conditional Status. Failure to complete the Field Shadowing within the required timeframe will result in the revocation of Conditional Status and the candidate will be required to attend refresher training to have Conditional Status reinstated.

Field Shadowing is the final step in the approval process for performing dwelling needs evaluation under either credentialing track (EA or DNE). During Field Shadowing, a KHC Technical Monitor/Trainer accompanies the candidate as s/he performs whole-house dwelling needs evaluations in the four situations they will encounter in their field work (site-built homes, mobile homes, homes with gas heat, and homes with electric heat.) The purpose of Field Shadowing is to evaluate the candidate's competence in four main categories: information collection, health & safety, building assessment and evaluating data. Once a candidate demonstrates proficiency during Field Shadowing, they are approved to work as evaluators in the KY WAP.

Full status evaluators may be required to successfully complete advanced, refresher or other training courses deemed mandatory by KHC to remain qualified to perform dwelling evaluations.

KHC may downgrade or suspend evaluator's certification status for failure to perform job duties to standards.

### **Quality Control Inspector**

All staff assigned quality control inspection activities of DOE funded work as any portion of their job duties must successfully complete the following trainings. Evidence of successful completion of training requirements must be maintained in agency files.

Dwelling Needs Evaluator Certification

BPI Quality Control Inspector Certification

NET/MHEA, EA-Quip Software training

Leakage, Envelope and Ducts (LED) class

Combustion Appliance Zone Safety (CAZ) training

Zonal Pressure Diagnostics training

ASHRAE 62.2-2016 training

Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)

Lead Renovator Certification (RRP)

First Aid Certification

CPR Certification

### **Crew Leaders**

All Crew Leaders must successfully complete the following training before working as a Crew Leader on a jobsite. Evidence of successful completion of training requirements must be maintained in agency files.

#### **Crew Leader**

Crew Leader Training Course

Certified Lead Renovator (RRP) training

ASHRAE 62.2-2016 training

Combustion Appliance Zone Safety (CAZ) training

Zonal Pressure Diagnostics training

Leakage, Envelope and Ducts training



Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)

CPR certification

Basic First Aid certification

### **Installer Staff (crew members)**

Anyone installing weatherization measures in the Kentucky WAP must successfully complete the following trainings. Evidence of the successful completion of training requirements must be maintained in agency files.

Retrofit Installer Technician training course

Lead Safe Work Practices training

Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)

CPR certification

Basic First Aid certification

**Note: Installer staff must work under the supervision of a crew leader unless they have completed all crew leader training requirements.**

### **Training and Certification Requirements for Sub-Contractors (HVAC, Electrical, Plumbing and General Weatherization)**

Contractors performing general weatherization work (and their employees) must attend comprehensive training for their job duties, i.e. installer staff must attend Retrofit Installer Technician training, crew leaders must attend Crew Leader training, etc.

Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)

Lead Safe Work Practices (required for crew members)

Certified Lead Renovator (RRP) (required for Crew Leaders, QCIs, DNE/EAs)

Lead Safe Firm certification

CPR certification

General First Aid certification

### **Technicians (Service Provider Staff or Sub-Contractors):**

All technicians are required to be licensed in their respective discipline (HVAC, Electrical, etc.) Technicians shall maintain their professional licenses in accordance with KRS 227A.010-150 for electric, KRS 198B.650-689 for HVAC, and meet all requirements regarding fees and continuing education.

### 7.1.1 *Limitation on Number of Personnel*

Please refer to section 6.1 of this manual.

### 7.1.2 *Restrictions on Labor Activities and Charges*

Please refer to section 6.1 of this manual.

Time Limits for Dwelling Needs Evaluation/Energy Audit:

Please refer to Section 6.1 of this manual

## 7.2 *Health and Safety Issues*

The evaluator/energy auditor shall not complete an evaluation where it is determined that conditions at the site pose an immediate health and safety threat to work crews or evaluator/energy auditor as outlined in Chapters 6 and 12. However, at a minimum the evaluator/energy auditor must perform an interior and exterior walk-through inspection of the client's home. It is the energy auditor's/evaluator's responsibility to decide, based on Section 6.16, if unfavorable site conditions exist to such a degree that weatherizing a dwelling is not feasible due to financial limitations, health and safety reasons or technical reasons. Dwellings that fall into this category are generally known as deferrals. NOTE: Installation of smoke and carbon monoxide detectors is prohibited if the home receives deferral status. Service providers shall refer such households to any other source of aid that might be available and make every effort to combine resources to correct site conditions so that the dwelling can be weatherized. Referrals shall be documented in the client files.

In addition, the agencies must provide written documentation with signatures that provide proof the client has been educated and fully informed about any Health and Safety issues discovered in their home by the Dwelling Needs Evaluator/Energy Auditor.

Also refer to: ***DNE Step-By-Step Checklist***, which is in the back of this manual.

## 7.3 *Required Tools and Equipment*

At a minimum, a qualified evaluator/energy auditor shall be equipped with the following tools and equipment:

- Energy systems diagnostic devices, i.e., gas leak detector, combustion efficiency analyzer, draft gauge, volt/ohm meter, etc.
- Blower door system
- Infrared Camera
- Pressure Pan
- Safety equipment: first aid kit, fire extinguisher, goggles, gloves, etc.
- Hand tools
- Power tools: cordless drill, skill saw, assortment of bits, etc.
- Heavy duty extension cord with surge protector.
- Access to a PC
- Step- and extension ladders capable of allowing access to roofs and attic areas.
- Basic materials needed to perform tests: tape, 6 mil plastic, blocking material.
- Watt Meter
- HEPA Vacuum
- Digital Camera with computer interface/download capabilities

- Flow Hood
- Smoke Generator
- Digital Manometer
- Duct tester
- Other equipment as required by KHC

The evaluator/energy auditor vehicle, in addition to being in good working order, must be capable of carrying and securing equipment in a safe manner.

Maintenance of all equipment is a shared responsibility between the evaluator/energy auditor and the local service provider. The evaluator/energy auditor shall take care that the equipment which is used stays in good working order and receives any recommended factory maintenance when applicable. The service provider shall see that its evaluator/energy auditor has access to a safe, roadworthy vehicle.

The service provider shall require that all On-site staff (including private contractors) successfully complete Basic CPR/First Aid. The service provider shall maintain documentation in the form of certifications or other acceptable statements for personnel who fit this description.

The service provider shall make available to and require the use of Personal Protective Equipment (PPE) such as, but not limited to: hard hats, steel toed boots, eye protection, respirators and dust masks, ground fault interceptors for power tools, and so forth. Also, each crew must be equipped with a standard worksite First Aid Kit. This equipment is considered a Fringe Benefit, but the agency must have a policy built around the inclusion of this.

The service provider shall maintain and display in a common area for review **Material Safety Data Sheets (MSDS)** Changed to SDS (safety data sheets) per OSHA for all materials being installed on job sites. The service provider shall inform its workers as to any dangers associated with the handling, storage, and installation, of these materials.

The Kentucky Weatherization Program no longer requires the completion of either the OSHA-10 or the OSHA-30 training courses. This does not eliminate the need for Sub-grantees to comply with OSHA standards. OSHA still requires that all workers receive training to address specific hazards that the worker can reasonably expect to encounter on a job site such as (but not limited to) fall protection, use of personal protective equipment, electrocution and the safe operation of power tools. KHC strongly recommends OSHA training for all workers as a best practice.

#### **7.4 Site Eligibility Determination**

Prior to any dwelling receiving any weatherization measures it must receive a Dwelling Needs Evaluation (DNE)/Energy Audit. Only those weatherization measures identified through the DNE and NEAT or MHEA audit may be provided and only if described in Chapter 7.

Each dwelling shall receive a walkthrough inspection of its interior and its immediate surroundings. At this time, a qualified inspector must determine if conditions exist that would prohibit the dwelling from being weatherized. The primary factor in that decision is the safety of the client, the evaluator/energy auditor, the crew or contractor.

Required:

If a Dwelling Needs Evaluator/Energy Auditor encounters obstructions/debris in any interior/exterior part of the home that would impede the evaluation process, and/or the process of installing prescribed work measures, the client must be asked to make arrangements to have obstructions/debris removed from the affected area(s) before commencing with the dwelling needs evaluation or the prescribed work measures.

## **7.5 DNE/Energy Auditor Step-By-Step Process**

### **Step 1: Client Interview/Education**

#### **1. Introduction**

Make an appointment with the client to set an arrival date and time.

The client must be present during the evaluation in order to:

- Receive education related to weatherization procedures,
- Receive and sign education and disclosure documents pertaining to health and safety issues/problems discovered by the Dwelling Needs Evaluator/Energy Auditor
- Understand and agree to the evaluated measures, and
- Assist in case of injury to evaluator/energy auditor.

Give a courteous introduction.

- Show agency identification.
- Establish good working relationship.

#### **2. Describe Program Goals**

- To decrease energy usage through-out the year.
- Provide year-round comfort.
- Inform the client about any health and safety issues found.
- To help the client save money on fuel and electric costs.

Describe how blower door tests and dwelling needs evaluation/energy audit will determine which materials and measures will be installed. Explain whole-house approach.

If client insists on other materials

- Explain guidelines prohibit measures other than those allowed by the weatherization program.
- Explain the NEAT/MHEA audit will give recommended measures to be performed, and that the client will need to sign a form agreeing to allow the recommended work measures to be performed in their home.

#### **3. Describe Evaluation/Energy Audit Process**

Dwelling Needs Evaluation/Energy Audit

- a. Requires a thorough inspection of both inside and outside of home.

- b. Includes attic and crawlspace or basement.
- c. May need to create access ways.
- d. Show client the blower door and explain its use
  - Evaluation shall include analysis of energy related mold and moisture, a determination as to whether or not it exists in the home, lead-based paint, asbestos, and any other health and safety issues/problems. See Section 5.11.
  - Energy System Evaluation. Requires inspection of combustion appliances and heating system.
  - Show client applicable equipment and explain its use.

Explain how evaluation results generated by NEAT/MHEA audit will be used to determine measures.

#### **4. Discussion of Client Lifestyle and Dwelling Characteristics.**

Discuss energy related lifestyle to help in choosing measures and behavior change suggestions.

- Type of home heating and cooling.
- How water is heated.
- Space heater uses and type of fuel.
- Existence of moisture and indoor air quality problems.
- Cold areas in home.
- Unconditioned rooms during winter.
- Type of clothing worn by season.
- Window shades open for warmth or closed to cool.
- Moisture problems from kerosene heaters, animals, plants, plumbing leaks, lack of ground cover.

Emphasize health and safety issues.

- Results of excessive moisture and plumbing leaks.
- Danger of carbon monoxide and fuel leaks from combustion appliances.
- Faulty or inadequate ventilation of combustion appliances.
- Toxic vapors from stored materials.
- If necessary, tell client to clear particular areas to provide inspection and work space.

#### **5. Involve Client During Evaluation/Energy Audit Process to Provide Understanding of Evaluation.**

Techniques and reasons for estimated measures

- Feel air leaks while blower door is running.
- Touch warm water pipes.
- Show and explain hidden bypasses.
- Listen to carbon monoxide detector.
- Call attention to leaky faucets.
- Demonstrate how to adjust furnace and water heater thermostats.
- Demonstrate how to change furnace filters.
- Identify other prominent energy conservation needs.

#### **6. DISCUSS MEASURES TO BE PERFORMED.**

Mark anticipated measures on the DNE/Energy Audit checklist.

- Explain blower door and energy systems test results.
- Explain thermal camera use and scan results.
- Explain how the test results, conservation principles, and program guidelines determine the measures.
- Describe how the measures will reduce energy use and costs.
- Explain whole-house method in regard to dwelling eligibility.

If client refuses a measure,

- Re-explain the reason and need for the measure.
- Encourage the client to accept the measure.
- If a client refuses a priority measure, the dwelling is not eligible for further service.

Obstructions and unacceptable conditions

- Tell client, and note on the **DNE/Energy Audit** Checklist, any measures that cannot be installed until conditions are improved.

Client Agreement

- Advise client that work cannot be performed until he or she signs the checklist.
- Advise client that once work is started, all work must be completed.
- Advise client that if he or she cancels any work, the client shall be liable for material and labor costs incurred on all work completed up to that point.

## **7. Describe Crew/Private Contractor Procedures.**

Describe material installation process

- Explain installation methods.
- Tell client that the crew will use the blower door during material installation and may find a need for additional measures and/or testing procedures.
- Assure the client that installed materials will blend with existing structure and that work areas will be cleaned when the crew is finished.
- If lead-based paint is found in the home, and if applicable to the work measures to be performed in the home, tell the client that Lead Safe Work Practices per EPA/DOE requirements must be followed.
- Tell the client that worst case scenario/CAZ testing must be performed if the home has combustion appliances that meet testing criteria requirements.

Work schedule

- Estimate when work crew will be scheduled for the job.
- Explain usual daily work schedule.
- Tell client a work start date will be set in advance.
- Give instructions to call your office if something unusual or different occurs.

## **8. Describe Post-Inspection/Quality Control Inspection Procedures.**

Inspector will make appointment to return after work is completed.

Inspection process

- Make sure materials were installed properly.
- Give instructions on keeping materials in good working condition.
- Confirm that no measures were missed.
- Post inspector/Quality Control Inspector will perform additional testing activities as required.

- Advise client that state and federal government representatives may visit to monitor work at a future date.

### **9. Discuss Fuel Savings Documentation.**

Ask client to keep fuel usage records.

- Bills and receipts.
- Documentation of amount used, cost, when purchased.

Explain the information will be used to calculate fuel and cost savings.

### **10. Ask for and Answer Questions Regarding Any Part of the Weatherization Process.**

#### **11. Provide the Client with Each of the Following Client Education Material Documents as Required, Explain Each Document, and Obtain a Signed Proof of Delivery Receipt:**

- A Brief Guide to Mold, Moisture and Your Home
- Lead Safe Certified Guide to Renovate Right
- EPA HTML Publication: Asbestos in Your Home ([www.epa.gov/asbestos/pubs/ashome.html](http://www.epa.gov/asbestos/pubs/ashome.html))
- EPA Publication: A Citizens Guide to Radon ([www.epa.gov](http://www.epa.gov), A Citizens Guide to Radon)
- CPSC Guide to Home Wiring Hazards (<https://www.cpsc.gov>, Publication # 518)
- DOE/EERE: Guide to Home Ventilation ([https://www.energy.gov/sites/prod/files/guide\\_to\\_home\\_ventilation.pdfw](https://www.energy.gov/sites/prod/files/guide_to_home_ventilation.pdfw))
- CPSC Guide: What You Should Know About Space Heaters (<https://www.cpsc.gov/content/cpsc-offers-tips-to-prevent-home-fires-from-space-heaters>)
- Combustion Equipment Safety and Hazards: [https://www1.eere.energy.gov/buildings/publications/pdfs/building\\_america/26464.pdf](https://www1.eere.energy.gov/buildings/publications/pdfs/building_america/26464.pdf)
- How to Maintain A Clean Home and Correct Unsanitary Conditions (Service Provider may create an in-house document)
- EPA Indoor Air Pollutants and Sources (<https://www.epa.gov/indoor-air-quality-iaq/indoor-pollutants-and-sources>)
- Obtain a signed disclaimer if unvented space heaters are being used and removal is not allowed.
- Obtain a signed disclaimer if portable/stand-alone electric space heaters are used and removal is not allowed.

### ***Step 2: Energy Systems***

Refer to Chapter 11 before any further actions or steps are taken.

#### **1. Unvented Space Heaters**

Primary source of heat

- Do not weatherize dwelling until after a vented primary heating system has been repaired or installed in accordance with local codes, NFPA guidelines, and has passed a post inspection/quality control inspection per program protocols.

Secondary source of heat

- Advise client of potential hazards and suggest ways to safely operate.
- In the case of low volume dwellings, inform client of possible moisture problems.
- Obtain a signed disclaimer from the client that clearly explains the health and safety hazards of continued use of unvented space heaters and retain copy in client file.

## 2. Safety Inspection

All dwellings

- Safety inspections shall be performed on all heating systems.
- Safety inspections shall be performed on all combustible gas water heaters and cook stoves.
- Safety inspections shall be performed in accordance with the following procedures and per specifications contained in the Energy Systems Policy Chapter of this manual (Chapter 12).
- All unsafe conditions identified during safety inspections shall be corrected and post inspected per program protocols prior to any further work being performed on the dwelling.

## 3. Inoperable Furnace

Check electrical connections.

- Use a volt/ohm meter to verify if wired to active power source and grounded.
- If not wired to live circuit or if wiring is defective, repair before continuing with safety tests.

Check fuel source.

- If no fuel is available to operate furnace: advise client that dwelling evaluation cannot continue until sufficient fuel is purchased or utility reconnected so that the furnace can be tested.

### **Mandatory program compliance requirement:**

**A dwelling cannot receive further Weatherization services until all inoperable furnaces have been made operable, all safety tests performed, all health and safety repairs performed, and all repairs have passed a post inspection/quality control inspection per program protocols.**

## 4. Fuel Line Inspection

All-natural gas, propane, and fuel oil appliances

- Inspect all fuel lines for leakage from the source to the appliance.
- Natural gas and propane system: use a Combustible Gas Detector to locate fuel leakage.
- Oil systems: perform a visual check of fuel lines.
- If fuel leakage is found: arrange for immediate repair. Condition must be corrected, and post inspected before further weatherization services can be performed.

## 5. Electric Connections Test

All appliances

- Perform a visual inspection of all electrical connections to determine repair or replacement needs.
- Use a Volt/Ohm Meter to verify if appliance is wired to an active power source and is grounded.



- If appliance is not wired to a live circuit or the wiring appears to be worn or defective, condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

## **6. Test for Carbon Monoxide in the Living Area**

All combustion appliances

Activate all combustion appliances and conduct a carbon monoxide test. If any of the following limits are exceeded, the condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

- i. If more than 0 ppm (parts per million) is detected in the living area
- ii. Cook stoves: more than 25ppm as measured for each burner, oven exhaust 200 ppm air free
- iii. Furnaces and space heaters: more than 100 ppm air free

## **7. Drop Out Safety Gas Valve Test**

All gas valves

- Perform drop out safety valve test. (See Ch. 9, Section 9.5, Step 2, Item # 6)
- If the device does not work, the condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

## **8. Heat Exchanger Test**

Natural gas and propane furnaces

- Test heat exchanger for presence of carbon monoxide.
- If more the 0 ppm is detected in the warm air plenum, the condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

## **9. Flue Draft Tests**

All applicable combustion appliances

- Perform draft test.
- If draft pressure is outside the specifications contained in the Energy Systems guidance of the current approved Weatherization Field Guide manual, the condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

## **10. Test for Carbon Monoxide in Flue Stacks and Exhaust Ports**

Natural gas, propane, and oil units

- Sample flue gas for carbon monoxide content.
- A concentration of 100 ppm (air-free) or less in the flue pipe is permissible.
- A concentration of up to 100 ppm (air-free) in the heat exchanger ports is permissible.
- If carbon monoxide concentration in the flue pipe or at exhaust ports is greater than 100 ppm (air-free): condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

### **11. Stack Temperature Test**

Natural gas, propane, and oil units

- Perform stack temperature test.
- If stack temperature is not within the acceptable range per NFPA guidelines or manufacturer recommendations, the condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

### **12. Smoke Test**

To be performed on oil units only

- Perform smoke test.
- If smoke sample is not within the acceptable range, the condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

### **13. Clocking the Meter**

All units

- Activate the unit and determine if BTU input matches manufacturer information on the unit.
- If BTU input does not match, the condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

### **14. Heat Pumps**

Utilize WX 900E Checklist – evaluate coil condition, refrigerant lines for leaks, condensate lines, filter condition and size, blower motor condition, organic debris in ducts, condensation on or in ducts, duct sized correctly, supply registers open, return duct unrestricted, and the wiring conditions of burned or frayed wires and missing or disconnected wires.

### **15. Solid Fuel Heating System**

Conduct visual inspection of venting.

If venting and clearances are not in accordance with NFPA 211: condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

Chimneys

- Conduct visual inspection for solid mortar.
- Confirm that only one kind of fuel is vented into a single chimney.
- Unsafe conditions must be corrected, and a post inspection/quality control inspection performed before dwelling can receive further weatherization services.

### **16. Water Heater Inspection**

All water heaters

- Pressure/ temperature relief valve (PTR Valve) must be functional.

- Install PTR valve, if possible, when no valve exists.
- Do not insulate any tank where no PTR valve is installed.

Natural gas and propane heaters

- If carbon monoxide is above 0 ppm in the ambient air or above 100 ppm (air-free) in "flue gas": condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.
- Perform draft test.
- If draft is not within NFPA guidelines, condition must be corrected, and a post inspection/quality control inspection performed before further weatherization services can be performed.

## 17. Venting Requirements

All systems

- To evaluate safety of venting conditions, consult NFPA 31, 54, or 211, depending on fuel type.

## 18. Smoke Detectors/ CO Detectors

Inspect dwelling for smoke detection devices/carbon monoxide detection devices.

- If devices are not on-site installed, an adequate number of detectors per chapter 6, section 6.13 of this manual.

## 19. Heating Unit Ductwork

Inspect the condition of existing supply and return ducts. Inspecting the condition of ductwork includes identifying excessive condensation on the interior or exterior with emphasis on identifying mold.

If the ductwork needs to be repaired or replaced:

- Identify the size and length of duct needed and note on the work order.

If additional ductwork is needed to provide supply or return to make the system safe and healthful:

- Identify the size and length needed and note on the work order.

## 20. Mechanical Ventilation Systems

Inspect existing exhaust systems in kitchen and bathrooms and measure actual cfm flow using a flow hood and properly configured digital manometer per ASHRAE 62.2-2016 or most current version in force.

## 21. Photograph Requirements

Photographs must be taken of all existing equipment and/or relevant areas that have been determined to require repairs/replacements and those photographs stored electronically or printed and retained in the client file.

### *Step 3: Air Infiltration/ Moisture/ Incidental Repairs*

#### 1. Blower Door Testing Requirements

All dwellings shall receive a blower door-driven inspection to:

- Evaluate initial air tightness.

- Identify leakage characteristics and sites.

Test data shall be documented on the Work Order in order to:

- Ensure compliance with ASHRAE 62.2-2016 or most current version in force.
- Measure effectiveness of treatments.

Refer to the blower door operations manual for specific details regarding blower door operation and testing instructions.

Establishing target blower door cfm<sup>50</sup> at pre-inspection:

Best practice for calculating the target blower door cfm is to use 1 cfm per square foot of floor space. Example: A 1000 ft<sup>2</sup> home would have a targeted blower door of 1000 cfm<sup>50</sup>. However, though 1 cfm per square foot is ideal, at a minimum the targeted blower door cfm should be based on the ASHRAE 62.2-2016 base formula times the N factor.

Example: A 1000 ft<sup>2</sup>, 3-bedroom house would have a target blower door of 1200 cfm<sup>50</sup>.

**Formula**

$$1000 \times .03 = 30 + 7.5 \times (3+1) = 60$$

$$60 \times N \text{ factor } (20) = \underline{1200 \text{ cfm}^{50}}$$

Breakdown of the formula above:

**Step #1:** 3 cfm for every 100 ft<sup>2</sup> of conditioned floor area

$$1000 \text{ ft}^2 \times .03 = 30 \text{ cfm}$$

**Step #2:** 7.5 cfm x (the number of bedrooms + 1) (3 bedrooms + 1 = 4)

$$7.5 \times 4 = 30 \text{ cfm}$$

**Step #3:** Add the sum of step #1 (30) and the sum of step #2 (30)

$$30 \text{ cfm} + 30 \text{ cfm} = 60 \text{ cfm}$$

**Step #4:** Multiply the answer from step #3 (60 cfm) by the N factor (20)

$$60 \times 20 = 1200 \text{ cfm}$$

Document thoroughly any conditions that may result in these targets not being achievable.

Example: Boxed framing, floors, walls, ceiling, or homes with balloon framing, lathe and plaster interior, etc. Contact your agency's technical monitor prior to beginning work when such conditions exist.

Follow Work Order instructions for completing all blower door tests.

- Mechanical ventilation is an allowable cost measure to be charged under Health and Safety. ASHRAE 62.2-2016 (or most current version in force) standards must be followed.

Conduct zone pressure diagnostic testing per the KWFG and SWS.

## **2. Cost Estimate and Limitation**

Material and labor needs shall be estimated for each measure identified during the evaluation.

REQUIRED: Total estimated costs on the work order(s) estimate(s) must be within 10% of final total job costs that are billed to KHC on the WX 710.

REQUIRED: Total NEAT/MHEA estimated costs from the energy audit report of Recommended Work Measures must be within 10% of final total job costs.

REQUIRED: Electronic copies of all jobs utilizing NEAT/MHEA must be available at each agency for exporting to KHC monitoring staff for review as required prior to weatherization.

### **Air Infiltration Measures**

- The estimated cost of each treatment shall be evaluated against its potential cfm reduction to identify the most cost-effective measures to perform.
- Repairs made to obvious holes in the building envelope, not related to installing insulation, that will result in a large cfm reduction shall be charged to Infiltration.
- Tightening of heating system ducts shall be charged as a stand-alone duct-sealing measure.
- Caulking, weather stripping and other treatments for sources of minor air infiltration shall be charged to Infiltration.

### **Moisture Related Repairs**

Repair costs associated with energy related bulk moisture problems shall be charged to the building component in which they are located or which they most directly affect.

KY Weatherization has adopted DOE's "Energy Related Mold and Moisture: Awareness and Impacts for Weatherization" as the state protocol. Level 1, small isolated areas of 10 ft<sup>2</sup> or less, can be stabilized and cleaned within DOE and KY guidelines with DOE funds only to ensure the health and safety of workers and the clients. See Mold and Moisture, Chapter 12, Sec.12.16, for energy related bulk moisture repair procedures. Evaluators/Energy Auditors have three (3) options during the evaluation process:

1. Delay work until conditions are corrected;
2. Refer client to another agency for clean up;
3. Agency cleanup of energy related mold and moisture conditions and proceed with Weatherization.

Ventilation (kitchen and bathroom exhaust) measures necessary to reduce high indoor relative humidity shall be charged to Health and Safety.

### **Incidental Repair**

Incidental Repairs are those repairs necessary for the effective performance or preservation of weatherization materials. When a repair activity is a component of an energy efficiency measure

that is being installed then the installation and materials are part of the efficiency measure and are classified as incidental repair. Such repairs include, but are not limited to, repairing (or replacement if repair costs exceeds 75% of new installation) windows and doors which could not otherwise be caulked or weather-stripped and providing protective materials, such as paint, used to seal materials installed under this program. Roof repair, knob and tube removal (including the installation of replacement wiring) for protection of and safety of insulation measures, minor electrical repairs (installing miscellaneous wiring, junction boxes and covers to ensure connections meet code), electrical upgrades to handle extra load for HVAC replacement, all of these meet the definition of incidental repair and are allowed as such. The cost of incidental repairs must be included in the cost of the package of measures.

### **Weatherization-Related Repairs**

#### **A. Policy**

1. Service provider may perform repairs needed to protect weatherization measures or their function. These repairs are also referred to as “Incidental Repairs”. The costs of these types of repairs are included with the cost of the work measure they are related to.
2. Examples of Weatherization-Related Repairs/Incidental Repairs:
  - a. Repair of a section of damaged ceiling or wall so that insulation can be installed in the attic or wall.
  - b. Installation of gutters and/or downspouts to prevent water damage to walls that will be insulated.

#### ***Allowable Costs***

Weatherization-related repairs are an allowable cost under DOE funds.

**Note:** Weatherization-related repairs (both individual measures and the total package) must be included in the SIR calculation regardless of funding source and in the Average WX Cost. See Chapter 7, Allowable Costs, for allowable expenditures.

#### **B. Procedure**

Programmatic

1. Client files must include the following documentation:
  - a. Description of repairs and related measures.
  - b. Justification for repairs made, including file photographs.
  - c. Justification for measures skipped associated with weatherization-related repair.
  - d. Verification that installed measures have an SIR of .8 or higher for LIHEAP funds and 1.0 or higher for DOE funds.
  - e. All necessary measure-specific justification.
  - f. Paid invoices for materials, measures, repairs, or modifications.
2. Costs must be budgeted, tracked, and reported separately from energy saving measure and health and safety costs in Service Provider accounts and assessment/audit forms.

#### **3. Exterior Evaluation**

Inspect entire exterior of dwelling.

**Required:** Photographs must be taken of the exterior, including areas that will receive work and those photographs must be printed out and retained in the client file or stored electronically in a secure and readily accessible location.

Identify all exterior thermal boundaries.

- Note any conditions that may require preparatory work prior to the initial blower door test.

Inspect for potential sources of bulk moisture.

- Evaluate general condition of roof system, roofing material, chimney and valley flashing.
- Examine the guttering/downspouts system for improper drainage away from dwelling.
- Inspect condition of exterior siding for signs of blistering or peeling paint (that exposes raw wood) which indicates strong moisture movement from within the building envelope and high indoor relative humidity.
- Inspect condition of attic space for signs of improper venting of appliances, roof leaks, plumbing penetrations, and bypasses identified during use of blower door. Any indication of moisture or mold should be analyzed and determined whether energy related or non-energy related.
- Inspect the basement/crawlspace for conditions indicating excessive bulk moisture (seasonal or constant) from outside the structure which indicates ground water problems or poor perimeter drainage.
- Inspect unconditioned spaces for existing moisture control systems (vapor retarders and ventilation).

Evaluate the extent of existing moisture problem.

- Corrective repairs must be performed where problems will be compounded by weatherization measures or where problem will negatively affect the performance of weatherization measures. Do not exceed Level 1 clean up procedures, as they would be outside the scope of weatherization. DOE funds may only be used for level 1.
- If corrective repairs can be accomplished within the scope of the program, note all repair needs on the Work Order in categories in which the moisture problems most affect.

#### 4. Interior Evaluation

Inspect the entire interior of the dwelling, conditioned and unconditioned areas.

**Required:** Photographs must be taken of the interior, including areas that will receive work and those photographs must be printed out and retained in the client file or stored electronically in a secure and readily accessible location.

Identify all interior thermal boundaries.

**Required:** When an occupiable space of a home adjoins a garage, all walls, floors, and ceilings that separate the garage from the occupiable space must be evaluated for air sealing measures if deemed necessary to prevent contaminants from entering the occupiable space of the dwelling per ASHRAE 62.2-2016 (or most current version in force).

**Required:** Duct sealing is also a required work measure per ASHRAE 62.2-2016 (or most current version in force). All duct work outside the conditioned space shall be sealed. If the air handler

and/or ducts are in an adjacent garage, the garage door to the outside must be open when the duct is tested for leakage.

- Note any conditions that may require preparatory work prior to initial blower door test. Inspect interior for sources of high moisture production.
- Ask about any seasonal (winter time) moisture related problems, such as, window condensation, frost formation or sweating, mildew, mold growth on interior surfaces.
- Determine if clothes dryer is properly vented to the outside, not into crawlspace or attic. **Required:** All clothes dryers must be exhausted to the outdoors.
- Note use of unvented space heaters and, if any are used as the primary heat source, no weatherization measures can be performed until corrected.
- Inspect condition of existing exhaust fan(s) in kitchen and bathroom for proper operation, if not functioning: note repair or replacement needs on Work Order under Health and Safety.

Evaluate the extent of existing moisture problem.

- If corrective repairs can be accomplished within the scope of the program,
- Estimate repair costs to correct energy related problems incidental to the installation and performance of weatherization measures.
- Indicate repair needs on the Work Order under the appropriate categories.

#### **5. Non-Correctable Moisture Problem**

Dwelling is not eligible for Weatherization services

- Where moisture conditions exist, which cannot be corrected within the scope of the program.
- Level 2 or greater cleanup is beyond the scope of the program, and referrals should be made to other agencies to assist with the repairs, before weatherization can be performed.

#### **6. Building Envelope Inspection/Repairs**

Inspect condition of building envelope components, (ceilings, walls, and floors).

- Note repair needs for large holes on the Work Order under Infiltration.
- Note repair needs that can be classified as incidental to installing ceiling, wall, or floor insulation in the appropriate category.
- Temporarily seal any large leakage sites that may interfere with a 50 PA blower door test.

#### **7. Doors and Windows Inspections**

Inspect all doors and windows separating conditioned and unconditioned areas.

Doors and windows

- Define the needs on the work order
- Large holes in panes or panels
- Note repair needs under Infiltration

Existing doors and windows

- If source of significant air infiltration, note repair needs on Work Order under infiltration.



Temporarily seal any large leakage sites that may interfere with a 50 Pa blower door test.

- Door panes
- Window sash openings, panes, etc.

## 8. Blower Door Setup / Dwelling Preparation

Setup: Reference blower door operation and testing standards manual that is dependent upon the model.

- Setup the blower door in the tightest and most convenient exterior door.
- Setup should be centrally located when possible.

Prepare house for depressurization test.

- Deactivate all combustion appliances (set to pilot or otherwise disable at thermostat or disconnect.)
- All heat/air conditioning systems must be turned off.
- Close all other exterior doors.
- Close all windows.
- **Close** all interior doors to **unconditioned** areas.
- **Open** interior doors to **conditioned** spaces.
- Prepare wood/coal stoves and fireplaces.
- Temporarily seal any intentional openings if a source of significant leakage.

## 9. Initial Blower Door Test

Depressurize the dwelling to 50 Pa

If 50 Pa cannot be reached,

- Recheck dwelling preparations.
- Temporarily seal any infiltration sites that may prevent obtaining a 50 Pascal reading.
- Depressurize to highest attainable pressure, up to 50 Pa.

Determine initial air infiltration rate in cubic feet per minute (cfm) from flow chart or gauges.

- Complete the blower door data on the Work Order.

## Interpretation of Initial Air Infiltration Rate

Evaluate dwelling overall needs based on an interpretation of its initial air infiltration rate.

- If dwelling has forced air distribution system (ducts) perform pressure balance test.
- Note corrective measures under Infiltration.
- At a minimum, the dwelling air infiltration rate should be reduced to the target cfm rate noted on the Work Order.
- Installation of high-density loose fill insulation in the walls is recommended.

## 10. Depressurization Inspection and Zone Pressure Diagnostic Testing

Perform visual inspection

- Check each area of the dwelling
- Use blower door pressure diagnostics technique to evaluate building envelope leakage.
- Thoroughly inspect areas of strong air flow for air leakage openings that are both large in size and located in areas of the highest-pressure difference, ceilings and floors.
- Position one interior door at a time so that it is open about one inch and notice the amount of air coming through the crack.

- If a strong blast of air exists, there must be a large amount of leakage into the room from the outside.
- Inspect for large holes in building components, missing or broken glass, partially open access doors, etc.
- Perform zone pressure diagnostic testing following the procedures outlined in the Kentucky Weatherization Field Guide and Standard Work Specifications.

#### **All Dwellings with Forced Air Distribution Systems (Ductwork)**

- A pressure balancing test is required.
- Inspect entire system (supply, return and plenum) for leakage around register penetrations and through the duct.
- Using a duct tester, evaluate total leakage and leakage to outside following procedures outlined in the KWFG. Perform pressure-pan testing following procedures outlined in the Kentucky Weatherization Field Guide and Standard Work Specifications. (Also see Pressure Pan Diagnostics guidelines in the back of this manual.)
- Pressure-pan tests can help identify leaky or disconnected ducts. With the house depressurized by the blower door with reference to the outdoors, pressure-pan readings are taken at each supply and return register.
- Improper connections must be corrected and sealed.
- Estimate and note duct tightening needs under Infiltration.
- Estimate and note duct insulation needs.

#### **11. Pressurization/Bypass Inspection**

Install necessary access doors to all unconditioned areas.

Pressurize dwelling and inspect for bypasses.

- Critical framing junctures.
- Framing openings connected to attic and crawlspace/basement.
- Chase way openings connected to attic crawlspace/basement.
- Dropped or soffitted ceilings.
- Protrusions through ceiling and walls connected to unconditioned space.
- Inspect the attic.
  - Stairways (folding stairs).
  - Split level stud spaces
  - Duct chase ways
  - Open wall cavities (interior and exterior)
  - Knee wall/floor joist openings
  - Plumbing stack
  - Chimney chase
  - Pocket doors
- Inspect crawlspace/unconditioned basement.
  - Access doors
  - Band joist/sill plate
  - Chimney chase
  - Duct chase
  - Plumbing chase
  - Service penetrations

## 12. Prioritizing Air Infiltration Reduction Treatments

Prioritize air leakage sites based on blower door inspection.

**Required:** When an occupiable space of a home adjoins a garage, all walls, floors, and ceilings that separate the garage from the occupiable space must be evaluated for air sealing measures if deemed necessary, in order to prevent contaminants from entering the occupiable space of the dwelling per ASHRAE 62.2-2016 (or most current version in force).

**Required:** Duct sealing is also a required work measure per ASHRAE 62.2-2016 (or most current version in force). All duct work outside the conditioned space shall be sealed. If the air handler and/or ducts are located in an adjacent garage, the garage door to the outside must be open when the duct is tested for leakage.

- Develop whole-house approach with priority given to a combination of attic bypass and duct system treatments/insulation, and wall and floor insulation.
- Select the most cost-effective treatments that will, at a minimum, reduce the dwellings air infiltration rate to the target cfm Rate as noted on the Work Order.
- Missing building envelope components; ceiling, wall and flooring materials.
  - If incidental to the installation of insulation, charge to appropriate building component.
- Large holes in building envelope (i.e., missing or broken glass, access ways).
- Duct system tightening repairs shall have high priority and shall be charged as a standalone duct sealing measure.
- Bypasses
  - Critical framing junctures (balloon framing)
  - Framing openings into the attic/basement/crawlspace
  - Chase way openings into the attic / basement / crawlspace
  - Dropped or soffitted ceilings.
  - Protrusion through ceilings and walls connected to unconditioned space.
- Attic Bypasses:
  - Stairways (folding stairs)
  - Split level stud spaces
  - Duct chase way
  - Recessed lights
  - Open wall cavities (interior and exterior)
  - Knee wall/floor joist openings
  - Plumbing stack
  - Chimney chase
  - Pocket doors
- Crawlspace/Basement:
  - Access doors
  - Band joist/sill plate
  - Chimney chase
  - Duct chase
  - Plumbing chase

- Service penetrations

#### Air leakage treatments

- Actual application of treatments will be based on blower door test after all major leakage work is completed and the attic, walls and floor have been insulated.

### *Step 4: Duct Insulation and General Heat Waste*

#### **1. Duct Insulation**

Ensure all necessary repairs to the duct system are made prior to insulating. Remember to determine existence of exterior duct condensation and repair relative humidity issues where ducts are located before insulating ductwork. Refer to the Kentucky Weatherization Field Guide and Standard Work Specifications for requirements.

Evaluate for insulation, all duct work located in non-conditioned areas.

#### **2. Water Heater Insulation**

- Ensure all necessary repairs to the water heating unit are made in accordance with energy systems evaluation and repair criteria.
- Evaluate the unit for insulation, if appropriate.
- Refer to the Kentucky Weatherization Field Guide and Standard Work Specifications for requirements.

### *Step 5: Attics/Ceilings*

#### **Reference: Kentucky Weatherization Field Guide and Standard Work Specifications**

#### **1. Living Area Inspection**

All dwellings

- Inspect ceilings of all living areas for water damage.
- Interview occupant regarding roof leaks.
- Note the location of all heat producing devices installed in the ceiling or projecting through the ceiling.
- REQUIRED: Use thermal camera to scan entire attic/ceiling area of home to verify existence or non-existence of attic insulation. Save images of thermal scans made, print out and retain in client's job file or store electronically in an accessible location.

#### **2. Attic Access Doors**

All attic areas

- Where none exist, temporary access doors must be provided to all attic areas over conditioned spaces.
- REQUIRED: All houses must have a permanent attic access door installed per the Kentucky Weatherization Field Guide and Standard Work Specifications in either the interior or the exterior of the home if one does not already exist.

Access doors

- Must provide direct vertical access minimum opening of 16" X 24" for horizontal surface, and 16" X 36" for vertical surface.

- Rigid board insulation or ¾" plywood shall be used as a temporary door and attached with screws after completion of inspection.
- Note additional needs for permanent access doors on Work Order.

### 3. Structural Capabilities

All ceilings

- Ceiling joists must support the weight of any and all inspectors/installers.
- Ceiling material must support the combined weight of insulation.
- If structure does not meet these standards, dwelling cannot be weatherized until appropriate repairs are made.

### 4. Roof Leaks

All roofs

- The source and cause of all roof leaks/water damage must be identified and corrected where there is existing insulation or before any insulation can be installed.
- Roof repairs may include patching or replacing deteriorated roofing; roof coating; and repairing or replacing defective sheathing, valley and chimney flashing, and framing members.

### 5. Electrical Wiring

All ceilings

- Inspect all electrical wiring and all connections.
- Note all problems/hazards and all corrective measures on work order

### 6. Heat System Components

All Attics

- Identify all heat system components in attic such as furnace, water heater, exhaust flue, combustion air supply, and ducts.
- Where there is existing insulation, temporarily correct all improperly installed blocking.
- Note all permanent blocking needs on Work Order.

### 7. Heat Producing Devices

All Attics

- Identify all heat producing devices such as recessed fixtures, doorbell transformers, fan motors, knob and tube wiring, and other devices.
- Where there is existing insulation, temporarily correct all improperly installed or nonexistent blocking.
- Note all permanent blocking needs on Work Order.

### 8. Attic Ventilation – Reference Kentucky Weatherization Field Guide and Standard Work Specifications for Requirements.

All Attics

- In all cases where there is either existing insulation or where insulation will be installed, sufficient and appropriately placed vents shall be installed to meet the following guideline.

### **Attic Ventilation Guidelines**

One square foot of attic ventilation is required for every 300 square feet of attic area (1/300 ratio). Where a high-low combination is used or when a vapor barrier is installed, one square foot of ventilation to every 150 square feet of attic area (1/150 ratio) is required where cross venting is used.

- Thoroughly inspect all existing eave and soffit vents and temporarily correct any problems.
  - Note all permanent blocking needs on Work order.
- Determine most suitable ventilation measures, taking into consideration attic shape, size, and roof type.
- A combination of high-low ventilation is the preferred system.
- Any existing kitchen and bath exhaust fans venting into the attic must be vented to the outdoors and insulated per KWFG and standard work specifications.
  - Note all ventilation needs on Work Order.

## **9. Ceiling Insulation**

### All Attic Areas

- Where possible, insulation shall be installed in all ceilings over the living area.
- R-38 is the minimum R-value for insulation on horizontal ceiling surfaces.
- The following requirements apply if the home has existing or no insulation and/or new insulation is to be installed:
  - Identify all heat producing devices, temporarily uncover them, and note permanent blocking needs on Work Order.
  - Identify ceiling joists cavities with eave vent, check for blockage and if none exists, measure the rafter cavities for the proper size chutes and document the number needed on the Work Order.
  - Install chutes, dams, tubes, or other blocking devices to prevent blown insulation from plugging air channels from soffit vents into the attic.
  - Install an attic access hatch/door if none is present. Also install permanent blocking around all horizontal attic access doors.
  - Determine the R-value and note additional needs on the Work Order.

### Knee wall areas

- Where possible, insulation shall be installed in all attic knee walls and the roof slope above the knee walls.

### Mobile Homes

- All ceiling/roof cavities shall be filled with insulation, where possible.
- Ceilings must be structurally capable of supporting the weight of the insulation.
- Ceiling cavity height must be at least 3 inches at center point.

Note all insulation and blocking needs on the Work Order.

### *Step 6: Walls*

## **Reference Kentucky Weatherization Field Guide and Standard Work Specifications for requirements**

### **1. Wall Insulation Evaluation**

All dwellings

- Insulation shall be evaluated for all walls that are thermal boundaries including those separating conditioned and unconditioned spaces within the dwelling.
- REQUIRED: Use a thermal camera to scan entire applicable wall areas of home to verify existence or non-existence of wall insulation in all exterior walls and/or walls following the thermal boundary of the home. Save images of thermal scans made, print out and retain in client's job file or store electronically in an accessible location.

## 2. Electrical Wiring

Knob and tube wiring

- Under no circumstances shall wall cavities in dwellings with live knob and tube wiring be evaluated for insulation.

## 3. Moisture and Structural Problems

All perimeter walls

- Inspect all perimeter walls of conditioned areas for:
  - Moisture and structural problems.
  - Roof leaks at wall junctions.
  - Gutters where insufficient overhang exists.
  - Missing down spouts.
- Note all repair needs on Work Order.

## 4. Heat Producing Devices

All perimeter walls

- Inspect all perimeter walls of conditioned areas for heat producing devices that require blocking.
- Where blocking cannot be installed around heat producing devices,
- Such wall cavities shall not be evaluated for insulation and noted as such on the Work Order.
- Note all blocking needs on the Work Order.

## 5. Existing Insulation

All perimeter walls

- Inspect for existing insulation, by removing a small section of siding, or by drilling 1" holes at each corner of house (at retrofit locations), or from attic if wall cavities are open, or by removing an outlet cover and using a nonconductive probe.
- Do not drill into walls, ceilings or floors if lead paint or asbestos is determined to be or assumed to be present in the home.
- Insulation shall not be evaluated for cavities with existing insulation

## 6. HVAC Ducts

All perimeter walls

- Cavities that serve as HVAC ducts shall not be evaluated for insulation.
- Describe all cavities that should not be insulated and their location on the Work Order.

## 7. Distance to Ground Surface

All perimeter walls

- Cavities where the bottom of the floor joists band board is within 18" or less of the ground surface shall not be evaluated for insulation. Note the location of all such cavities on the Work Order.
- All cavities above 18" of the ground surface shall be evaluated for insulation.

## 8. Siding

Vinyl and aluminum

- Determine feasibility of removing siding.
- If siding cannot be removed, determine feasibility of installing insulation from the interior of the dwelling.

Asbestos

- Asbestos cannot be removed, cut, sanded, or drilled.
- Determine feasibility of installing insulation from the interior of the dwelling.

Brick veneer

- Determine feasibility of removing fascia board and using fill tube method.
- Determine feasibility of an interior installation.
- Determine feasibility of drilling between mortar joints.

Cosmetic considerations

- In all cases, it shall be the Evaluator/Energy Auditor determination as to whether the installation of wall insulation can be performed without significantly detracting from the looks of the exterior or interior of the dwelling.
- Where the client will not allow wall insulation due to cosmetic considerations and the Energy Auditor believes it can be performed without detracting from the dwellings looks: the dwelling shall not receive further weatherization services.
- It is allowable to paint plugs to match surrounding surfaces. Use computer matched paint where possible.

## 9. Preparatory Work

Check all cavities for possible routes for loose fill to escape during insulation process.

- Blocking for balloon framings.
- Cracks or joints at framing junctures.
- Siding in need of repair or replacing.
- Blocking for heat producing devices.
- Built-in closets.
- Pocket doors.

Note location of all blocking needs on Work Order.

## 10. Determine Type of Insulation to Use

Loose fill cellulose and fiberglass

- Shall not be installed when wall cavities are exposed.
- Can be installed from exterior and interior.

Dense pack cellulose

- Shall not be installed when wall cavities are exposed.
- Can be installed from exterior and interior.



- Must be blown at a density of 3.5 pounds per cubic foot.

Flexible (batt)

- Shall be installed in exposed wall cavities.

Rigid board

- Rafter slopes above knee walls.
- Other applicable areas.
- Must be covered by ½" gypsum or equivalent when exposed in the living area.

## 11. Recommended Methods for Estimating Wall Insulation Needs

Loose Fill Cellulose (*always refer to product coverage data*)

- Measure the perimeter of the living areas, (distance around the house).
- Measure the average height of the ceilings.
- Measure the thickness of the wall cavities.
- Estimate the window and door area,
- Include in this figure insulated areas and other areas that will not be insulated.
- Enter this information into the following formula to arrive at the net wall area.

Perimeter (x) wall height gross = wall area

Gross wall area (-) window and doors area = net wall area

### Example:

140 ft. x 8 ft. = 1120 ft<sup>2</sup> of gross wall area

1120 ft<sup>2</sup> (-) 168 ft<sup>2</sup> (Drs+Wds) = 952 ft<sup>2</sup> of net wall area

- To calculate the number of bags of insulation needed, divide the net wall area by the appropriate number per R-Value desired:  
     For R11- divide net wall area by 50  
     For R13- divide net wall area by 42  
     For R19- divide net wall area by 29

### Example:

A 952 ft<sup>2</sup> (net wall area) house insulated to R11 would take 19 bags of cellulose.

Loose fill fiberglass

- Loose fill fiberglass shall not be used in houses for sidewall insulation.
- Follow the same calculations for net wall area then divide by the following to calculate bags of insulation needed:  
     Divide the net wall area by 178 for R11.  
     (3 ½" cavity)  
     Divide the net wall area by 140 for R15.  
     (5 ½" cavity)

Flexible (batt Insulation)

- Calculate the total square feet of the area to be insulated.
- Measure the width and thickness of the wall cavities.
- To calculate the number of rolls of insulation needed use the following chart:  
     If stud cavity is 15 ½" wide and 3 ½" thick, divide by 88  
     If stud cavity is 23 ½" wide and 3 ½" thick, divide by 135  
     If stud cavity is 15 ½" wide and 5 ½" thick, divide by 49  
     If stud cavity is 23 ½" wide and 5 ½" thick, divide by 75

**Example:**

1000 ft<sup>2</sup> divided by 88 ft<sup>2</sup> equals 11 ½ rolls needed.

Rigid board

- Measure the square foot area and divide by 32 ft<sup>2</sup> for 4" X 8" pieces and 48 ft<sup>2</sup> for 4" X 12" pieces.
- Number of pieces of gypsum board can be estimated in the same manner.

**Step 7: Floors/Foundations**

Reference Kentucky Weatherization Field Guide and Standard Work Specifications for requirements

**1. General Requirement**

Floor insulation shall be evaluated for the following areas.

- Unconditioned basement.
- Houses and mobile homes with a crawl space and 18" or more between the bottom of floor joists and the ground surface.
- At the band joist area of dwellings with conditioned basements.

Floor insulation shall have a minimum R-19 value where possible.

**2. Moisture Inspection**

- Talk to client regarding seasonal or constant moisture under dwelling.
- Inspect crawl interior and exterior of the dwelling for any correctable causes of excess moisture.

**3. Ground Cover**

Crawlspaces enclosed by solid foundation or skirting.

- Install 6 mil. polyurethane where possible.

Where crawlspace has moisture problem,

- Ground cover shall only cover 80 percent of area with 20 percent folded back for later installation.

**4. Foundation Ventilation**

Crawlspaces enclosed by solid foundation or skirting:

- Ventilation must be installed where there is existing insulation or where floor insulation is to be installed.
- Where ground cover is installed, and no moisture problems exist,
  - Net Free Vent Area must be 1 ft<sup>2</sup> per every 1500 ft<sup>2</sup> of crawlspace.
- Where ground cover is installed, and moisture problems do exist,
  - Net Free Vent Area must be 1 square foot per every 300 square feet.
- Where ground cover is not installed, the Net Free Vent Area must be 1 square foot per every 150 square feet of crawl space.

**5. Estimating Floor Insulation**

- Calculate the floor area to be insulated.
- Divide the total square feet by the coverage of the type of insulation to be used.
- Floors with oversized floor joist cavities
  - Calculate for the larger width of insulation and cut to size accordingly.

**6. Pipe Wrap Evaluation**

- Measure the size and length of pipe wrap needed.

- Note attachment methods on the Work Order.

## 7. Skirting

Skirting shall only be evaluated in order to repair or finish out existing skirting.

Framing

- Treated framing lumber shall be used whenever the framework will touch the ground.
- Non-treated framing lumber can be used for all framing above the ground.

### *Step 8: Worst-Case Draft and Pressure Test/Caz Testing*

(See current approved Field Guide and Standard Work Specifications for further details)

This test is required for all combustion appliances at the time of **EACH** of the following:

- During the dwelling needs evaluation/energy audit
- During each day of weatherization work at the end of each workday
- During the post inspection/quality control inspection of all work measures

This test uses the home's air handler, exhaust fans, and chimneys to create worst-case depressurization in the combustion zone. During this worst-case situation, you measure the indoor-outdoor pressure difference and chimney draft. The reason for these tests is that worst-case conditions do occur, and chimneys should vent their combustion gases even under these extreme conditions. Draft is measured downstream of the draft diverter or barometric draft control in older furnaces, boilers, and water heaters. Downstream, generally means above the draft diverter or between the draft diverter and chimney.

Draft is the pressure difference between the chimney and combustion zone. Atmospheric draft appliances are draft-tested during the worst-case conditions. This worst-case draft test will determine if the venting system will exhaust the combustion gases when the combustion zone pressure is as negative as you can make it.

A sensitive digital manometer is usually used for accurate and reliable readings of both combustion-zone depressurization and chimney draft.

### **Steps Involved**

1. With exterior doors and windows closed, connect a digital manometer to read the pressure difference between combustion zone and outdoors, and record the current natural pressure difference.
2. Turn on the exhaust fans, clothes dryer, and air handler; then measure the combustion zone-to-outdoors pressure difference again.
3. While air handler and exhaust fans are running, open and close interior doors until the negative pressure difference between the combustion zone and outdoors is at its most negative pressure difference. Record this maximum or worst-case depressurization value.

A combustion zone-to-outdoors pressure difference of more than  $-5$  pascals during this test indicates a danger of back drafting naturally drafted gas and oil appliances.

A combustion zone-to-outdoors pressure difference of  $-8$  pascals or more indicates a danger of flame roll-out.

4. Operate each atmospheric draft boiler, furnace, or water heater under these same worst-case conditions. Measure draft with a manometer or draft gauge. Test for back drafting with smoke, a negative draft should be observed within 1 minute of start-up.
5. Take all necessary steps to identify and remove excessive negative house pressures. Also, take appropriate measures to increase draft by undertaking chimney improvements, combustion air, or other measures to encourage the venting of combustion gases.

Ambient CO levels should be monitored in the combustion zone during draft testing, especially if depressurization of the combustion zone exceeds  $-5$  pascals during house-depressurization testing.

If ambient CO levels in the combustion zone exceed 35 parts per million (ppm), draft tests should cease for the technician's safety. The combustion zone should be ventilated before testing and repair of CO problems resumes.

Naturally drafting chimneys should have  $-1$  to  $-15$  pascals of draft, depending on outdoor temperature (measured chimney with reference to the combustion zone) while at worst-case conditions. The lower the outdoor temperature, the higher this negative draft should be. Combustion gases shouldn't spill for longer than 60 seconds from the combustion device while operating at worst-case conditions.

### **Special Procedures Regarding Solid Fuel**

- Solid fuel appliances including wood and coal burning stoves and fireplaces, pellet stoves, etc. will involve performing all steps outlined in Step 8 with the following exceptions and special steps applying only to the solid fuel appliance:
  1. A draft and spillage test is not required of the solid fuel appliance.
  2. A carbon monoxide test is not required of the solid fuel appliance.
  3. If the home has a fireplace that the owner uses, set up and turn on the blower door to a 300-cfm flow rate with Ring B to simulate.
  4. NOTE: Before performing your tests, extinguish all flames in solid fuel appliances. Do not perform worst case draft and pressure testing/CAZ testing, with any fires burning in any solid fuel appliance.

The WX 710 must identify that this test has been done and the appliance(s) has/have passed and list the draft numbers attained, per appliance, during the test.

For further information, refer to the approved Field Guide and Standard Work Specifications.

### ***Step 9: Determine If Lead-Based Paint Protocols Must Be Followed***

(See Section 12.15: Lead Paint and Lead Safe Weatherization Work Practices)

Required: Lead Paint testing with an EPA approved lead paint test kit must be performed on any and all areas of the home that will be disturbed by weatherization work measures if the home was determined to have been built before 1978. Evidence that testing was performed must be retained in the client file.

If lead paint testing is performed by the Dwelling Needs Evaluator/Energy Auditor using a swab test kit, the following procedures are required:

#### General Requirements:

- This test can only be performed by a Certified Renovator
- Test painted surface areas that will be affected. In other words, test the paint on surface areas that you will be disturbing, i.e. cutting, drilling, etc.
- Use an EPA recognized swab test kit to perform the tests. Examples of two brands are: “LeadCheck”® or “D-Lead” ®
- Follow the manufacturer’s instructions for preparing the surface to be tested, i.e.: using a utility knife to make a cut through all paint layers down to the bare building material for each test surface and preparing the test swab and test verification card before swabbing the test surface.
- Follow lead safe work practices referenced in Section 12.15 as applicable while performing these swab tests.

Once the test has been completed, keep the test swab, test verification card and record the date, test result, home information, etc. Keep all test kits and forms with the client file or in another secure, readily accessible location for at least 3 years

**Note:** In lieu of using a test swab kit, the Certified Renovator may collect a paint chip from the components to be disturbed for laboratory analysis to determine if Lead-based paint exists.

#### *Step 10: Determine if Baseload Measures Are Needed*

##### **On the baseload record sheet:**

- Record metered data from refrigerator and visually inspect refrigerator condition
- Gather existing interior lighting information
- Record existing shower head GPH water usage rate
- Record water heater data and usage

Determine if servicing/re-venting of the clothes dryer is required per the Kentucky Weatherization Field Guide and Standard Work Specifications

**Required: Low-flow showerheads must be considered in all NEAT/MHEA audits.**

#### **7.6** *Energy Auditor*

##### Overview

An Energy Auditor is a residential energy efficiency professional who evaluates the energy efficiency, health, and safety of a home, and conducts field measurements to identify areas for savings. The Energy Auditor produces this information as a report and makes recommendations to the weatherization client.

In addition, an Energy Auditor is a building scientist who gathers empirical data, conducts tests and uses energy modeling software, to reduce the energy consumption, improve the safety, and increase the lifespan of a building while improving the quality of life and comfort for building occupants.

**Required Qualifications/Certification:** To Become a BPI-certified Energy Auditor, a National standardized written test and a field test must be completed successfully. In addition, a minimum amount of continuing professional education must be completed each year as determined by BPI and/or the Department of Energy Weatherization Assistance Program.

For more information regarding Energy Auditor requirements and responsibilities please refer to the Building Performance Institute Energy Auditor Certification Scheme Handbook.

## ***Chapter 8: Dwelling Work Procedures***

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### ***8.1 General Requirements***

#### **Mandatory Program Compliance Requirement:**

A dwelling cannot receive further weatherization services until all inoperable furnaces have been made operable, all safety tests performed, all health and safety repairs performed, and all repairs have passed a post inspection/quality control inspection per program protocols. Service providers found to have not followed this requirement will be out of compliance with program requirements.

#### **Site Eligibility Requirement: The home must be free of obstructions/debris in all affected work areas**

If the work crew/contractor encounters obstructions/debris in any interior/exterior part of the home that would impede the process of installing prescribed program work measures, the client must be notified and requested to have said obstructions/debris removed from the affected area(s) before commencing with the prescribed program work measures.

The following are general requirements for crew leaders of crew-based service providers and as indicated for each crew worker:

- Perform all applicable blower door tests and other tests as required, including worst case scenario, CAZ testing when required.
- Document the amount, type and cost of materials installed on each dwelling daily.
- Document the daily direct labor hours per category on the Crew Hours Documentation section of the Work Order.
- When required, utilize Lead Safe Work Practices per 40 CFR 745.
- Follow all applicable OSHA requirements.

The following are general requirements for private contractors performing regular weatherization measures:

- Perform all appropriate blower door tests and other tests as required, including worst case scenario, CAZ testing when required.
- Initiate requests for Change Orders when measures are needed that were not identified on the Work Order or Bid Specifications.
- Complete all required information on applicable weatherization forms.
- When required, utilize Lead Safe Work Practices per 40 CFR 745.
- Follow all applicable OSHA requirements.

### *General Restriction on Use of Personnel*

Please refer to [section 5.1](#) of this manual.

## **8.2 Personnel Qualifications Standards**

The service provider must ensure that all staff assigned crew leader activities as any portion of their job duties and approved private contractors performing regular weatherization measures are proficient in the use of the blower door and other requirements as described and required throughout Chapter 9.

All staff performing energy systems measures as any portion of their job duties must participate in all required Energy Systems training courses. When work is limited to solid fuel systems, crew leaders and contractors are exempt from the energy systems training requirement except for those aspects relative to solid fuels.

KHC reserves the right to exclude from the program any crew leaders or private contractors who do not demonstrate, after extensive training, an ability to install weatherization materials in accordance with program requirements and standard work specifications.

Participation in and the successful completion of advanced, refresher, and other related training as required by KHC is mandatory to remain qualified to perform material installations.

## **8.3 Safety Standards**

**Crew Leader** - The Crew Leader shall be responsible for assuring that all tools and equipment, including vehicles, are in a safe operating condition and that they are safely used on the job site.

**Crew Vehicle** - The crew vehicle should be periodically checked for general operating condition and receive regular service and maintenance. Appropriate boxes and racks should be installed to secure all tools and equipment.

**Tools and Equipment** - The correct tools and equipment should be used for the measures and materials being installed. All tools and equipment should be periodically checked and maintained to ensure a safe operating condition. Protective clothing and personal protective equipment (i.e. dual cartridge respirator, goggles, coveralls, and safety ropes) should be worn at all appropriate times.

**Energy Systems** - Prior to any regular weatherization measures being performed, the crew leader shall confirm, by verifying Work Order documentation or by performing actual tests that no combustible fuel line leaks exist and that 0 parts per million carbon monoxide is present in the ambient air.

**Site Conditions** - No weatherization measures shall be performed on any dwelling where the Crew Leader, subcontractor, or energy systems technician has identified and determined that conditions at

the site pose an immediate health or safety threat to him/her or work crews. See Sec. 5.11 and Chapter 12.

#### **8.4 Required Tools and Equipment**

Energy system technicians must be equipped with the following tools and equipment to properly perform energy systems measures:

- Gas leak detector
- Leak seal solution
- Assorted pipe wrenches
- Tic tracer
- Volt/ohm meter
- Assorted hand tools
- Combustion analyzer
- Stack thermometer
- Smoke test kit
- Chimney sweep brushes
- Flashlight
- Dual cartridge respirator
- Shop vacuum
- Draft gauge
- Low-temp thermometers (2)

Regular weatherization crews and contractors must be equipped with at least the following tools and equipment to properly perform regular weatherization measures:

- Blower door
- Digital manometer
- Smoke pencils or smoke generators
- Plastic and tape
- Respirators, goggles, gloves (PPE)
- Insulation blowing machine for cellulose and fiberglass
- Rigid and flexible fill tube
- 6-foot step ladder, 16-30-foot extension ladders
- Shovel
- Shop vacuum
- Rough service drop light
- Flexible, nonconductive batt insulation device
- Siding removal tools
- Circular saw
- Reciprocating saw
- Miter saw
- Electric and cordless drills with bits
- Assorted hand tools
- Measuring tape



- Utility knife
- Tin snips
- Grounded extension cord
- GFCI extension cord

## 8.5 On-Site Work Process

### *Step 1: Client Relations/Education*

#### 1. Advance Notification

- Arrange work schedule so that the client or other adult family member will be home at all times.
- Make an appointment for an arrival date and time.

#### 2. Initial Contact

Introduce yourself and all crew members.

- Show agency identification, if available.
- Establish a good working relationship.
- Do a pre-work walk thru with the client.
- Describe normal work house and routine.
- Estimate number of days for the job.
- Ask client to clear work area of obstructions or inappropriate conditions.
- Ask client to keep children or pets away from work area.

#### 3. Daily Contact

- Advise client of any measures that cannot be installed until obstructions or inappropriate conditions are removed.
- Explain how materials will be installed.
- Tell the client what to expect.
  - Crew will be using the blower door.
  - Where work will take place.
  - What kind of tools will be used?
  - What kind of noise will be heard?
  - What kind of odors, if any, will be noticed?
  - Describe condition of work area at end of day.
  - Hazards to be careful of or avoid.
  - Advise client of any work changes or any problems encountered during the job.
  - Inform the client when leaving the work site for lunch and at the end of each day.

### *Step 2: Energy Systems*

Reference KY WX Energy Systems checklists, KY Field Guide and Standard Work Specifications

#### 1. General Requirement

Service provider approved technician staff and private contractors are responsible for performing all measures as prescribed by the Work Order.

#### 2. Fuel Leaks

##### **Natural gas and LP appliances**

- Sweep all lines and fittings with combustible gas detector.

- Confirm any leakage sites with soap test.
- All leakage must be corrected immediately.
- If leakage is severe:
  - Evacuate dwelling
  - Have fuel turned off prior to starting repairs.
- Replace defective fuel lines and other leaking components in accordance with
  - NFPA 54 for natural gas, or
  - NFPA 58 for LP.
- Minor leaks can sometimes be repaired by tightening loose fittings.
- Sweep lines again to verify that repairs have corrected the problem.

#### **Fuel oil appliances**

- Visually identify leakage sites.
- Replace any defective fuel line components in accordance to NFPA 31.
- Some minor leaks can be repaired by tightening loose fittings.

### **3. Electrical Inspection/Repair**

All electrical connections

- Look for frayed or disconnected wires, scorch marks, blown fuses, etc.
- Verify the presence of electricity using a volt/ohm meter.
- Do not attempt to operate any appliance that appears to have electrical problems.
- All electrical work must be performed in accordance to the National Electrical Code (NEC).

### **4. Carbon Monoxide Testing of the Ambient Air**

Using a CO detector, sweep for the presence of CO in the indoor air, at a duct register and near the heating unit itself.

- If more than 0 but less than 35 ppm of CO is detected:
  - Proceed with inspection to determine the problem.
  - Eliminate CO in the living area as quickly as possible.

### **5. Carbon Monoxide Testing for Cracked Heat Exchange**

- Insert CO detector probe into warm air plenum.
- Activate unit.
- More than 0 ppm of CO indicates,
  - Defect in the heat exchanger, or
  - Possible leakage in the return air duct causing combustion appliance to spill.
- Visually inspect the heat exchanger for cracks, if possible.
  - Observe burner flame pattern for distortion when air handler is engaged.
  - Observe O<sub>2</sub> reading on combustion analyzer for change when blower activates (variance of more than 1% indicates a possible crack in the heat exchanger)
- If unit is found to be defective,
  - Replace heat exchanger, if practical, or
  - Replace the entire heating unit in accordance with the appropriate codes.

### **6. Draft Test for Natural Gas, LP, and Oil**

- Activate unit.
- After steady state is achieved (3-5 min.)
  - Insert draft gauge to verify a negative pressure of -2.25 Pa to -.75 Pa based on outdoor temperature

1. To convert pascals to inches water column, 1 pascal equals .004 inches water column

- Make note of the reading and continue the inspection.

*Note: Weather conditions may affect draft. It may be difficult to obtain draft on hot humid day.*

Minimum Draft Requirements:

Outside Air Temp	Minimum Draft Pressure
At 80 degrees	.75 pascals
At 70 degrees	-1 pascals
At 60 degrees	-1.25 Pascals
At 50 degrees	-1.5 Pascals
At 40 degrees	-1.75 Pascals
At 30 degrees	-2 Pascals

**Important:** All vent pressure measurements are taken with reference to the Combustion Appliance Zone.

If draft is too low, the possible causes are:

- Inadequate fuel pressure,
- Unit under firing,
- Debris or other obstructions in heat exchanger or vent pipe,
- Oversized fluepipe or,
- Improper termination of vent pipe
- Outside condition such as wind that might inhibit draft.

If draft is too high, the possible causes are:

- Fuel pressure set too high,
- Unit over-firing,
- Improper vent pipe termination height.

Determine source of problem and correct before Weatherization can be performed.

## 7. Dropout Safety Valve Test, Natural Gas, and LP

Confirm that all gas valves are equipped with a dropout safety valve if applicable.

**Required Procedure:**

- Set the gas control valve to the pilot setting. Extinguish the pilot flame by blowing it out and listen for the dropout safety valve to activate. **Do not turn gas valve to off position.**

- If dropout safety valve does not activate within 2.5 minutes, or within manufacturer specifications, the valve is faulty and should be replaced.
- Test with gas leak detector to verify valve has stopped gas from flowing thru valve.

### **8. Locking the Meter, Natural Gas Only**

All other appliances (water heater, cook stove, etc.) must be:

- Turned off.
- Activate unit being tested.
- After steady state is achieved, count the seconds it takes for 1 revolution of the smallest dial of the gas meter.
  - Using a BTU conversion card, find the seconds for 1 revolution of the smallest dial.
  - Add three zeroes to this number to identify the actual BTU input of the unit.
- Compare this reading with the BTU input listed on the data plate.
- If actual input is greater than listed input, unit is over-firing and service to repair problem is required. Consult manufacturer specs for percentage of over or under firing which requires service. Typically, 10 percent on 70-80 percent efficient units and 3-5 percent on 90 plus units
- If actual input is less than listed input, unit is under-firing and service to repair problem is required.

### **9. Analyzing the Flue Gases, All Fuels**

Activate unit.

After steady state is achieved (3-5 min.)

- Sample the flue gases with a combustion analyzer.
- If CO level above 100 ppm, (air-free) is found, the unit has incomplete combustion.
- Indicate the condition on a Work Order, and then perform a clean and tune and all required repairs.
  - Oxygen (O<sub>2</sub>) Range should be between 6 and 9 percent
  - Net Stack should be between 300 and 550 degrees
  - Draft should be -.02 to- .04 water column inches (w.c.)
  - Gas Pressure should be 3.5" i.w.c. (nat.) 11" i.w.c. (LP) or PMI
- Check the temperature of the flue gas and compare to table.
- If temperature is above the accepted range, unit is over firing.
- If temperature is below the accepted range, unit is under firing.

### **10. Smoke Test, Oil Only**

Activate unit.

Use a smoke tester fitted with a sampling sheet; sample the gases by drawing the pump 10 times only.

- Remove sampling sheet and compare to an approved smoke scale.
- If unit is under-firing or over-firing, unit should be serviced.

### **11. Venting for Natural Gas, LP, and Oil**

Perform a visual inspection of the entire venting system of all combustible appliances.

Venting shall be in accordance to:

- NFPA 54, 58 for natural gas and LP

- NFPA 211, for solid fuel
- NFPA 31, for oil.

Determine if the vent components meet basic clearances.

- If venting does not meet NFPA guidelines or basic clearances,
- Perform repairs as necessary.

## 12. Confined Spaces

All combustible appliances:

Determine if combustible appliance is in a confined or unconfined space. Refer to NFPA 54.

If unit is in a confined space:

- Correct the situation by adding ventilation according to NFPA codes or,
- Relocate the appliance, if practical.

## 13. Check and Tune (aka Clean and Tune) (Natural Gas, LP, Oil)

Reference Kentucky Weatherization Field Guide and Standard Work Specifications

If preceding tests require corrective measures:

- Perform a check and tune.
- To correct under-firing or over-firing of an appliance, adjust fuel pressure using a tube manometer.
- To verify that the thermocouple is properly functioning, perform a millivolt test of the circuit.
- If a reading of 12 millivolts cannot be reached after adjustment, replace the thermocouple.
- Using a milliamp tester, adjust the heat anticipator to match the amp draw of the gas valve.

## 14. Air Distribution System, Forced Air Furnaces Using Natural Gas, LP, Oil

- Test the high limit control, belt driven or direct drive.
- If limit controls fail to shut down the unit at the proper temperature setting,
  - Replace defective limits.
- Check temperature rise from cold-air return to warm air plenum.
  - Adjust blower motor to establish a rise of 40 to 70 degrees.

## 15. Checking Amperage of Blower Motor

Using an amp probe, verify amperage rating of the blower motor, check for obstruction within the blower housing or return air plenum. Replace the blower motor if the amperage cannot be improved.

## 16. Solid Fuel Inspection

- Visually inspect the entire appliance as detailed in the Energy Systems Technical Reference chapter.
- Visually inspect the quality of fuel being used.
- If the dwelling is below 2000 cfm @ 50 Pa,
  - Install a fresh air vent for each appliance.
- If corrective measures are necessary,

- All materials installed must be in accordance with NFPA 211.

### **17. Electric Furnaces and Space Heaters**

Inspect for loose wires, missing filter and other obvious defects.

Activate unit.

- Determine if it is functioning correctly.
- If unit is faulty, perform a check and tune.

### **18. Water Heaters**

Inspect for obvious signs of damage.

- Scorch marks, rust, disconnected venting etc.

If unit uses natural gas or propane,

- Evaluate like any other combustion appliance.
- If needed, perform a check and tune.

### **19. Cooking Equipment Using Natural Gas and Propane**

- Sweep for fuel leaks using a gas detector.
- If fuel leaks are found, repair, if possible.
- Activate equipment and perform combustion analysis for CO emission. Maximum allowable CO above each burner is 25 ppm as measures and 200 ppm air free in the oven.
- If CO emissions are found, repair, if possible.

### **20. Replacement Furnaces**

- Calculate the necessary BTU output (load calculation) for the dwelling living area according to HVAC codes using manual J software.
- All replacement units must be rated at or above 80 percent efficiency.

### **21. Smoke Detectors**

- Install smoke detectors per manufacturer recommendations.

All dwellings.

Refer to Section R313 of KY Residential Code. Smoke alarms to be located:

- In each sleeping room
- Outside of each separate sleeping area in the immediate vicinity of the bedrooms
- On each additional story of the dwelling, including basements
- On each level in split level dwellings where an intervening door is located between the adjacent levels.
- An alarm located only on the upper level is permitted where there is no intervening door between the adjacent levels and the lower level is less than one full story below the upper level.
- Where interior alterations, repairs or additions requiring a permit occur or a sleeping room is added or created, the individual dwelling unit shall be provided with smoke

alarms as required for the new dwellings, with such alarms hard wired and interconnected.

- Hard wiring and interconnection is not required in existing areas provided:
  - The alteration or repair causes the removal of wall or ceiling finishes exposing the structure, and
  - No attic, crawl or basement is available which can provide access for hard wiring and interconnection without the removal of interior finishes.

## **22. CO Detectors**

- All dwellings - Install CO detectors per manufacturer recommendations
- Electric plug-in CO detectors should have a battery backup.

### ***Step 3: Infiltration***

#### **1. General Requirement**

All crew leaders or private contractors are responsible for the following guidelines and requirements on all dwellings.

Priority shall be given to air leakage and bypasses in areas of high-pressure differential (high and low portions of the thermal boundary).

Consideration shall be given to the interactive relationship of priority measures in weatherizing a dwelling. Priority treatments such as duct sealing, air bypass sealing and dense pack insulation reduce the infiltration rate significantly while at the same time improving the thermal performance of the dwelling.

Crews and private contractors shall be responsible for performing treatments in order of priority as noted on the Work Order and adhering to infiltration reduction guidelines.

Refer to blower technical reference chapter of this manual for specific instructions regarding set up and operation of the blower door.

#### **2. Interim Blower Door Testing**

Blower door testing is required before any work is performed and after completion of each priority treatment.

- To verify cost effectiveness

Blower door testing schedule

- Before any work is performed compare to DNE test.
- After all Infiltration work but before attic bypasses are addressed.
- After attic bypass measures.
- After attic insulation or, in the case of balloon framing, after attic and wall insulation.
- After wall insulation.
- After floor insulation.

#### **3. Preparation at Warehouse**

- Identify and obtain all materials needed to perform air infiltration measures as listed on the Work Order.
- Check all information included with the Work Order.

- Confer with evaluator/Energy Auditor.
  - Ask questions if any confusion exists.

#### 4. Preparation On-Site

Briefly explain to the client the activities to be performed.

- To verify and adjust, if necessary, the MVR for the dwelling, ask if the number of occupants has changed since the DNE was performed.

Install blower door.

- Setup in same exterior door used for the DNE, if possible.
- Calculate infiltration rate at highest attainable Pa, up to 50.
- Compare cfm rate to DNE test on Work Order.
- If there is a (+) or (-) 100 cfm difference,
  - Recheck setup and preparation.
  - Confer with client regarding temporary repairs or sealing performed by Evaluator/Energy Auditor.
  - Contact the Evaluator/Energy Auditor regarding his dwelling preparation procedure.
- If the PRE-WORK Test is acceptable then proceed with the measures as prescribed on the Work Order.

If Work Order calls for installing attic ventilation

- Cut all necessary vent holes and then,
- Check infiltration rate to see if cfm Rate has increased.

If cfm rate has significantly increased,

- Perform all necessary attic bypass treatments.
- Identify/confirm the thermal boundaries of the living area.
- Identify/confirm framing type and critical framing junctures.

Identify potential air bypasses.

Determine where insulation will not contribute to air stoppage.

If dwelling has a forced air heating system,

- Evaluate the air distribution system contribution to the overall air leakage rate.
- Use the pressure pan method to estimate duct system leakage.
- Use duct tester for total duct leakage and leakage to outside.

**Note:** *There are cases where some infiltration repair is necessary in order to evaluate and effectively treat the air distribution system.*

#### 5. Building Leakage Characteristics

Refer to Pressure Diagnostic Techniques in the Blower Door Technical Reference chapter for methods to evaluate the air leakage characteristics of a dwelling.

#### 6. First Priority Infiltration Measures and Incidental Repairs

Measures to stop air infiltration should be performed on the thermal boundaries of the living area, where possible.

Air infiltration reduction work shall begin with the repair of holes in the building envelope.

- Missing components.
- Temporarily sealed leakage sites as noted on the Work Order.



- Repairs that can be classified as incidental to attic, walls, and floor insulation should be charged to those measures.

Identify and repair other holes in the building envelope as noted on the Work Order.

Repair moisture related problems as described on the Work Order.

- Charge repairs to the measures to which they are incidental.
- Perform blower door test.

## **7. Bypasses: Identification and Treatment**

### **Plumbing Chase Treatment**

- Plumbing chases are used to conceal supply, drain, and vent pipes.
- They typically run from basement to attic, with openings at each floor where pipes branch off.
- They can be located in either the interior or exterior wall.
- Seal off vertical plumbing chases at the crawl space or basement ceiling and at the attic floor.
- Close off as much of the hole as possible with aluminum flashing, shingles, or rigid foam insulation.

**Note:** Polystyrene should not be exposed to temperatures above 140 degrees Fahrenheit. Caulking or spray foam sealant can be used to seal any remaining gaps.

### **Exterior and Partition Wall Treatment**

- Exterior and interior partition walls which do not have top plates, or which have gaps between the top plate and the finish wall need to be sealed off.
- Seal with expanding foam, foam backer rod (crack filler), or by stuffing fiberglass insulation wrapped in plastic into the cavity.
- Large gaps, such as found with balloon framing will require an air barrier, sealed in place.
- Fiberglass alone does not impede air movement.

**Note:** If wall is open at crawlspace, the same procedures should be used.

### **Pocket Door Treatment**

- Pocket doors (doors that slide into the wall cavity) can present major bypass leakage areas.
- Seal the wall cavities, into which the pocket door slides, from the attic, wall, and basement with rigid insulation, caulked in place.
- When the pocket is connected to an exterior wall cavity, deal with this juncture at exterior wall with fiberglass insulation stuffed tightly into the open cavity.

### **Chimney Treatment**

- A gap of several inches is usually left around the chimney where it penetrates the floor and ceiling framing.
- Combustible materials must be at least 2" away from chimney.
- This leakage path should be sealed at all levels.
- Before sealing the gaps around a chimney, inspect it to make sure there are no combustible materials in contact with it, and make any necessary repairs.

- To safely seal the gap, cut flashing to fit over the surrounding joists and tightly against the chimney.
- Seal the flashing at joists and chimney with long-lasting, high temperature sealant such as hi-temperature caulk.
- Install insulation shield to prevent insulation from coming into contact with chimney
- Pack the insulation tightly in place (loosely packed insulation will do little to stop air flow).
- Check with your local building code official about local building codes.

#### **Metal Chimney Treatment**

- Factory built chimneys, like masonry chimneys, generally have gaps around them which result in heat loss.
- Chimneys should be sealed at the attic and, if applicable, floor level.
- Seal using the same procedures described for masonry chimney.
- Make sure manufacturer specifications are met and adhered to, especially pertaining to double wall flue pipe.

#### **Attic Access Treatment**

- Should be weather-stripped and insulated to a minimum R38 (same R-value as attic).
- Hatchways can be insulated by securing foam board to the backside of the access door.
- To insulate fold down stairs, build an insulated enclosure sized to fit over the stairs.
- Charge repairs to attic insulation.

#### **Penetrations through Attic Floor**

- Holes for wires, pipes, and vents, etc. Seal with caulk and/or expanding foam. Caulking used to seal around heat producing devices, chimneys, or flues serving combustion appliances must be rated for that application (High temp).

#### **Duct Penetrations Treatment**

- Forced hot air heat system ducts usually have small holes and gaps where the ducting penetrates ceiling, floor, and walls.
- Identify / confirm leakage areas.
- Seal all cracks and gaps around duct penetrations with caulk or foam sealant.
- See Duct Pressure Balancing procedures.
- Sealing duct leakage:
  - Seal all areas in supply and return with mastic and mesh or equal.
  - Perform an incremental reading after this component.

#### **Recessed Light Treatment**

- Significant air leakage is found around fixtures.
- Caulk around fixture from below, with a high temperature flexible caulk.

Note: From an energy conservation standpoint, such fixtures should be replaced with a ceiling fixture or an IC Rated recessed lighting fixture.

#### **Dropped Ceiling Treatment**

- Dropped ceiling may be present over showers, bathtubs, kitchens and bathrooms laundry chutes and stairways. Sunk below the attic floor, they may allow air to leak into the attic.
- Install ceiling at attic floor level using 3/4" plywood or 1 X 12" sheathing, sealing, and insulate to prescribed level.
- Add new joist or braces if necessary.

#### **Attic/Knee Wall Treatment**

- Seal all cracks and seams between heated and unheated space.
- At the floor joist/ceiling cavities connected to the knee wall attic area, seal tightly, using rigid foam or waxed cardboard, and caulking.

#### **Whole House Fan Treatment**

- To seal whole house fans, a tight-fitting insulation cover either on the attic or living space side, should be made which is installed each fall and removed each spring.

#### **Basement Air Leakage Treatments**

- Use the same treatments described for plumbing chases, exterior and partition walls, and chimneys.

#### **False Walls and Ceilings Treatment**

- False walls and ceilings are commonly found over laundry chutes, plumbing access spaces, and built-in closets.
- These spaces may be open to attic, crawlspaces, chimney cavities, plumbing chases, or the outside.
- Large openings may be closed off with foam sealant, polyethylene sheeting, or rigid board insulation, sealed in place.
- Seal small cracks with caulk.

#### **Storage Closets**

- Storage closets can be a significant source of leakage, especially when the ceiling level had been dropped. It is common to find these areas unfinished.
- Large holes and gaps should be sealed with rigid materials and caulk.

#### **Fireplace(s) Treatment**

- Fireplaces, without a tight-fitting damper, lose large amounts of heat out the chimney.
- If a damper exists, advise the client to close when fireplace is not in use.
- When a damper does not exist, an inexpensive alternative is to build a temporary damper out of a piece of rigid insulation or plywood; it should be cut and friction fitted into the fireplace flue; hang a ribbon or some means of a reminder for the client so this seal will be removed before a fire is lit.
- Seal any gap where the wall and fireplace meet with silicone caulk.
- If fireplace is not and will not be in use, install permanent cover over fireplace and install metal cap over chimney.

## **8. INCREMENTAL BLOWER DOOR TEST**

After all measures have been performed as prescribed in the Work Order, including any change orders,

- Crew leader/private contractor must perform an incremental blower door test to obtain the cfm leakage at this point.
- If the cfm leakage has not met the target air infiltration reduction guideline, identify additional leakage sites and proceed as necessary.

#### *Step 4: Duct Insulation/General Heat Waste*

##### **1. Duct Insulation**

- Insulate all duct work located in non-conditioned areas using approved materials.

##### **2. Water Heater Insulation**

- Visually inspect the heater for obvious defects and their conditions that require repairs as described in Energy Systems.
- Install an approved water heater jacket on all water heaters as applicable.
- Bind jackets with 3 straps and adhesive tape rated for that application.
- Double wrap tape seams (no duct tape).
- Install foam pipe sleeve insulation on the first five (5) feet of the hot and cold-water pipes exiting the heater.
- Secure seams with adhesive tape rated for that application (no duct tape).

#### *Step 5: Attics/Ceilings*

##### **1. General Requirement**

The crew leader or private contractor is responsible for performing the following treatments as prescribed by the work order and according to the Material specifications and Installation Standards Chapter of this manual. A blower door pressurization test must be performed to seal air flow bypasses before insulation is installed. A blower door depressurization test must be performed after the entire treatment has been performed.

##### **2. Roof Leaks**

All houses and mobile homes

- Confirm location of roof leaks and repair accordingly.
- Use safety precautions on steep roofs.
- Do not walk on mobile home roofs; walk boards should be used.

##### **3. Blower Door Pressurization Test**

If separate crew is installing insulation,

- Verify that all attic bypasses have been addressed prior to installing insulation.

##### **4. Attic Ventilation**

Houses only

- All necessary holes for the entire attic ventilation system should have been cut out prior to addressing attic bypasses.
- Install all necessary components.

##### **5. Blocking**

All houses and mobile homes

- Block around all heat producing devices as prescribed by the Work Order.
- Block around insulation for proper ventilation as prescribed by the Work Order.

## 6. Install Insulation

### Houses

- Deliver insulation to the attic through an exterior opening (access door, gable, or roof vent), if possible.
- Wear protective clothing including a respirator and goggles during installation.
- Install blocking for heat producing devices.
- Install depth markers
- Install junction box covers
- Install marker flags (for junction boxes, electrical connections, can lights, etc.).
- Install insulation according to the Work Order.
- Inspect blocking of heat producing devices and ventilation baffles before leaving attic and correct as needed.
- Install insulation certificate

### Mobile homes (loose fill insulation exterior application edge method)

- Install blocking around furnace flue and all other heat producing devices.
- Remove gutter and trim, in 8-foot sections at a time.
- Prop up metal roof with 2" X 6" blocks.
- Insert blowing hose or a fill tube to the opposite side.
- Insulate cavity and remove hose slowly while filling the entire cavity.
- Inspect blocking around heat producing devices.
- Reattach metal roof, sections of gutter and trim as each 8-foot section is insulated.
- Clean area.

### Mobile homes (loose fill insulation interior application)

- Remove ceiling in furnace closet, if applicable, install blocking around exhaust flue a minimum of 3" and reinstall ceiling.
- Measure from each exterior wall and strike minimum of 2 lines equally spaced from one end of the mobile home to the other.
- Install a plastic drop cloth over furniture.
- Drill 2" holes, 24" apart.
- Insulate cavities.
- Install plastic plugs (caulk with clear silicone, if necessary).
- Remove drop cloth and clean area.

## 7. Attic Access

**Required:** All houses must have a permanent attic access door installed per the Kentucky Weatherization Field Guide and Standard Work Specifications in either the interior or the exterior of the home if one does not already exist. Minimum opening size is nominal 16" x 24" for horizontal surface and nominal 16" x 36" for vertical surface.

- Install all permanent horizontal and vertical access ways according to the Work Order.
- Insulate and weather-strip according to the Work Order and KY WX Field Guide/Standard Work Specifications.
- Exterior access doors must be hinged and have a lockable hasp installed

## 8. Blower Door Depressurization Test

### All houses and mobile homes

- Install the blower door and depressurize the house.
- Document all applicable information on the Work Order and sign on the appropriate line.

## *Step 6: Walls*

### **1. General Requirement**

Crew Leaders and private contractors shall be responsible for performing all repairs as listed on the Work Order before installing sidewall insulation. Wall insulation materials shall only be installed in walls between conditioned and unconditioned areas.

### **2. Incidental Repairs**

All dwellings

- Repair all moisture related problems as described on the Work order.
- Repair interior or exterior wall surfaces as described on the Work Order.

### **3. Blocking of Heat Producing Devices**

All dwellings

- Locate and block around all heat producing devices and repair as listed on the Work Order.
- If a heat producing device has been added since the evaluation, do not fill that cavity until blocking has been provided.

### **4. Dwelling Preparation**

Houses only

- Remove siding if needed.
- Locate and mark all cavities that will require caution when drilling, (exterior side); i.e. all electrical outlets, fuse or breaker boxes, etc.
- Drill 1" or 2" holes for cellulose insulation.
- Drill 2" holes for loose fill mineral fiber or when a fill tube method will be used.

### **5. Installation Methods**

Multiple hole installation

- Drill holes as prescribed by the Work Order.
- Install insulation.
- Install plugs flush with the surface.
- Clean up area.

Balloon frame application

- Insert hose or fill tube from the attic and fill each cavity.
- Exterior or interior drilling will be needed for cavities that have blockage.
- Install plugs, painted to match existing surfaces.
- Clean up area.

Fill tube application (houses)

- Remove siding if needed.
- Locate cavities and drill a 2" hole at the top or bottom of each cavity.
- Insert a non-electric conductive tube and install insulation.
- If blockage exists, drill additional holes as needed.
- Install plugs.
- Clean up area.
- Fill tube method can also be used when insulating from the living area side.

Fill tube application (mobile homes)

- Re-nail and tighten interior surface as prescribed on the Work Order.
- Remove exterior trim and J-channel at the floor level (exterior).
- Remove screws from siding, six feet at a time, from floor level up to 2 feet.

- Insert fill tube and insulate.
- Reinstall screws, J-channel and trim per section.

Flexible (houses)

- Dress accordingly; long sleeves, gloves, hat, mask, and goggles.
- Install batts with no voids.
- Neatly cut out areas for outlets, receptacles, etc.
- Follow installation guidelines around water pipes.
- In a conditioned basement, neatly cut to pressure fit at the band joist area.
- Follow manufacturer installation guidelines.

Flexible (mobile homes)

- Follow same instructions for siding removal for loose fill.
- Place the batt on a nonconductive flexible surface with a piece of vapor retarder (4 mil plastic toward the inside) and slowly push the batt to the top of the wall. (Vinyl-faced insulation may be used in place of the 4-mil plastic.)
- Rigid foam board, cut to fit.
- Install with no voids.
- Install with a friction fit.

**6. Incremental Blower Door Test**

Perform a blower door depressurization test.

- Document results on the Work Order.

*Step 7: Floors/Foundations*

**1. General Requirement**

Crews and private contracts shall be responsible for adhering to the material and installation standards as described on the Work Order, KWFG and Standard Work Specifications

**2. Moisture Problems**

Check the foundation area for excessive moisture.

- If excessive moisture exists, contact the evaluator/energy auditor for instructions.

**3. Incidental Repairs**

Perform any repairs needed as prescribed on the Work Order.

**4. Floor Insulation, Foundation, Ventilation, and Pipe Insulation**

Flexible insulation

- Repair all moisture related problems before installing insulation as prescribed on the Work Order.
- Install a ground cover, if applicable, and foundation ventilation.
- Install insulation (perimeter or under floor insulation) and new belly board, if applicable.
- Install pipe insulation as prescribed.
- Install a crawlspace door with lockable hasp, if applicable.

Loose fill insulation

- Repair all moisture related problems.
- Install a ground cover and foundation ventilation, if applicable.
- Repair existing belly board as prescribed on the Work Order.
- Install insulation and check for leakage into HVAC ducts periodically.
- Install water pipe insulation, if pipes are exposed.
- Install or repair the crawlspace door as prescribed on the Work Order.

**5. Incremental Blower Door Test**

Perform a blower door depressurization test.

- Document results on the Work Order.

### *Step 8: Worst-Case Scenario*

Perform worst case scenario/CAZ testing at the end of each work day when applicable. (Refer to Kentucky Weatherization Field Guide and Standard Work Specifications, and Chapter 7 of This manual)

## **Chapter 9: Post-Inspection/Quality Control Inspection Procedures**

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### **Introduction and Overview**

Signing off on the post inspection/quality control inspection is the most important task an evaluator performs.

By affixing their signature to the Completed Dwelling Report, (WX 710), the Evaluator/Quality Control Inspector is putting his/her professional reputation on the line. He/she is attesting to the quality and completeness of the work that was done, and in doing so is stating that he/she has personally inspected all work, performed all test-out procedures, and is guaranteeing the finished project meets all standards.

There are ramifications beyond the repairs and measures that include the safety of the family that has been served.

### **Post Inspection/Quality Control Inspection Elements**

- Is completed and accurate NEAT/MHEA audit or other WX sanctioned audit software reports in the client file?
  - Do the work measures performed on the home agree with the recommended measures of the audit?
- Were mold protocols properly addressed and followed if applicable?
  - Verify that the client has received the mold pamphlet and signed the mold signature form.
  - Visually confirm that mold is not present above the accepted WX threshold.
- Were Section 106/ State Historic Preservation Offices, (SHPO's) protocols properly addressed?
  - Verify the Section 106 form was properly filled out and signed.
- Were lead-based paint protocols properly addressed?
  - Verify that EPA's lead pamphlet "Renovate Right" has been given to the client and that the signature page verifying client's receipt of the pamphlet has been signed and is in the file.
  - Verify that documentation exists to prove that the age of the home was determined AND, if it was built before 1978, verify that DOE and EPA regulations/protocols, (LSW and RRP respectively) were followed. Verify that appropriate documentation is in the file. If applicable, include test kits used with required documentation, pictures, forms, etc.



- Site conditions in general:
  - Any site conditions that would have prevented WX work should have been identified during the pre-inspection. If any conditions were missed, they should be recognized and reported to the client and other appropriate parties via written documentation in the post inspection/quality control inspection. See Sec. 5.11.
- Energy Systems:
  - All heating units are retested as part of the post inspection/quality control inspection. This step ensures there have been no adverse effects on appliances as a result of weatherization.
  - Dwelling Needs Evaluators/Energy Auditors are required to post inspect/quality control inspect and test all units that have had work performed on them before any other WX work is performed.
  - Were worst case scenario/back drafting tests performed?
    - This test uses the home's air handler, exhaust fans, and chimneys/vents to create worst-case depressurization in the combustion appliance zone, (CAZ). This test is required at the time of the post inspection/quality control inspection on all homes that have combustion appliances. Refer to the current approved WX Field Guide.
  - When performing a heat system inspection on any system with ducted airflow, a duct blaster must be used. Initial and final leakage measurements must be recorded.

**General:** Were any allowable work measures needed on the home that should be evaluated for WX that were not evaluated or not included in the work write up/NEAT MHEA audit?

### **9.1** *General Requirements*

All dwellings receiving any weatherization measures shall have a complete and thorough post inspection/quality control inspection performed in accordance with all standards contained in this manual. Post inspections/quality control inspections shall only be performed after the work has been completed. A dwelling can only be reported as complete after it has received and passed a post inspection/quality control inspection.

All energy systems safety tests, CAZ testing and a blower door test shall be performed on all dwellings as applicable.

Digital and infrared pictures must be taken of all areas of the home, from both exterior and interior locations, where weatherization work was performed. These pictures must be printed out and retained in the client job file or stored electronically in a secure and readily accessible location.

Certificates of Insulation for each job where insulation was installed in any part of the home must be completed per the requirements of KHC Program Notice 02-2013 and 16 CFR, Part 460, Section 460.17. One completed copy must be given to the client with proof of delivery to the client and one copy must be retained in the client file.

If the Inspector/Quality Control Inspector identifies measures that were performed in an unacceptable manner, it is the inspector's responsibility to prepare a list of deficiencies for the crew or private contractor. After the deficiencies have been corrected, the inspector shall perform another inspection of those measures. If the measures are still unacceptable, the inspector, his direct supervisor, and the crew leader or private contractor, should meet and discuss the problems and then proceed as necessary.

If a post-inspector/Quality Control Inspector encounters obstructions/debris in any interior/exterior part of the home that would impede the post-inspection/quality control inspection process, the client must be asked to arrange for the removal of said obstructions/debris from the affected area(s) before performing the post-inspection/quality control inspection process.

### *General Restrictions on Activities*

Please refer to [section 5.1](#) of this manual.

## **9.2 Personnel Qualification Requirements**

All staff assigned post inspection/quality control inspection activities as any portion of their job duties must successfully complete the training requirements set forth in the state plan and Chapter 7, Section 7.1 of this manual and other training as required by KHC. KHC reserves the right to exclude from this process Inspectors who do not demonstrate, after extensive training, an ability to perform acceptable post inspections/quality control inspections in accordance with program requirements. Participation in and the successful completion of advanced, refresher and other related training courses as required by KHC is mandatory to remain qualified to perform post inspections/quality control inspections.

## **9.3 Tools and Equipment Requirements**

An inspector/Quality Control Inspector must be equipped with the following tools and equipment:

- Blower door assembly
  - Digital manometer
  - Plastic and tape
  - Respirator, goggles, gloves (PPE)
  - 6' step ladder, 16' to 30' extension ladders
  - Required energy system diagnostic equipment (i.e. gas leak detector, CO detector, draft gauge)
  - Walk boards
  - Rigid board
  - Pressure pan
  - Duct tester system
  - Circular saw
  - Reciprocating saw
  - Electric and cordless drills with bits
  - Assorted hand tools
  - Measuring tape
  - Utility knife
  - Tin snips
  - Grounded extension cord
  - GFCI cord
  - Shop vacuum
  - Coveralls and gloves
  - Fire extinguisher
  - Safety ropes
  - First aid kit
  - Flashlight
  - Blocking materials
  - Infrared camera
  - Flow hood
  - Smoke Generator
- Digital Camera with computer interface/download capabilities

## **9.4 Post Inspection/Quality Control Inspection Process**

### *Step 1: Client Education*

#### **1. Advance Notification**

Make an appointment with the client.

The family member who made application and signed all subsequent forms must be present during the post-inspection/quality control inspection to:

- Receive additional education relative to weatherization measures, warranties, etc.
  - Sign acceptance statement.
  - Assist in case of injury to Inspector/quality control inspector.
- 2. Arrival at Site**
- Give a courteous introduction.
  - Establish a good working relationship.
  - Explain the post-inspection process.
    - Must inspect all measures as prescribed by the Work Order to ensure correct installation and proper operation.
    - Must perform all applicable energy systems safety tests and a blower door test.
  - Explain the measures that were performed and answer questions and give advice on proper care and operation of applicable measures.
  - Observe energy conservation behaviors.
    - Thermostat setting.
    - Unvented space heater usage.
    - Window shades.
    - Clothing.
    - Use of lights or appliances.
    - Encourage/reinforce behavior that will conserve energy.
- 3. Blower Door Test Interpretation**
- After completing the blower door test, explain results to client.
- 4. Exit Interview**
- Ask the client about the performance of installed measures.
  - Ask about any problems experienced with the crew or private contractor regarding attitudes or behavior.
    - If problems are identified, take corrective actions as necessary in accordance with the service provider personnel policies.
  - Share any additional information concerning measures performed and obtain the required signatures on the post-inspection/quality control inspection form.

## *Step 2: Energy Systems and Other Health and Safety Measures*

### **1. General Requirement**

Energy systems AND electrical-related Health and Safety work measures must be inspected prior to any weatherization measures being provided

Specific post inspection/quality control inspection checks must be performed depending on the type of energy systems and fuel. It is the responsibility of the Inspector/quality control inspector to ensure that the dwelling energy systems have been repaired and present no further health and safety problems and to certify that the weatherization process can continue. Post inspectors/Quality Control Inspectors should utilize the respective energy systems checklist to document post-inspection/quality control inspection testing of the energy system.

The inspector/Quality Control Inspector must check all individual measures listed on the Work Order and ensure that they were performed in accordance with acceptable material and installation standards.

### **2. Fuel Leaks**

### **Natural gas and propane**

- Using a combustible gas detector sweep all lines, connections and fittings to ensure no leakage is occurring.
- If leakage is detected, immediately arrange for repairs.

### **Oil**

- Visually inspect the entire oil delivery system for signs of leakage.
- If leakage is detected, immediately arrange for repairs.

### **3. Electrical Inspection**

Visually check all wiring associated with the heating system(s).

- Verify that there are no loose, frayed or disconnected wires.
- If defects are identified, immediately arrange for repairs.

### **4. Carbon Monoxide Testing of the Ambient Air**

Activate all combustion appliances

- Using a CO analyzer, sweep air registers and appliances for the presence of CO in the ambient air.
- If CO is detected, identify the source and arrange for immediate repairs.

### **5. Draft Test**

All combustion appliances

- Perform draft test
- If draft is not correct, determine the reason and arrange for repairs.

### **6. Dropout Safety Valve Test**

All applicable appliances

- Perform drop-out safety valve test.
- If the drop-out feature does not work, arrange for immediate replacement of gas valve.

### **7. Back-Drafting Test**

All combustion appliances

- Perform back-drafting test.
- If back-drafting occurs, identify the reason and arrange for repairs.

### **8. Mechanical Ventilation Exhaust Venting, Combustible Air Intake, Combustible Surfaces Clearances, and Duct Systems**

Visually inspect all work for completeness and adherence to this manual and applicable codes.

#### **New Mechanical Ventilation Systems Installed:**

Use a flow hood and digital manometer to measure actual cfm fan flow rate of each new mechanical ventilation system installed. Record all actual measured readings, and then add up each reading from the new mechanical ventilation equipment installed to verify that the total equals or exceeds the final adjusted fan flow mechanical cfm required for the home as determined by ASHRAE 62.2-2016 (or current version in force). Adjust as needed to obtain required mechanical ventilation rate. Retain the recorded readings document in client file.

Visually inspect all newly installed mechanical ventilation systems to ensure all equipment components were installed and that installation configurations, including attached ducting, grilles, etc. conform to the requirements of ASHRAE 62.2 standards. Provide client with operating/maintenance instructions for equipment and obtain proof of delivery document to be retained in client file.

If any work is not acceptable:

- Prepare list of all deficiencies.
- Arrange for RE-WORK.

**9. Client Education Requirements**

- Clearly explain all alterations, repairs and additions.
- Clearly explain removal and/or replacement of unvented, dangerous, or inoperable units.
- Obtain signed statements as required by state or service provider policies.
- Carefully explain the operation and maintenance of new energy systems devices of any kind.
- Provide client with owner's manuals, written operating and maintenance instructions and obtain a signed proof of delivery of these documents to be retained in client file.

**10. Manufacturer Information and Guarantee**

- Client should receive all information and guarantees on all equipment or parts that were installed. Client should be informed of one (1) year contractor labor warranty. Retain a copy of all such documents. Obtain proof these documents were delivered to the client and retain proof of delivery document in the client file.

*Step 3: Infiltration*

**1. General Requirement**

It shall be the responsibility of the inspector to ensure:

- Completeness of work performed.
- Work was performed as prioritized on Work Order.
- Material specifications and installation standards were followed.

**2. Post Inspection/Quality Control Inspection Blower Door Test**

- Perform 50 pascal depressurization
- Check quality and completeness of infiltration reduction treatments.
  - Refer to Blower Door Pressure Diagnostic Techniques.
- Compare reading with DNE blower door reading and with final work reading.
  - Post inspection/quality control inspection reading should be comparable to final work reading (within a range of (+) or (-) 200cfm)
- Conduct Zone Pressure Diagnostic testing per the KY WX Field Guide and Standard Work Specifications.

**3. Post Inspection/Quality Control Inspection Readings Below 2,000 cfm at 50 PA**

All dwellings with combustion appliances

- Shall be tested for potential back-drafting or spillage caused by exhaust device operation. See Step 8 of this chapter.
- See Blower Door Technical Reference chapter,
- Back-drafting/spillage potential test. See Step 8 of this chapter.
- Forced air distribution systems shall be tested for excessive room pressures caused by imbalanced supply and return duct systems.
- See Blower Door Technical Reference Chapter, and
- Pressure balance test procedures.

**4. Ceiling, Walls, and Floor Repairs**

Check for:

- Correct material.

- Correct installation.
  - Completeness of work.
  - Quality of work.
- 5. Glass Replacement**  
Check for:
- Correct material.
  - Correct installation.
  - Completeness of work.
  - Quality of work.
- 6. Window and Door Repair/Replacement**  
Check for:
- Correct material.
  - Correct installation.
  - Completeness of repair.
  - Quality of work.
- 7. Caulking and Weather-Stripping**  
Check for:
- Correct material.
  - Correct installation.
  - Completeness of repair.
  - Quality (neatness) of repair.

#### *Step 4: Duct Insulation/General Heat Waste*

##### **General Requirement**

It shall be the responsibility of the Inspector/Quality Control Inspector to ensure that all duct insulation, all water heater jackets, and all other measures listed in this component were installed correctly.

#### *Step 5: Attics/Ceiling*

##### **1. General Requirement**

All attics shall be visually inspected on all dwellings. All attic areas must be entered and inspected to ensure that all measures described on the Work Order were performed in accordance with the Material and Installation Standards manual. **REQUIRED:** Use thermal camera to scan entire attic/ceiling area of home to verify existence or non-existence of new attic insulation installed. Save images of thermal scans electronically or print out and retain in client's job file

##### **2. Loose Fill**

All dwellings

- Inspect for correct blocking procedures around all heat producing devices, combustion air grilles, chutes for soffit vents and other miscellaneous devices.
- Determine if bypasses have been identified correctly and sealed accordingly.

##### **3. Flexible**

All dwellings

- Inspect for correct blocking procedures around heat producing devices.
- Inspect for proper fasteners to insure adherence.

- Verify that insulation that cannot be seen was purchased by, examining purchase orders and invoices.
- 4. Rigid Board**
    - Inspect for a friction fit.
    - Confirm thermal and fire rating.
    - Verify that insulation that cannot be seen was purchased.
      - Examine purchase orders and invoices.
  - 5. Roof Leaks**
    - Visually inspect all repaired areas.
    - Determine if repairs will stop leaks.
    - Rooftop inspections are required when rooftop measures are performed.
      - Chimney repair, new roofing materials, etc.
    - Interview the client regarding leaks.
      - Determine if leaks have been repaired.
  - 6. Ventilation**
    - Determine if the correct amount of net free ventilation was evaluated and installed.
    - Determine if the vents have been placed in the correct position.
    - Determine if the vents were installed correctly.
  - 7. Attic Bypasses**

Pressurize the dwelling and while inside each attic area determine if all bypasses were sealed.

### *Step 6: Walls*

- 1. General Requirement**
  - a. It shall be the responsibility of the Inspector/quality control inspector to ensure that all materials prescribed by the Work Order have been installed in compliance with material and installation standards. It is recommended that all insulation measures that will not be visible after completion receive an On-site, in-progress inspection to ensure quality and completeness standards. **REQUIRED:** Use a thermal camera to scan entire applicable wall areas of home to verify existence or non-existence of new wall insulation installed in all exterior walls and/or walls following the thermal boundary of the home. Save images of thermal scans made electronically or print out and retain in client's job file.
- 2. Loose Fill**
  - Inspect for correct dwelling evaluation procedures.
  - Validate blocking.
    - In-progress inspection recommended.
  - Remove at least 10 percent of the total plugs.
    - Determine the existence and density of insulation.
    - Reinstall plugs.
- 3. Flexible**
  - Determine if the insulation has been installed correctly, if visible.
  - If the insulation will not be visible after installation, arrange for an in-progress inspection.
  - If an in-progress inspection could not be performed, confirm expenditures by examining invoices.
- 4. Rigid Board**

- Verify that the material has a fireproof covering for interior application.
- Perform in-progress inspections, if applicable
- If an in-progress inspection could not be performed, confirm expenditures by examining invoices.

### *Step 7: Floors/Foundations*

#### **1. General Requirement**

It shall be the responsibility of the Inspector/quality control inspector to make a complete visual inspection of the entire accessible crawlspace area. The inspector/quality control inspector shall determine if all measures prescribed by the Work Order have been correctly performed according to material and installation standards. The inspector/Quality Control Inspector shall also confirm the quantity of materials used.

#### **2. Floor Insulation**

- Determine if the correct materials have been used.
- Determine if the insulation has been installed correctly.
- Mobile homes
  - Remove loose fill patches in at least 5 different locations throughout the belly board and determine the coverage of insulation.

#### **3. Pipe Insulation**

- Determine if the correct type and size pipe wrap was used.
- Determine if the installation meets standards.

#### **4. Foundation Ventilation**

- Determine the correct amount of venting needed for the dwelling.
- Confirm that the amount of venting installed is adequate and meets material and installation standards.

#### **5. Crawlspace Door**

- Determine if the door meets material and installation standards.
- Determine if the door is free from obstructions and will operate freely.

#### **6. Skirting**

Metal or vinyl

- Determine if the material meets specifications.
- Determine if the installation is plumb and square.
- Determine if the correct fasteners were used.
- Determine if an adequate access way has been provided.

### *Step 8: Worst-Case Scenario*

Perform worst case scenario/CAZ testing during the post inspection/quality control inspection when applicable. (Refer to Kentucky Weatherization Field Guide and Standard Work Specifications, and Chapter 7 of This manual.) Documentation to prove the test was performed must be included in the client file.

### *Step 9: Baseload Measures*

It shall be the responsibility of the inspector/Quality Control Inspector to ensure that all measures performed in the base loads section of the Work Order meet all material and installation standards.



Inspect and test per program requirements as applicable all new appliances installed to verify the installation meets applicable codes and other requirements and is operating within manufacturers specifications.

Provide client with all owner's manuals, maintenance and operation instructions, and obtain a signed proof of delivery of these documents to be retained in the client file.

## **9.5 Quality Control Inspector**

### **Overview**

A Quality Control Inspector is a residential energy efficiency professional who ensures the completion, appropriateness, and quality of energy upgrade work by conducting a methodological audit/inspection of the building, performing safety and diagnostic tests, and observing the work.

In addition, a Quality Control Inspector is an evaluator who verifies the work performed against the work plan, specifications and standards, performs building diagnostics, records/reports findings and concerns, and specifies corrective actions to ensure the completion, appropriateness and quality of the work providing for the safety, comfort, and energy savings of the building occupants.

**Required Qualifications/Certification:** To Become a Quality Control Inspector, a National standardized written test and a field test must be completed successfully. In addition, a minimum amount of

continuing professional education must be completed each year as determined by BPI and the Department of Energy, Weatherization Assistance Program.

For more information regarding Quality Control Inspector requirements and responsibilities please refer to the Building Performance Institute Quality Control Inspector Certification Scheme Handbook.

## **Chapter 10: Baseload Measures**

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### **10.1 General Overview**

A baseload measure is a retrofit, repair, or modification which is intended to conserve energy usage not associated with heating or cooling. Baseload measures can potentially be applied to all homes and are reliable energy savers.

### **10.2 Appropriateness and Justification**

Homes that are in a state of advanced deterioration will be less likely to benefit from baseload measures in that their basic repair needs will often cost up to or beyond the state mandated "cap" per job. For all other homes, baseload measures can deliver verifiable and sustained energy savings. Therefore, baseload measures shall be routinely considered as part of the initial home evaluation/energy audit and applied as necessary.

Justification for baseload measures and their prioritization within an individual project are built into the audit procedures contained in NEAT/MHEA. They are further described in detail in the “KENTUCKY WEATHERIZATION FIELD GUIDE” Section 2.4, and Standard Work Specifications. The audit is designed to assign a Savings to Investment Ratio (SIR) to each baseload measure, ranking it among all measures in terms of energy savings.

### **10.3 Typical Baseload Measures**

Typical baseload measures fall under one of the following categories:

- 1. Water heating and temperature management.** Repairs under this category include water heater wraps, pipe insulation, low-flow showerheads, and adjusting water heater temperature to approximately 120 degrees °F.
- 2. Refrigeration assessment and replacement.** Metering with an approved metering instrument new notice: all units considered for replacement must be metered are required to determine the efficiency of a refrigerator. Units manufactured on or after 1993 do not require metering. Units must be metered a minimum of 2 hours. Those units that fail to meet the minimal standards of efficiency are candidates for replacement. In many cases, the NEAT/MHEA audit can identify inefficient units in its onboard database.
- 3. Units to be replaced shall be taken to a facility, licensed to reclaim refrigerant.** Written documentation to prove the refrigerator was properly disposed of per EPA requirements is required. No refrigerator taken out of service shall be sold or returned to service.
- 4. Refrigerator Replacement units** shall conform to program standards. See Sec 5.7 Adjustment of temperature settings and cleaning coils are also baseload measures.
- 5. Lighting assessment and replacement.** Lighting shall be evaluated using the NEAT/MHEA audit. Replacements shall be in accordance to its recommendations. In instances where a local program is partnered with another funding source (such as a utility company) the replacement protocols in place will be sufficient to meet program standards.
- 6. Servicing clothes dryers.** Clothes dryers shall be serviced in accordance to the KWFG.

## **Chapter 11: Energy Systems Policies**

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### **11.1 Qualified Personnel**

All energy systems inspections and analyses shall be conducted by persons who have satisfactorily completed training courses mandated by Kentucky Housing Corporation. KHC reserves the right to exclude inspectors who fail to demonstrate adequate ability based on training reviews and field performance. Further, KHC may require that heat system inspectors/energy auditors receive specialized training in selective areas when such training proves necessary.

## **11.2 Inspections**

All dwellings shall receive a comprehensive heat system(s) inspection performed by an inspector/energy auditor who meets the qualifications set forth by KHC.

The heat system inspection shall include, but is not limited to, its description in the Dwelling Needs Evaluation/Energy Audit chapter of the WXP. The purpose of the heat system inspection is to verify the safety of the dwelling heating equipment.

Replacement of equipment, repairs, and other modifications to heat systems shall be done according to established industry methods. Adherence to applicable codes is mandatory.

## **11.3 Life Threatening Situations**

If a life-threatening situation is identified, steps shall be taken immediately to rectify the problem. A contractor or qualified in-house service person shall be made aware to give it priority status.

The following situations shall be considered life threatening:

- Significant fuel leaks.
- Carbon monoxide levels that exceed limits herein described. (see Section 11.5 of this Chapter)
- Electrical malfunctions posing immediate danger to occupants or technicians.
- Back-drafting of any heating equipment.

## **11.4 Combustible Fuel Leaks**

Fuel leaks associated with natural gas and propane must be repaired as quickly as possible. Depending on the severity of the leak(s), it may be necessary to vacate the occupants from the premises and shut off the fuel at its source. If the occupants will not cooperate, contact the vendor to shut off the fuel. In situations where the leakage can be repaired safely, arrange for a qualified contractor or in-house service person to do so immediately.

## **11.5 Addressing Carbon Monoxide Presence/Carbon Monoxide Detectors**

All dwellings that contain combustion equipment shall receive a quality carbon monoxide detector(s) and be inspected for the presence of Carbon Monoxide (CO). Any concentration of CO greater than 0 ppm in the ambient or supply air is an indication of potential malfunction that must be identified and repaired immediately. Arrange for the repair from a qualified contractor or in-house service person.

**Cooking Equipment:** Carbon monoxide levels below 25 ppm as measured per individual burner and 200 ppm air-free in the oven exhaust are acceptable when tested in compliance to established work procedures.

Some cooking equipment can be functioning while producing excessive amounts of CO. If conditions cannot be repaired within the scope of the cooking equipment evaluation procedures, inform the client that services cannot be rendered until the conditions are corrected. In situations where there is no way to rectify the CO problem discontinue work, install a CO detector, advise the client to keep the area ventilated and report the problem to KHC. The Weatherization Assistance Program is not responsible for the replacement or maintenance of cooking equipment.

## 11.6 Unvented Heating Equipment

No dwelling using unvented combustion heating equipment as a primary heating source shall be weatherized until all such equipment is removed or disabled and replaced with a code-compliant vented combustion appliance to function as the primary heating source if funding/cost limitations will allow it.

Obtain a signed statement from the client documenting that they have been informed of the dangers of using unvented heating equipment in the home.

Heating appliances equipped with Oxygen Depletion Switches (ODS) and commonly known as **ventless** shall be acceptable where they provide secondary heat only.

## 11.7 Definition of Heating System

A heating system is the equipment by which energy is used to condition air for warmth or produce heat for hot water and cooking. The components of any combustion heating equipment shall include a device such as a furnace, space heater or water heater, its electrical and fuel supply, venting, and distribution system.

Electrical heating systems include a heat producing device such as a furnace, space heater, or water heater, power supply, and distribution system.

### Primary Heating System

A qualified inspector/energy auditor shall determine the primary heating system of a dwelling. The primary heating system shall be inspected for safety prior to weatherizing the dwelling. Generally, the primary heating system is the equipment that uses the most energy in the conditioning of air for warmth.

### Secondary Heating System

A qualified evaluator/energy auditor shall determine the secondary heating system of a dwelling. The secondary heating system(s) shall be inspected for safety prior to weatherizing the dwelling. Generally, the secondary heating system is that equipment which is used for warmth but is supplemental to another system with more capacity.

Water heating equipment, and to some extent, cooking equipment, can also be thought of as secondary heating systems and must be inspected and repaired in accordance with program standards.

## 11.8 Heating System Requirements and Treatments

**General:** All dwellings to be weatherized must have a safe, operable heating system or combination of heating equipment that is a fixed and permanent system.

### 1. Definition of a fixed and permanent heating system:

A fixed and permanent heating system is one that includes at least **one** or **more** of the following characteristics:

- It is permanently wired into the home's electrical circuit wiring system
- It is attached to one or more components of the home building envelope
- It is attached to and receives its fuel from a fuel line/piping delivery system

- It is connected to a code compliant masonry chimney or factory built metal chimney/flu system used to vent combustion byproducts outside of the home's building envelope
- It is connected to a supply and return ducting system used to distribute conditioned air throughout the occupiable interior space of the building envelope.

Any heating system that does not possess at least one of the above characteristics will not be treated as a fixed and permanent heating system.

**Examples of a fixed and permanent heating system:**

- Electric, gas, propane, oil and heat pump/split system furnaces connected to the home electrical circuit wiring system, and connected to supply and return ductwork, and, if required, connected to a code compliant masonry or factory built metal chimney/flu system
- Electric baseboard space heaters affixed to the wall of the interior building envelope of the home and permanently wired into the home electrical circuit wiring system
- Natural gas, propane, oil, wood, and coal vented space heaters connected to a code-compliant masonry chimney or factory built metal chimney/flu system.

**Note:** Weatherization services are strictly prohibited on a home that does not have a permanent and fixed heating system as its primary heating source as defined above and has passed a DNE health and safety inspection/Quality Control Inspection.

**2. Policy for primary heating systems that are not permanent and fixed:**

No dwelling may receive weatherization services if the home does not have a fixed and permanent heat system/source as their primary source of heat.

Examples of heating sources/systems that are not considered fixed and permanent include but are not limited to: portable, stand-alone electric space heaters and portable, stand-alone kerosene space heaters.

If the dwelling does not have a fixed and permanent heating system, a determination must be made by the Dwelling Needs Evaluator/Energy Auditor as to whether a fixed and permanent heating system can be installed in the client's home per WX Program protocols and requirements. If it is determined that a fixed and permanent heating system can be installed, installation should be performed. All work must pass a post inspection/quality control inspection before any further weatherization work is performed. If it is determined that a fixed and permanent heating system cannot be installed, the job must be treated as a deferral/walk-away. All dwellings that use any kind of unvented combustion heating equipment refer to Section 11.6.

- For dwellings with an inoperable heating system, repair the existing system if practical. If the cost of repairing the inoperable system exceeds 75 percent of the cost of a replacement unit of equivalent capacity, replace the unit.
- For dwellings without an existing manufactured heating system utilizing unvented space heaters, treat unvented space heaters as described in section 11.6 of this section. Install a vented heating system of adequate capacity to heat the dwelling. This heating system can be a forced air furnace with ductwork, or a combination of vented space heaters.

- For dwellings with operable primary heating systems but with no fuel source, do not weatherize until the fuel source is restored and the system is inspected and treated according to program requirements.
- Replacement of heating equipment shall be equivalent to existing systems regarding capacity. See Sec. 5.3. Supplemental equipment is not allowed.

## **11.9 Issues Concerning Fuel and KHC Policy**

### **Acquiring Fuel**

*The acquisition of fuel is not permissible with weatherization funds. Deposits, delivery charges, and other expenses concerned with the purchase of fuel are also prohibited. The purchase of LP tanks is prohibited.*

### **Supply Lines**

The weatherization program allows for the purchase of supply lines and other delivery system components from the meter or tank to the point of connection to an approved heating system. However, the following restrictions apply:

#### **Natural Gas and Propane**

The meter is the property of the fuel vendor. Work is allowed from the house side of the meter only unless local community standards dictate otherwise.

Tanks are the property of the vendor or the owner. Work is allowed from the connection at the second stage regulator tank to the heating unit only.

#### **Oil Systems**

The tank, although the property of the vendor or occupant, may be inspected for leakage and water accumulation. A tank which is defective because it is leaking fuel is the responsibility of the vendor or occupant. Excessive water found in a tank must be drained away and, if necessary, sufficient fuel made available to perform an energy system evaluation prior to the dwelling receiving additional services.

Work is permissible from the tank to the connection(s) of the heating unit(s) only.

#### **Electric Systems**

Work may only be performed from the service panel (including breakers and conductors) or breaker box to the circuitry of the dwelling or to the heating/cooling equipment. Exterior hardware such as meters, weather heads, and conduit are the responsibility of the client or vendor.

#### **Private Wells**

All piping, pumps, regulators, etc. used in the delivery of cost-free fuel from a private well or other source and located outside the dwelling is the responsibility of the owner. The weatherization program will only replace or repair fuel line components from the point of entry into the dwelling to its connection with approved heating equipment.

#### **Changing Fuel Sources**

It is possible to change the fuel source of a dwelling provided there is an economic or circumstantial justification. It is required that KHC staff be contacted beforehand for prior approval. Agencies must complete and submit a WX 910 form with documentation and justification for approval.

### ***11.10 Solid Fuel Systems – Primary and Secondary Units***

- All devices that utilize solid fuel shall be inspected for safety by a qualified inspector/energy auditor
- A solid fuel system of any kind shall include a stove, its venting components, and any protective or shielding materials necessary to have an approved system.
- All dwellings that utilize solid fuel shall be equipped with a fresh air inlet in situations where a blower door reading indicates 2000 cfm or less.

Solid fuel systems in mobile homes

- Existing units which have been deemed acceptable by a qualified evaluator/energy auditor can be improved regarding venting, clearances and repairs. See Sec. 5.4.
- A replacement unit must be an approved model for use in a mobile home. See Sec. 5.4.

### ***11.11 Chimneys***

Masonry chimneys which are in use at a dwelling must be inspected for safety and adequacy by a qualified evaluator/energy auditor. Those masonry chimneys that do not meet the applicable codes must be fitted with an approved liner kit if the chimney is to remain in use.

Factory built chimneys are acceptable provided they are installed per manufacturer instructions.

### ***11.12 Water Heater Replacements***

Replacement of water heating equipment is permissible if any of the criteria in section 5.6 apply:

#### **Other Issues Pertaining to Water Heaters**

Non-electric water heaters located in bathrooms: any water heater located in a bathroom shall be permitted to stay in place provided adequate combustion air can be supplied to the unit.

Where feasible, water heaters fitting this profile shall be isolated in an approved enclosure and fitted with vents to supply adequate exterior combustion air,

Where space or structures do not allow for the construction of an enclosure, the water heater may be left in place provided interior combustion air is supplied at a level that satisfies the BTU rating of the device.

New installations in bathrooms shall be enclosed and supplied with adequate combustion air according to code, or the unit must be a direct-vent type.

### ***11.13 Reference Publications and Other Literature***

Agencies that perform weatherization services shall acquire the publications and industry literature that KHC deems necessary. These publications include but are not limited to NFPA and other applicable code books, manuals, and commercial materials.

### ***11.14 Smoke Detectors and Carbon Monoxide Detectors***

Dwellings that lack a working smoke detector shall be supplied with an approved device(s), installed according to manufacturer instructions. “Hearing impaired” type smoke detectors are required for hearing impaired clients. All requirements of Section 5.13 of this manual must also be met.

All dwellings shall be supplied with an approved Carbon Monoxide Detector(s) installed per manufacturer instructions. “Hearing impaired” type carbon monoxide detectors are required for hearing impaired clients. All requirements of Section 5.13 of this manual must also be met.

### ***11.15 Warranty Periods and Extended Care***

Agency labor on installations and repairs is not guaranteed after the date of the final inspection/quality control inspection. It is the responsibility of the local service provider to make the client aware of all specific contracted installation and parts warranties extending beyond the date of final inspection.

The contracts for HVAC or other work using DOE funds must ensure that adequate guarantees of workmanship, implied or otherwise, are part of the bid process. These costs are generally built into to the contract including the equipment, workmanship, and the length of time covered by any implied warranty required in the bid specifications.

Once a home is reported to DOE as complete, the required final inspection/quality control inspection indicates that all work performed was done so in a workmanlike manner including all work that may have been contracted out such as furnace work, etc. Performing activities such as routine maintenance, repairs or warranty-type work is not permitted using DOE funds for work beyond those costs already invoiced.

## ***Chapter 12: Health and Safety***

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### ***12.1 Health and Safety Plan***

The following is an excerpt from the Kentucky State Plan Master File Worksheet

Allowable energy related health and safety actions are those actions necessary to maintain the physical well-being of both the occupants and/or weatherization workers where:

- Costs are reasonable as determined by DOE in accordance with this approved Master Plan;
- The actions must be taken to effectively perform weatherization; or
- The actions are necessary as a result of weatherization work.

No single unit shall exceed \$3,000 of Health and Safety cost, without written approval from KHC. Health and Safety activities that are not direct components of an efficiency measure shall be charged as a Health and Safety cost.



Kentucky Weatherization (KY WX) addresses general Health and Safety (H&S) extensively in its Weatherization Program Manual (WXPM). KHC oversees the content and updating of the WXPM as needed. The WXPM functions as the primary guidance for compliance for KHC's sub-grantee(s) and their subcontractors. In this manner, a reliable source of H&S regulations is always available to the program operators, and a consistent system is in place that is readily understood by all participants. The Health and Safety (H&S) chapter will outline all current and in progress health and safety procedures covering the specific health and safety issues, actions, allowability, testing, and client education and training requirements.

The weatherizing agency must determine presence of at-risk occupants before proceeding with evaluation services. The Health and Safety Client Application and Home Screening Questionnaire form must be reviewed and signed by the client and evaluator/energy auditor before the evaluation is started.

Crew and client H&S issues are viewed as closely linked in the areas of site conditions and work procedures. Working from this concept, which assumes that any hazard associated with a work site, whether it is a work practice, an existing condition, client behavior, and so forth, has the potential of harming both crew and client, a holistic approach towards H&S is taken throughout the entire process of weatherizing a home, with special emphasis given to the initial inspection. This is most clearly illustrated in the H&S and DNE/Energy Audit Chapters of the WXPM which, among other things, provides a step-by-step procedure for identifying H&S problems and the action steps necessary to address them.

All of this is contingent on having well trained inspectors/energy auditors. KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the job-site thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX Dwelling Needs Evaluators/energy auditors (or "evaluators") must have passed or participated in training in the following areas. See Chapter 7, Section 7.1 for a list of the specific training courses required.

- DNE/Energy Auditor Training
- WX Policy and Procedure Training
- Blower Door Usage
- NEAT/MHEA Audit Usage and Interpretation
- Energy Systems Training
- Lead Based Weatherization Safe Work Practices
- CPR/Basic First Aid
- Energy Related Mold and Moisture (includes Indoor Air Quality)
- Basic A/C and Heat Pump Inspection
- Asbestos Identification
- RRP Certified Renovator
- ASHRAE 62.2 Training
- Other training courses determined necessary by KHC

### **Health and Safety Issues**

As potential hazards are identified, they are analyzed in terms of their severity and how they will be dealt with, up to and including deferral. Whenever possible, measures should be considered through the cost justification method of an SIR>1 for DOE Funds (SIR >.8 for LIHEAP funds) as an Energy Conservation

Measure (ECM) first, before using funds from the H&S allocation. Clients must always be informed of any H&S risk discovered during the evaluation process in writing. Confirmation of receipt of that information by the client must be obtained and kept in the client file. A listing of H&S issues is compiled, any of which that can't be corrected can result in a deferral on any given project. They are as follows:

### ***12.2 Air Conditioning and Heating Safety***

“Red tagged”, inoperable or nonexistent heating system replacement, repair, or installation is allowed where climate conditions warrant, unless prevented by other guidance herein. Kentucky climate involves a defined heating season with a Heating Degree Day (HDD) measurement range from 4200 to slightly over 5000. However, the state also has a shorter but taxing cooling season. The Cooling Degree Day (CDD) measurements in Kentucky range from 1500 to slightly less than 1000 in the eastern most mountainous region. The majority of the state shares the same HDD measurements as northern parts of states such as South Carolina, Georgia, Alabama, Texas, Oklahoma, and New Mexico.

Persons requesting the need for air conditioning based on their health being at risk must provide a letter from a doctor defining the condition requiring an air-conditioned environment and the maximum allowable air temperature relevant to that person's individual condition.

When repairing combustible fuel line leaks from the meter or tank to the energy system or appliance, materials must meet federal, state, and local code. Repair gas cooking appliances to eliminate gas leaks and reduce unsafe levels of carbon monoxide in living areas. Repair materials must meet federal, state and local code. Installation of protective materials on combustible surfaces adjacent to energy systems to meet NFPA clearance codes is allowable. Materials and installation must meet NFPA specifications. Materials must meet federal, state and local code.

Energy systems are repaired or replaced under H&S, when inoperable or unsafe. This measure is taken to eliminate unsafe levels of carbon monoxide in the living area and to ensure adequate heating. Justification documentation in the form of the appropriate heat system checklist (per energy source) which includes all required diagnostic recordings for the individual unit, and photos demonstrating the specific issue(s) with the system must be in the client file. Replacement of operational units, where diagnostic readings are obtainable, should be considered as a cost-justified ECM using regular weatherization funds with an SIR>1 for DOE Funds (>.8 for LIHEAP funds) before using H&S funds. A unit with a cracked heat exchanger where diagnostic readings are attainable must be considered for replacement through cost justification as an ECM first before using H&S funding. Replacement of non-operational units may only be done using H&S funding.

### ***12.3 Appliances and Water Heaters***

Replacement of water heaters under H&S is allowed on a case by case basis under the conditions outlined in the WXPM, Chapter 5, Section 5.6. Discuss and provide information and explanation on appropriate use, maintenance, and disposal of appliance/water heaters (where applicable).

Replacement and installation of appliances other than water heaters, such as stoves or washing machines, are not allowable H&S costs.

## **12.4 Asbestos**

Asbestos anywhere on the interior of the dwelling that would need to be addressed either directly or incidentally during the weatherization process is not an allowable H&S cost. Additionally, asbestos testing or abatement is not an allowable H&S cost. Policies have been in effect for asbestos presence and related work practices for many years. The approach is not to disturb, move, cut or drill said material and deter those measures that might do so. In instances where measures can be installed without disturbing asbestos surfaces or materials, that is the best approach. In instances where a local authority such as Code Enforcement imposes specific guidelines or requirements, service provider program staff are to make themselves aware of those restrictions and comply with them.

In addition to this existing asbestos policy KHC acknowledges that removal of siding can potentially cause a health hazard. Therefore, no handling or altering of asbestos materials is allowed. It will be mandatory that all dwelling needs evaluators/energy auditors, crew leaders and weatherization workers attend a course that is specifically targeted to educating these professionals on how to identify asbestos containing materials and work around them without creating a hazard. This course is presented via webinar or web posting, by KHC training staff.

If it is determined that weatherization work cannot be performed without creating a hazard, the project is to be deferred. The client is to be informed in writing of the potential hazard and the agency must not return to weatherize until an AHERA-certified professional issues a clearance statement. A copy of this statement/report must be kept in the client file.

Exterior walls and sub-surfaces must be inspected for asbestos prior to drilling or cutting.

When vermiculite is present, unless testing determines otherwise, the unit is to be deferred. Where blower door tests are performed, it is a best practice to perform pressurization instead of depressurization. Encapsulation by an appropriately trained professional is allowed. However asbestos encapsulation and testing costs are not reimbursable by the KY WAP. Removal is not allowed.

Regarding pipes, furnaces and other small covered surfaces, assume asbestos is present in the covering materials. Encapsulation is allowed by an AHERA asbestos control professional and should be conducted prior to blower door testing. Asbestos encapsulation and testing are not reimbursable costs within the Kentucky WAP.

Clients must be informed that suspected asbestos is present and how precautions will be taken. Clients will be instructed not to disturb suspected asbestos containing material. Clients must be provided information and explanation on asbestos safety information and steps to correct deferral conditions when applicable. The clients are required to sign a form, provided by the weatherizing agency, indicating they have been informed when applicable.

## **12.5 Biologicals and Unsanitary Conditions**

A sensory inspection is required. Clients must be informed of observed conditions. Clients must be provided information and explanation on how to maintain a sanitary home and steps to correct deferral conditions when appropriate.

Remediation of conditions that may lead to or promote biological concerns and unsanitary viruses is not an allowable cost. Addressing bacteria and viruses is not allowed. Cleaning or repairing biological and

unsanitary conditions to perform weatherization is not allowed. Deferral may be necessary in cases where a known agent is present in the home that may create a serious risk to occupants or weatherization workers. Also see section 12.16, Mold and Moisture.

### **12.6 Building Structure and Roofing**

Site conditions identified and documented by the service provider that pose a safety hazard to its employees and subcontractors cannot be corrected within the scope of the program.

Structural problems within client dwellings can often lead to deferral because they are beyond the scope of the program. Beyond simple incidental repairs, such as roof patching, there is no feasible means to address severe structural defects.

During the pre-inspection or initial inspection of the dwelling, the evaluator/energy auditor must have access to all aspects of the structure to adequately and appropriately gather data for the NEAT or MHEA energy audit. Clothing, dogs, trash, or other impediments restricting access to any portion or portions of the dwelling may necessitate deferral of the unit.

Building rehabilitation is beyond the scope of the WAP. H&S funds should not be used when the repair is a component of an ECM. In that case, the repair should be cost-justified as an incidental repair. Clients must be notified of structurally compromised areas when applicable.

### **12.7 Code Compliance**

Correction of preexisting code compliance issues is not an allowable cost other than where they are triggered by performing weatherization measures. State and local (or jurisdiction having authority) codes must be followed while installing weatherization measures. Condemned properties and properties where “red tagged” health and safety conditions exist that cannot be corrected under this guidance should be deferred.

Clients must be notified of observed code compliance issues. H&S funds should not be used when the repair is a component of an ECM, such as fixing a light fixture in order to install a CFL/LED bulb. In this case the cost should be cost-justified as an incidental repair.

### **12.8 Combustion Gases**

Proper venting to the outside for combustion appliances, including gas dryers is required. Correction of venting is allowed when testing indicates a problem. The following inspection and testing are required per the WXP in Sections 5.3, 5.6, 5.12, 7.2, and KHC Program Notice 06-2010. Combustion safety testing is required when combustion appliances are present.

Correction of venting issues should be completed as an incidental repair when it is a component of an ECM. Proper venting to the outside for combustion appliances, including gas dryers is required. Combustion safety testing is required when combustion appliances are present. Inspections must include:

- Inspections of venting of combustion appliance and confirmation of adequate clearances to combustibles.

- Testing natural draft appliances for draft and spillage under worse case conditions before and after air sealing.
- Inspection of stovetop cooking burners and oven burner for operability and flame quality. Replacement of cook stoves is not allowed. Repair is an allowable H&S cost.

Clients must be provided information and explanation of combustion safety and hazards information, including the importance of using exhaust ventilation when cooking and the importance of keeping burners clean to limit the production of CO.

### ***12.9 Drainage***

Drainage repairs are allowed with H&S funds only as they relate to code compliance. A repair is allowed as incidental repair when it is a component of an efficiency measure, such as a French drain when installing an air conditioning system but must be cost-justified with the ECM(s).

Major drainage issues are beyond the scope of the Weatherization Assistance Program. Homes with conditions that may create a serious health concern that require more than incidental repair should be deferred. See Section 12.16, Mold and Moisture.

Clients must be provided information and explanation of the importance of cleaning and maintaining drainage systems, as well as the benefits of landscape design when applicable.

### ***12.10 Electrical (Other than Knob and Tube Wiring)***

Minor electrical repairs are allowed where health and safety of the occupants is at risk. Upgrades and repairs are allowed when necessary to perform specific weatherization measures such as relocating an electrical outlet to allow for a dryer to be relocated for proper ventilation or proper connection of an existing water heater. A visual inspection must be conducted; inspections and testing must be performed as described in the WXPM.

Clients must be provided information and explanation on the hazards of overloading circuits, basic electrical safety/risks and overcurrent protection when applicable. H&S funds should not be used when the repair is a component of an ECM such as a service upgrade to handle increased load of a new heat system.

### ***12.11 Electrical (Knob and Tube Wiring)***

Minor electrical repairs are allowed where health and safety of the occupants is at risk. Upgrades and repairs are allowed when necessary to perform specific weatherization measures. A visual inspection must be performed; all inspections and testing must be performed as described in the WXPM.

Knob and tube wiring shall not be covered or encapsulated with insulation in Kentucky. The removal and replacement of knob and tube is allowed as an incidental repair to an ECM such as installing insulation.

Discuss and provide information and explanation to the client on the hazards of overloading circuits, basic electrical safety/risks and overcurrent protection when applicable.

### ***12.12 Fire Hazards***

Current inspection criteria take into account fire hazards associated with combustion appliances including clearances and venting systems. Through fuel specific checklists, inspectors/energy auditors identify such hazards and make repairs accordingly with respect to budgetary and program limitations. Required adherence to appropriate National Fire Protection Association (NFPA) codes when repairing or replacing equipment also minimizes the potential for fire hazards.

Correction of fire hazards is allowed when necessary to safely perform weatherization. Home evaluations include checking for fire hazards during the audit. Clients must be informed of observed hazards even if they will not be treated during weatherization.

### ***12.13 Formaldehyde, VOCs, and Other Air Pollutants***

Formaldehyde and Volatile Organic Compounds (VOCs) – Formaldehyde, tobacco smoke, thinners, solvents, cleaners, and any other substances capable of negatively impacting indoor air quality are identified through the on-site inspection process. Basic strategies such as proper storage and ventilation are used to eliminate problems. Air sealing thresholds are maintained so that the presence of these pollutants is not concentrated and allowed to reach toxic levels. However, this is primarily an occupant responsibility. In some cases, deferral may be an option.

Removal of pollutants is allowed and is required if they pose a risk to workers. If pollutants pose a risk to workers and removal cannot be performed or is not allowed by the client, the unit must be deferred. Removal of pollutants that is not necessary to perform weatherization (e.g. cleaning old paint cans and oil out of a garage) is not allowed.

Clients must be informed of observed conditions and associated risks. Client must be given written information and explanation on safety and proper disposal of household pollutants when applicable.

### ***12.14 Injury Prevention of Occupants and Weatherization Workers***

Workers must take all reasonable precautions against performing work on homes that will subject workers or occupants to health and safety risks. Minor repairs and installation may be conducted only when necessary to effectively weatherize the home; otherwise these measures are not allowed.

Workers are to observe if dangers are present that would prevent weatherization. Clients must be informed by evaluators/energy auditors and/or workers of observed hazards and associated risks.

### ***12.15 Lead-Based Paint***

Presence of lead-based paint associated with dwellings built before 1978. State policy mandates that all personnel working directly on dwellings shall participate in a KHC approved Lead Workers Safety class. Moreover, the presence of lead is an inspection issue and current procedures are designed to identify the presence of lead on Work Orders and to ensure crews work safely in those situations. (See Lead Safe Weatherization Work Practices; in the WXPM.)

With respect to lead based paint issues, KY WX uses an approach that addresses client safety and awareness, worker safety and awareness, and on-site safety precautions.

The head of household of every home to be weatherized receives the informational pamphlet "Renovating Right". The inspector/energy auditor also conducts a client education segment as part of the initial inspection to ensure that the occupants are fully aware of the hazards posed by lead based paint exposure. This procedure is documented by using a signed receipt from the head of household which confirms that the information was not only distributed but also explained. This receipt is kept in the client file.

All workers on site on any Weatherization project, whether they be a crew-based employee of one of the service providers or a private sector contractor, must complete Lead Safe Work Practices training or RRP training as outlined in Chapter 7, Section 7.1. The intent of these courses is to educate the worker about lead hazards and the proper ways to deal with them, and in doing so, to work in such a way as to not expose clients or their families to these hazards. All crews and contractors are required to carry HEPA vacuum machines, respirators, disposable bio suits, and all other items required for Lead Safe Work Practices.

The program manual addresses this area specifically with detailed guidance for onsite protocols:

- Wear a tight-fitting respirator and disposable coveralls.
- Seal work areas within a home with tape and plastic. Cover furniture, carpet, and other surfaces with plastic drop cloths or tarps.
- Spray water on disturbed areas to minimize dust.
- Clean-up work area each day. Sweep carefully and wet mop as needed. Use a HEPA vacuum cleaner to collect dust and paint chips.
- Keep children away from work area at all times.

While this represents only a summary of the overall Lead Safe Work Practices and training, it illustrates KY WX's awareness of the issue and how it is integral to safety on weatherization projects.

Lead Safe Weatherization Work Practices are performed as a health and safety practice and cannot be considered part of an efficiency measure. Lead Safe Work Practices shall always be calculated and charged as a health and safety cost.

KHC's monitoring staff are responsible for oversight of this area. While Lead Safe Work Practices have long been built into the program, the monitors will focus on this area as they conduct their annual monitoring visits. Program operators must show that all Lead Based Paint protocols (information sharing, Lead Safe Work Practices, proper equipment, etc.) are up to date and in compliance with regulations. Programs found to be out of compliance, and those which fail to comply once identified, will face serious sanctions which may include reduced allocation or loss of contract. Failure to comply with Lead Safe Work requirements poses such serious consequences for the households served that KHC will concentrate special focus on this area.

Sub-grantees must follow EPA's Lead Renovation, Repair and Painting (RRP). In addition to RRP, Weatherization requires all weatherization crews working in pre-1978 housing to be trained in Lead Safe Weatherization (LSW). Deferral is required when the extent and condition of lead-based paint in the house would potentially create further health and safety hazards.

All Sub-grantees and private sector contractors must have Lead Renovator Firm status. All evaluators (inspectors) must have Lead Renovator (RRP) certification as well as all crew leaders. This is a requirement for contracting with the program. This applies to contractors performing and/or managing

the following activities: weatherization related work, inspection services, energy auditing services, dwelling needs evaluation or like services. Private contractors must also meet the requirement of having adequate RRP certified employees among their ranks. As new contractors apply to work on WX projects the EPA requirements must be explained during the application process.

Private contractors must furnish proof of RRP and Lead Renovator Firm status as a condition of working for the WX program. The monitoring staff will routinely check that documentation is on file at each agency, verifying compliance with the EPA rules.

All weatherization crews working on pre-1978 homes must receive the DOE approved LSW training and a certified renovator must be assigned to the project and be readily available.

State Monitor/Trainers must be Certified Lead Renovators.

The head of household of every home to be weatherized receives the informational pamphlet "Renovating Right". The inspector/energy auditor also conducts a client education segment as part of the initial inspection to ensure that the occupants are fully aware of the hazards posed by Lead Based Paint exposure.

The RRP requirements of client education apply. The agencies must give the client a copy of the EPA publication *The Lead-Safe Certified Guide to Renovate Right pamphlet, July 2011 edition*, and have the client sign the Sample Pre-Renovation Form located in the back of the Pamphlet to certify the client has received the pamphlet.

That signed form must be kept in the client's file as proof the client received educational material about the dangers of lead paint.

The certified renovator must be physically present at the work site while signs are being posted, containment is being established, and the work area is being cleaned after the renovation to ensure that these tasks are performed correctly. Although the certified renovator is not required to be on-site at all times while the renovation project is ongoing, a certified renovator must nonetheless regularly direct the work being performed by other workers to ensure that the work practices are being followed. When a certified renovator is not physically present at the work site, the workers must be able to contact the renovator immediately by telephone or other mechanism. In addition, the certified renovator must perform the post-renovation cleaning verification.

### ***12.16 Mold and Moisture***

Limited water damage repairs that can be addressed by weatherization workers and correction of moisture and mold creating conditions are allowed when necessary in order to weatherize the home and to ensure the long-term stability and durability of the measures. Where severe mold and moisture issues cannot be addressed, deferral is required.

The Kentucky Weatherization program is not a mold remediation program and funds should not be used to test, abate, remediate, purchase insurance, or alleviate existing mold conditions identified during the audit, the work performance period or the quality control inspection. Most typically, weatherization services may need to be delayed. Upon the discovery of a mold condition, the local agency must provide some form of notification or disclaimer to the client describing what was done to the home in an attempt to alleviate the condition or to prevent new mold growth.



Major moisture problems that cannot be corrected within the scope of the program include:

- An enclosed crawlspace or basement that has standing water for significant periods of time due to inadequate ground or surface water drainage.
- Any building with no overhangs and no gutters, exhibiting signs of major moisture problems such as blistering paint and extensive mold/mildew on the inside of the house.

The clients must be provided with a disclaimer on mold and moisture awareness.

### ***12.17 Occupant Pre-Existing or Potential Health Conditions***

A component of every inspection includes client education, whereby the occupant's health problems are identified and discussed. Once a clear understanding has been reached between the program inspector/energy auditor and the occupant, work practices will be deployed so as not to aggravate any preexisting condition. In some rare instances, a deferral may be the only option.

When a person's health may be at risk and/or the work activities could constitute a health or safety hazard, the occupant at risk will be required to take appropriate action based on the severity of risk. Temporary relocation of at-risk occupants may be allowed on a case by case basis. Failure or the inability to take appropriate actions must result in deferral.

Occupants are required to reveal known or suspected health concerns as part of the initial application for weatherization. The occupants of the dwelling will be interviewed again during the audit. The client must be provided with information of known risks and contact information for agency weatherization office staff, so client can inform them of any issues arising during the Weatherization process.

**The weatherizing agency must determine presence of at-risk occupants before proceeding with evaluation services. The Health and Safety Client Application and Home Screening Questionnaire form must be reviewed and signed by the client at the time of application intake and by evaluator before the evaluation is started.**

### ***12.18 Occupational Safety and Health Administration (OSHA)***

Workers must follow OSHA standards and OSHA HazCom 2012 and take precautions to ensure the health and safety of themselves and other workers. For more information, please reference the OSHA website at <https://www.osha.gov/dsg/hazcom/>.

Employers that have hazardous chemicals in their workplaces are required by OSHA's Hazard Communication Standard (HCS), 29 CFR 1910.1200, to implement a hazard communication program. The program must include labels on containers of hazardous chemicals, Safety Data Sheets (SDS) for hazardous chemicals, and training for workers. Each employer must also describe in a written program how it will meet the requirements of the HCS in each of these areas.

Technical monitors conduct job file reviews for evidence of safe work practices. During field monitoring of in-progress units, technical monitors will assess if crews are using safe work practices.

The Kentucky Weatherization Program no longer requires the completion of either the OSHA-10 or the OSHA-30 training courses. This does not eliminate the need for service providers to comply with OSHA standards. OSHA still requires that all workers receive training to address specific hazards that the

worker can reasonably expect to encounter on a job site such as (but not limited to) fall protection, use of personal protective equipment, electrocution and the safe operation of power tools. KHC strongly recommends OSHA training for all workers as a best practice.

### **Online OSHA training resources.**

#### **Construction 10 Hour**

1. AdvanceOnline
2. ClickSafety (also Roadway, Cal-OSHA, and Spanish)
3. Summit Training Source (also Spanish version)
4. PureSafety (also Spanish version)
5. Career Safe - (Youth and Corporate versions)
6. Redvector
7. 360Training
8. University of South Florida
9. Coastal Training Technologies
10. Turner Construction

#### **Construction 30 Hour**

1. Turner Construction (also Spanish version)
2. ClickSafety
3. 360Training
4. Summit Training Source
5. University of South Florida
6. PureSafety
7. AdvanceOnline

### **12.19 Pests**

Pest infestation within the dwelling or in any area outside of the dwelling where service provider staff or subcontractors would have to work is cause for deferral. (Pests include, but are not limited to: fleas, roaches, rodents).

Clients must be informed of observed condition and associated risks.

### **12.20 Radon**

Whenever site conditions permit, exposed dirt must be covered with a vapor barrier except for mobile homes without skirting or an exterior under surface that serves as a vapor barrier. In homes where radon may be present, precautions should be taken to reduce the likelihood of making radon issues worse. In extreme cases deferral may be an option.

Radon testing or remediation is not an allowable H&S cost. Clients must be provided with the EPA consumer's guide to radon.

### **12.21 Refrigerant**

Refrigerators may be replaced as an ECM only. All reclaimed refrigerant processes must follow the Clean Air Act of 1990, section 608, as amended by 40 CFR 82, 5/14/93. All testing must comply with EPA testing protocols. Clients are to be advised not to disturb refrigerant. Anyone working with refrigerant within the WAP, must have the appropriate training, either an EPA-approved section 608 type I or universal certification. Any appliance disposal must include refrigerant reclamation.

Non-certified technicians may not attach or disconnect hoses of gauges to measure pressure within the appliances, top-off or remove refrigerant from appliances, or otherwise damage the integrity of the appliance.

### **12.22 Smoke Detectors, Carbon Monoxide Alarms, and Fire Extinguishers**

1. Weatherization agencies must install carbon monoxide (CO) alarms and smoke alarms in dwelling units where these devices are nonexistent or non-functioning.
2. CO alarms must be UL-listed, installed in accordance with the manufacturer's recommendations and located in compliance with the KWFG Chapter 1 starting with Section 1.2. Installed CO alarms must have the capability to accurately detect and display low levels of carbon monoxide to 10 ppm and comply with other program requirements. Electric plug-in CO alarms must have battery backup.
3. CO alarms designed for the hearing impaired must be installed when the client is hearing impaired.
4. Local agencies must provide the occupant(s) of the dwelling unit with verbal and written information regarding the following:
  - Dangers of CO and smoke.
  - How to operate and reset the CO and smoke alarms.
  - How to read the CO alarm.
  - How to respond to CO levels above 10 ppm.
  - How to change the batteries of CO and smoke alarms.
5. Smoke alarms must be installed in accordance with the manufacturer's recommendations, KWFG Chapter 1, starting with Section 1.3, listed in accordance with UL 217, comply with NFPA 72 and other program requirements.
6. Smoke alarms designed for the hearing impaired must be installed when the client is hearing impaired.
7. Where multiple smoke alarms are required, interconnection is required. Actuation of any one smoke alarm shall activate all of the alarms in the individual unit. Hard wiring and interconnection is not required of existing devices provided:
  - a. The alteration or repair will require the removal of wall or ceiling finishes exposing the structure, and
  - b. No attic, crawl or basement is available which can provide access for hard wiring and interconnection without the removal of interior finishes.
8. Smoke alarms/detectors must be located:
  - In every sleeping room.

- Outside of each sleeping area in the immediate vicinity of the bedrooms.
  - On each additional story (including basements).
  - In split-level dwellings where an intervening door is located between the adjacent levels. However, in split-level dwellings without an intervening door, a smoke alarm installed on the upper level shall suffice for the adjacent lower level, provided the lower level is less than one full story below the upper level.
  - Near every combustion zone. This alarm can serve the requirements of bullets 1 through 4 where feasible.
9. Providing fire extinguishers is allowed only when solid fuel is present. Fire extinguishers must be installed according to the manufacturer's recommendations, be type ABC, UL-listed, ≤ 10 lb. and with a permanently affixed wall bracket to receive the extinguisher. The client must sign a written agreement to allow a fire extinguisher to be installed in the home within sight of the solid fuel burning heat system when standing at the unit. The agency must discuss and provide the client with information on the use and upkeep of the extinguisher.

### ***12.23 Solid Fuel Heating***

The weatherization agency must inspect the stove, chimney and flue. Combustion zone depressurization testing (CAZ) is required per the Kentucky Weatherization Field Guide and Standard Work Specifications, and the WXPM section 7.5, step 2 item 15.

Maintenance, repair, and replacement of primary indoor heating units is allowed where occupant health and safety is a concern. Maintenance and repair of secondary heating units is allowed. Replacement of secondary heating units is not allowed. This system must be operational and inspected using all WXPM test protocols before any other weatherization begins.

### ***12.24 Stand-Alone Portable Electric Heaters***

Defined as, but not limited to, heaters that do not have a permanent connection to electric power. Repair, replacement or installation is not allowed. Removal is recommended. Circuitry must be checked to ensure adequate power supply for existing space heaters.

Clients must be informed of the hazards associated with these types of heaters and the weatherization agency must obtain a signed waiver from the client if removal is not allowed.

These heaters are not considered a primary heat source. Weatherization services on a home are prohibited if stand-alone, portable electric heaters as defined above are the only source of heat for the home.

### ***12.25 Space Heaters, Unvented Combustion***

Unvented combustion space heaters are not considered a primary heat source. Removal is required, except as secondary heat source and where the unit conforms to ANSI Z21.11.2. Units that do not meet ANSI Z21.11.2 must be removed prior to weatherization but may remain until a replacement heating system is in place. Testing for air-free carbon monoxide (CO) is to be performed per the WXPM. All units must have an ANSI Z21.11.1 label.

The client must be informed of the dangers of unvented space heaters – CO, Moisture, NO2, CO can be dangerous even if CO alarm does not sound. The replacement system must be operational and inspected using all WXPM test protocols before any other weatherization begins.

### ***12.26 Space Heaters, Vented Combustion***

Vented space heaters will be treated as furnaces. The WXPM details the testing required during an evaluation. The replacement system must be operational and inspected using all WXPM test protocols before any other weatherization begins.

### ***12.27 Spray Polyurethane Foam***

Use EPA recommendations (<https://www.epa.gov/saferchoice/spray-polyurethane-foam-spf-insulation-and-how-use-it-more-safely>) when working within the conditioned space or when SPF fumes become evident within the conditioned space. When working outside the building envelope, isolate the area where foam will be applied, taking precautions so that fumes will not transfer to inside conditioned space, and exhaust fumes outside the home. Testing will include checking for penetrations in the building envelope. Sensory inspection inside the home for fumes during foam application must also be conducted.

The client must be informed of plans to use two-part foam and the precautions that may be necessary. Workers using foam products must receive training on the proper use of these various products and understand the specification for each application type. Documentation of installers viewing an installation video or online training and verification of reading and understanding product use information must be kept at the service provider agency. SDS sheets are mandatory for any foam product used and a thorough understanding of the temperature sensitivity of the product in use is required.

### ***12.28 Ventilation***

Compliance with ASHREA 62.2-2016 (or the most recent version in force), and the approved Addendum b, is required when performing weatherization services. Implementing ASHREA 62.2 is not required where acceptable indoor air quality already exists as defined by ASHREA 62.2. Existing fans and blower systems should be updated if inadequate. Evaluation and test-out measures must comply with the WXPM.

Discuss and provide information to the client on the function, use, and maintenance of ventilation systems and components. The client must also be provided with a disclaimer that ASHREA 62.2 does not negate high polluting sources or guarantee indoor air quality.

Training of evaluators and crew leaders is provided by KHC. This training includes proper sizing and evaluation of existing and new systems, depressurization tightness limits, critical air zones, etc.

### ***12.29 Window and Door Replacement, Window Guards***

Replacement, repair, or installation of doors, windows or window guards is not an allowable H&S cost but may be allowed as an ECM if it is cost justified. If disturbing lead paint, follow LSW practices and the

client must be informed of lead risks as prescribed in the WXPM, SWS, and KWFG, and this H&S plan when applicable.

### **Deferrals**

Deferrals, or "walkaways" as they are commonly known, are processed accordingly:

1. The client shall be informed in writing as to why the dwelling cannot be weatherized. If there are conditions that the client must correct before service can be provided, those conditions must also be stated in writing.
2. The service provider is required to refer the client to any alternate program such as home rehab, if one is available in the area.
3. The service provider shall clearly indicate in the client file why the dwelling was given deferral status.
4. The service provider must document all referrals to other programs or services in the client file.
5. The client must receive any information prescribed in the Health and Safety section of the WXPM that is appropriate.

### **Client Education**

The WXPM defines the required information disclosures that must be completed during the evaluation/energy audit discovery process. This process is documented by using a signed receipt from the head of household to confirm that the information was not only distributed, but also explained. This receipt must be kept in the client file. Draft forms have been developed to document all information discussed and given to the clients along with the application and onsite interviews to verify preexisting health concerns. The use of these forms is mandatory.

### ***12.30 Lead Paint and Lead Safe Weatherization Work Practices***

#### **Recognition and Intent**

Pursuant to the U.S. Department of Energy (DOE), and EPA's Renovation, Repair and Painting Final Rule (40 CFR 745) requirement and as amended in the 8/5/11 Federal Register that all Weatherization Assistance Programs shall have in place a set of policies and protocols to effectively address the issues regarding lead-based paint, this chapter defines the protocols of the KY WAP regarding lead-based paint and lead safe work practices. The following guidelines shall apply when dwellings with lead-based paint are encountered during the provision of Weatherization services.

#### **Client Education**

The service provider shall inform all potential clients as to the hazards associated with Lead Based Paint through the Environmental Protection Agency (EPA) pamphlet *Renovate Right*. The service provider shall document and keep on file signed statements from all clients verifying that this information has been conveyed. Barring any objection from the client, weatherization service may then be rendered with knowledge of and compliance with Lead Safe Work Practices (LSWP).

#### **Worker Safety and Training**

The service provider, in conjunction with KHC, shall ensure that all personnel performing tasks on any weatherization work sites shall have participated in an EPA-approved LSW training or EPA RRP Certified

Renovator training as applicable. This includes crew-based as well as private contractor operations. Therefore, it is understood that all new personnel shall agree with and comply with these requirements as a condition of working in the Weatherization program.

The service provider shall require all on-site workers to utilize LSWP when and where appropriate, and to make available and insist upon the usage of, all proper safety equipment and techniques.

### **On-Site Inspections/Quality Control Inspections**

The service provider, through its inspection personnel, shall endeavor to identify those dwellings where lead-based paint is present. The conventional approach is to assume that if the dwelling was built before 1978, lead based paint is present. In those circumstances, the inspector/energy auditor shall determine if the recommended measures to be performed will disturb the existing lead-based paint. If lead-based paint will not be disturbed service can be rendered in the normal manner.

If, however, it is determined that the work to be performed will disturb lead-based materials, the inspector/energy auditor shall indicate in the comments section of the work order (NEAT/MHEA Generated) that Lead Safe Work Practices are to be followed. The types of work that might fall into this category include, but are not limited to, any activity that generates and spreads dust, cutting and drilling through surfaces, preparation and retrofitting windows and doors, etc.

### **Lead Safe Work Practices (LSWP)**

LSWP is a group of methods used by weatherization technicians when the presence of lead is suspected and will likely be disturbed in the process of weatherizing a dwelling. Using LSWP protects workers and occupants from unnecessary exposure. Strict compliance with EPA's Renovation, Repair and Painting Final Rule (40 CFR 745 and as amended in the 8/5/11 Federal Register) is required.

Lead-based paint is also discussed in Sections 2.10 and Section 7.5, Step 9 of this manual.

Steps involved include but are not limited to:

- Wear an approved tight-fitting respirator, gloves, and disposable coveralls.
- Seal work areas within a home with tape and plastic following proper protocols. Cover furniture, carpet, and other surfaces with plastic drop cloths or tarps.
- Spray water on disturbed areas to minimize dust.
- Clean-up work area each day per proper protocols. Sweep carefully and wet mop as needed. Use a HEPA vacuum cleaner to collect dust and paint chips.
- Keep children away from work area at all times.

Also See: **12 Steps to working With Lead Based Paint** located in the back section of this manual.

### ***12.31 Energy-Related Mold and Moisture***

#### **Awareness and Impacts for Weatherization**

Reference DOE Weatherization Program Notice 17-7 dated August 9, 2017 for guidelines and specifics.

## General Overview

The Weatherization program is not a mold remediation program and funds should not be used to test, abate, remediate, purchase insurance, or alleviate existing mold conditions identified during the audit, the work performance period or the quality control inspection. Most typically, weatherization services may need to be delayed. Upon the discovery of a mold condition, the local agency must provide some form of notification or disclaimer to the client describing what was done to the home in an attempt to alleviate the condition or to prevent new mold growth. DOE FUNDS MAY BE USED TO CORRECT ENERGY RELATED CONDITIONS TO ALLOW FOR EFFECTIVE WEATHERIZATION WORK AND/OR TO ENSURE THE IMMEDIATE HEALTH OF WORKERS AND CLIENTS.

Energy related conditions may include: mechanical system problems (temperatures, venting, internal and external condensation); ventilation problems; lack of insulation (wall, floor, attic, pipe, etc.); interior condensation (windows, crawl, attic, walls, etc.); and exhaust problems (clothes dryer, range hood, bathroom fans).

Weatherization crews, private contractors and approved evaluators or inspectors/energy auditors shall receive specialized training in the recognition of conditions that promote mold growth they may encounter in their weatherization work and how best to prevent creating new mold conditions. At the same time, crews need training in how to treat less extensive mold conditions they may encounter in certain homes.

Reference DOE Weatherization Program Notice 17-7 dated August 9, 2017 and ensure all new hires and existing staff complete the required Intro to WX Webinar located at [LearnREE.com](http://LearnREE.com). This webinar provides an overview of all DOE/EPA requirements for dealing with mold and moisture related health and safety issues. This training is required for all new inspectors/energy auditors, crew workers, and contractors. Proof of completion of this webinar is required.

Evaluators or inspectors/energy auditors are required to include protocols as outlined in the program notice referenced above in their Dwelling Needs Evaluation/Energy Audit inspection procedures. Clients shall receive the EPA's booklet *A Brief Guide to Mold, Moisture and Your Home* during the client education portion of the pre-inspection. Based upon observed conditions at the site, evaluators or inspectors/energy auditors shall then utilize the WX-MA form, *Weatherization Mold Assessment and Release Form* for documentation and disclosure purposes.

Cleanup Criteria – Level 1 cleanup of energy related mold and moisture conditions, refers to a small isolated area of 10 square feet or less. Areas of 10 square feet or less can be cleaned or removed when remedying an energy related condition only and is reimbursable by KHC. Anything above that is beyond the scope of Weatherization and would need to be referred to another funding source for remediation. Weatherization can be performed if client is still eligible and major mold and moisture issues have been remedied by the other funding source. Crews and contractors are required to wear an N95 respirator, gloves and goggles when performing said energy related mold and moisture repairs.

### **12.32 Worst-Case Draft and Pressure Test/CAZ Testing**

(See Kentucky Weatherization Field Guide and Standard Work Specifications for Further Details)

This test is required for every home with combustion appliances at the time of EACH of the following:



- During the Dwelling Needs Evaluation/Energy Audit
- At the end of each day of weatherization work
- During the post inspection/quality control inspection of all work measures

**Note:** Please see Section 13.33 for special procedures when solid fuel appliances are involved.

This test uses the home's air handler, exhaust fans, and chimneys to create worst-case depressurization in the combustion zone. During this worst-case situation, the auditor measures the indoor-outdoor pressure difference and chimney draft. The purpose of these tests is to ensure that chimneys will vent their combustion gases even under worst case conditions. Draft is measured upstream of the draft diverter and downstream of the barometric draft control in older furnaces, boilers, and water heaters. Upstream generally means above the draft diverter or between the draft diverter and chimney.

Draft is the pressure difference between the chimney and combustion zone. Atmospheric draft appliances are draft-tested during the worst-case conditions. This worst-case draft test will discover whether the venting system will exhaust the combustion gases when the combustion zone pressure is as negative as possible.

A sensitive digital manometer is usually used for accurate and reliable readings of both combustion-zone depressurization and chimney draft.

### Steps Involved

- With exterior doors and windows closed, connect a digital manometer to read the pressure difference between combustion zone and outdoors, and record the current natural pressure difference.
- Turn on all exhaust fans and clothes dryer; check door closures; measure the combustion zone-to-outdoors pressure difference again.
- Turn on air handler and determine if the zone pressure is more negative with the air handler running and recheck all door closures to achieve the most negative pressure.
- If the pressure is more negative, leave air handler on, if less negative, turn the air handler off.
- Record this maximum or worst-case depressurization value.
- A combustion zone-to-outdoors pressure difference of more than  $-5$  Pascals during this test indicates a danger of back drafting naturally drafted gas and oil appliances.
- A combustion zone-to-outdoors pressure difference of  $-8$  Pascals or more indicates a danger of flame roll-out.
- Operate each atmospheric draft boiler, furnace, or water heater under these same worst-case conditions. Measure draft with a manometer. Test for back drafting with smoke. A negative draft should be observed within 1 minute of start-up.
- Ambient CO levels should be monitored in the combustion zone during draft testing.
- If ambient CO levels in the combustion zone exceed 35 parts per million (ppm), tests should cease for the technician's safety. The combustion zone should be ventilated before testing and repair of CO problems resumes.
- Naturally drafting chimneys should have  $-1$  to  $-15$  Pascals of draft, depending on outdoor temperature—measured chimney with reference to the combustion zone—while at worst-case conditions. The lower the outdoor temperature, the higher this negative draft should be. Combustion gases shouldn't spill for longer than 60 seconds from the combustion device while operating at worst-case conditions.

### **12.33 Special Procedures Regarding Solid Fuel**

- Solid fuel appliances including wood and coal burning stoves and fireplaces, pellet stoves, etc. will involve performing all steps outlined in Section 13.32 with the following exceptions and special steps applying only to the solid fuel appliance:
  1. CAZ testing is required. Draft and spillage testing is not required of the solid fuel appliance.
  2. A carbon monoxide test is not required of the solid fuel appliance.
  3. If the home has a fireplace that the owner uses, set up and turn on the blower door to a 300-cfm flow rate to simulate.
  4. NOTE: Before performing tests, extinguish all flames in solid fuel appliances. Do NOT perform worst case draft and pressure testing/CAZ testing with fires burning or hot embers in any solid fuel appliance. Ashes in appliances should be covered with wet newspapers to prevent pulling ashes out of the appliance during depressurization.

For further information, refer to the Kentucky Weatherization Field Guide and Standard Work Specifications.

### **12.34 Hazard Communication Program**

Employers that have hazardous chemicals in their workplaces are required by OSHA's Hazard Communication Standard (HCS), 29 CFR 1910.1200, to implement a hazard communication program. The program must include labels on containers of hazardous chemicals, safety data sheets (SDS), (formerly known as Material Safety Data Sheets, (MSDS)), for hazardous chemicals, and training for workers. Each employer must also describe in a written program how it will meet the requirements of the HCS in each of these areas.

Employers must implement an effective hazard communication program by following these six steps:

#### ***Step 1. Learn the Standard/Identify Responsible Staff***

- Obtain a copy of OSHA's Hazard Communication Standard.
- Become familiar with its provisions.
- Make sure that someone has primary responsibility for coordinating implementation.
- Identify staff for specific activities (e.g., training).

You may obtain a copy of the Hazard Communication Standard on OSHA's hazard communication webpage at [www.osha.gov/dsg/hazcom](http://www.osha.gov/dsg/hazcom). The provisions of the standard that apply to employers using chemicals in their workplaces are found primarily in paragraphs (e) written hazard communication program; (f) labels and other forms of warning; (g) safety data sheets; and (h) employee information and training. It is important that you become familiar with these provisions to determine what is needed for compliance in your workplace.

To ensure that you have an effective hazard communication program and address all of the necessary components, a specific staff person should be assigned responsibility for implementation of hazard communication. The person designated for overall program coordination should then identify staff to be responsible for specific activities, such as training.

### ***Step 2. Prepare and Implement a Written Hazard Communication Program***

- Prepare written Policies and Procedures to indicate how hazard communication will be addressed in your facility.
- Prepare a list or inventory of all hazardous chemicals in the workplace.

Paragraph (e) of the standard requires employers to prepare and implement a written hazard communication program. This requirement is to help ensure that compliance with the standard is managed in a systematic way, and that all elements are coordinated. The written program must indicate how you will address the requirements of paragraphs (f) labels and other forms of warning; (g) safety data sheets; and (h) employee information and training, in your workplace.

The written program also requires employers to maintain a list of the hazardous chemicals known to be present in the workplace. Using the product identifier (e.g., product name, common name, or chemical name) to prepare the list will make it easier for you to track the status of SDS and labels of a hazardous chemicals. Remember, the product identifier must be the same name that appears on the label and SDS of the hazardous chemical.

### ***Step 3. Ensure Containers are labeled***

- Keep labels on shipped containers.
- Label workplace containers where required.

Chemical manufacturers and importers are required to provide labels on shipped containers with the following information: product identifier, signal word, pictograms, hazard statements, precautionary statements, and the name, address and phone number of the responsible party. Therefore, when an employer receives a hazardous chemical from a supplier, all information will be located together on the label; however, additional information may also appear.

As the employer, you are required to ensure that containers in the workplace are labeled. You may use the same label from the supplier, or you may label workplace containers with alternatives, such as third-party systems (e.g., National Fire Protection Association (NFPA) or Hazardous Materials Identification System (HMIS)) in addition to the other required information. Any container of hazardous chemicals in the workplace must at a minimum include the product identifier and general information concerning the hazards of the chemical. Whatever method you choose, your workers need to have access to the complete hazard information.

### ***Step 4. Maintain Safety Data Sheets (SDS)***

- Maintain safety data sheets for each hazardous chemical in the workplace.
- Ensure that safety data sheets are readily accessible to employees.

Safety data sheets are the source of detailed information on a hazardous chemical. Employers must maintain copies of SDS for all hazardous chemicals present in their workplaces. If you do not receive an SDS from your supplier automatically, you must request one. You also must ensure that SDS are readily accessible to workers when they are in their work areas during their work shifts.

This accessibility may be accomplished in various ways. You must decide what is appropriate for your workplace. Some employers keep the SDS in a binder in a central location (e.g., outside of the safety office, in the pick-up truck on a construction site). Others, particularly in workplaces with large numbers of chemicals, provide access electronically. However, if SDS are supplied electronically, there must be an adequate back-up system in place in the event of a power outage, equipment failure, or other emergency involving the primary electronic system. In addition, the employer must ensure that workers are trained on how to use the system to access SDS and are able to obtain hard copies of the SDS. In the event of a medical emergency, hard copy SDS must be immediately available to medical personnel.

#### ***Step 5. Inform and Train Employees***

- Train employees on the hazardous chemicals in their work area before initial assignment, and when new hazards are introduced.
- Include the requirements of the standard, hazards of chemicals, appropriate protective measures, and where and how to obtain additional information.

Paragraph (h) of the HCS requires that employers train employees on the hazardous chemicals in their work area before their initial assignment and when new hazards are introduced into the work area, and this training must be conducted in a manner and language that employees can understand. Workers must understand they are exposed to hazardous chemicals. They must know that labels and safety data sheets can provide them with information on the hazards of a chemical, and these items should be consulted when needed. In addition, workers must have a general understanding of what information is provided on labels and SDS, and how to access them. They must also be aware of the protective measures available in their workplace, how to use or implement these measures, and whom they should contact if an issue arises.

#### ***Step 6. Evaluate and Reassess Your Program***

- Review your hazard communication program periodically to make sure that it is still working and meeting its objectives.
- Revise your program as appropriate to address changed conditions in the workplace (e.g., new chemicals, new hazards, etc.).

Hazard Communication Programs must remain current and relevant for you and your employees. The best way to achieve that is to review your hazard communication program yearly to make sure that it is still working and meeting its objectives and to revise it as appropriate to address changed conditions in the workplace (e.g., new chemicals, new hazards, etc.).

#### **Additional Information**

See *Hazard Communication: Small Entity Compliance Guide for Employers That Use Hazardous Chemicals* for more detailed information on how to implement an effective hazard communication program. Additional information on the Hazard Communication Standard can be found on OSHA's Hazard Communication webpage at [www.osha.gov/dsg/hazcom](http://www.osha.gov/dsg/hazcom).

### **Introduction and Overview:**

The Department of Energy has adopted the ASHRAE 62.2 2016 effective July 1, 2017 for the Weatherization Assistance Program. Information contained in this section references the ASHRAE 62.2-2016 standard. If a newer version of the ASHRAE standard is adopted subsequent to the publication of this manual, agencies must adhere to the standard in effect at the time work is completed. With the MVR requirement having been eliminated from the Weatherization program protocols, the primary purpose of air infiltration measures on a home is to reduce the natural air infiltration rate of the home down as low as possible with mechanical ventilation being introduced into the home to maintain indoor air quality and comply with ASHRAE 62.2-2016 (or current version in force) standards and subsequent amendments and/or addendums.

KHC provides training and technical assistance with regards to the currently adopted ASHRAE 62.2-2016 standards and any subsequent amendments and/or addendums to ASHRAE 62.2-2016 for the Weatherization Assistance Program on an ongoing basis to ensure that all required procedures and protocols are followed by all providers of weatherization services. All service provider staff must complete all training required by KHC.

### **13.1 Exemptions from Mechanical Ventilation Requirements**

Any home calculated to need less than 15 cfm (<15) of mechanical ventilation will not need a mechanical ventilation system installed. If the initial blower door estimated final does not require mechanical ventilation a fan does not have to be installed up front (before regular weatherization). If the final blower door reading does require mechanical ventilation of 15 cfm or greater, it can be installed after regular weatherization work has been completed.

### **13.2 Whole-building Ventilation and ASHRAE 62.2 Overview**

Most homes in North America currently rely on air leakage for ventilation. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) publish ventilation standards.

The current ASHRAE 62.2 standard requires fan-powered mechanical ventilation in all homes, as well as local exhaust ventilation in kitchens and bathrooms. The standard allows for natural infiltration (air leakage) to contribute toward the required whole-building ventilation rate. The standard also allows for whole-building fan-powered mechanical ventilation to make up for insufficient local ventilation. All service providers of weatherization services are required to comply with the requirements of the ASHRAE 62.2 currently in force and any subsequent amendments and/or addendums.

This chapter of the Kentucky Weatherization Program Manual utilizes and discusses various components of the ASHRAE 62.2 standard to assist you in complying with the various requirements of the standard. Various sections of the standard are referenced throughout this chapter. For example, when a section number such as “4.1” is listed, that will refer to the actual section contained in the standard wherein more details can be obtained.

Refer to the ASHRAE 62.2 standard and any subsequent amendments and/or addendums for more details, guidance, and exceptions that are beyond the scope of this program manual.

- Copies of the current ASHRAE 62.2 standard and other reference materials can be purchased at the following web site: <https://www.techstreet.com/ashrae/standards/ashrae-62-2-2016>
- Residential Energy Dynamics provides a free online tool to help calculate ASHRAE 62.2 ventilation rates. <http://residentialenergydynamics.com>

If you air-seal homes during weatherization, you must install whole-building mechanical ventilation systems as required under the current ASHRAE 62.2 standard, which has 3 components.

- Whole-building ventilation requirement.
- Local ventilation requirement.
- Natural infiltration credit.

### **13.3 Whole-Building Ventilation Requirement**

To comply with ASHRAE 62.2, you can use either the formula or the table 4.1a shown in section 13.7 to determine the whole-building ventilation airflow requirement. You can provide this fan-powered airflow in a number of ways.

- A dedicated exhaust or supply fan running continuously or cycling by automatic control.
- A bathroom or kitchen exhaust fan running continuously or cycling by automatic control.
- A central air handler drawing filtered outdoor air into its return.
- A balanced ventilation system such as a heat-recovery ventilator (HRV) or energy-recovery-ventilator (ERV).

### **13.4 Purpose**

ASHRAE Standard 62.2 defines the roles of and minimum requirements for mechanical and natural ventilation systems and the building envelope intended to provide acceptable indoor air quality (IAQ) in residential buildings.

Defines role of and minimum requirements for:

- Mechanical ventilation
- Natural ventilation
- Building envelope
- Intent is to provide acceptable IAQ

### **13.5 Scope**

Acceptable IAQ is the goal, but not necessarily achieved even if the standard is met:

- Because of the many factors that may affect occupant perception of IAQ: temperature, humidity, noise, lighting, and psychological stress
- Ambient air from outdoors is unacceptable
- Ventilation system (s) are not operated and maintained as designed
- When high polluting events occur: smoking, painting, certain hobby activity and others that overwhelm the ventilation system.

Note: Addendum T brings unvented space heaters into the scope of this standard, allows 62.2 to set requirements related to these devices.

### 13.6 Whole-Building Ventilation Requirements and Calculations

4.1 Ventilation Rate. A mechanical exhaust system, supply system, or combination thereof shall be installed to operate for each dwelling unit to provide continuous dwelling-unit ventilation with outdoor air at a rate not less than specified in Section 4.1.1.

4.1.1 Total Ventilation Rate. The total required ventilation rate ( $Q_{tot}$ ) shall be as specified in Table 4.1a or, alternatively, calculated using Equation 4.1a.

- Equation (4.1a)  $Q_{tot} = 0.03A_{floor} + 7.5$  (number of bedrooms +1)

### 13.7 New or Existing Single-Family Buildings

ASHRAE Formula – Eq. 4.1a:

$$\begin{aligned} \text{cfm}_{fan} = & \mathbf{0.03A_{floor} + 7.5 \text{ (Number of bedrooms + 1)}} \\ & \mathbf{+ \text{ (alternative compliance supplement)}} \\ & \mathbf{- \text{ (Infiltration credit)}} \end{aligned}$$

A = conditioned floor area; “the part of the building that is capable of being thermally conditioned for the comfort of occupants.” (ASHRAE 62.2)

- Assumes two occupants in master bedroom and one each in the other bedrooms. Over this density, increase ventilation by 7.5 cfm/person.
- Whole building, intermittently operating ventilation may be used under some conditions for compliance.
- Ventilation air must come directly from the outdoors.
- Credit is allowed for envelope air leakage in some cases based on ASHRAE 62.2.

**Table 4.1a: Minimum Ventilation Air Requirements, In cfm, New Buildings**

Floor Area (S.F.)	Number of Bedrooms				
	1	2	3	4	5
< 500	30	38	45	53	60
501-1000	45	53	60	68	75
1001-1500	60	68	75	83	90
1501-2000	75	83	90	98	105
2001-2500	90	98	105	113	120
2501-3000	105	113	120	128	135
3001-3500	120	128	135	143	150
3501-4000	135	143	150	158	165
4001-4500	150	158	165	173	180
4501-5000	165	173	180	188	195

### 13.8 Whole-Building Ventilation-Occupant Density

4.1.1 Different Occupant Density – where higher occupant numbers are known, increase the ventilation rate by 7.5 cfm for each additional person.

### **13.9 (4.1.2) Infiltration Credit**

**Formula:**  $.052 \times \text{cfm50} \times s \times \text{swf}$

- Where S equals building story (building height) factor, swf = wind and shielding factor.
- 1 Story factor = 1
- 1.5 Story = 1.18
- 2 Story = 1.32
- 2.5 Story = 1.44
- 3 Story = 1.55
- SWF for Kentucky Weather Stations: See Table B1 page 25 of ASHRAE 62.2- 2016
- Lexington – 0.48, Louisville – 0.47, BG – 0.43, London – 0.42
- Jackson – 0.38, Northern KY – 0.50, Somerset - 0.38, Fort Campbell AAF – 0.44

### **13.10 (4.2) System Type**

The whole house ventilation system shall consist of:

- One or more supply or exhaust fans and associated ducts and controls
- Local exhaust fans shall be permitted to be part of a mechanical exhaust system
- Outdoor air connected to the return side of an air handler shall be permitted as supply ventilation as long as minimum return air temperatures are maintained per manufacturer. (Normally 55 degrees F.)

### **13.11 (4.3) Airflow Measurement**

The airflow required is the quantity of outdoor ventilation air supplied and/or indoor air exhausted by the ventilation system as Installed and shall be measured using a FLOW HOOD, flow grid, or other airflow measuring device.

### **13.12 (4.4) Controls and Operation**

- The “fan on” switch on a HVAC system shall be permitted as an operational control for systems introducing ventilation air through a duct to the return side of a system.
- Readily accessible override control must be provided to the occupant.
- Local exhaust fan switches and fan on switches are permitted as override controls.
- Controls must be appropriately labeled.
- Exception: An intermittently operating whole-house ventilation may be used if the rate is adjusted per section 4.5

### **13.13 (4.5) Variable Mechanical Ventilation:**

- See sections 4.5, 4.5.1, 4.5.2, 4.5.2.1, 4.5.2.2, 4.5.2.2.1, 4.5.3 and 4.6 of ASHRAE Standard 62.2

### **13.14 (5.) Local Exhaust**

5.1 Local Mechanical Exhaust - Shall be installed in kitchen and bathroom

NOTE: Each local ventilation system shall be either: intermittent or continuous

5.2 Demand-Controlled Mechanical Exhaust - Designed to be operated as needed by the occupant

5.2.1 Controls and Operation



5.2.2 Ventilation Rate - Minimum airflow rate: Table 5.1 Kitchen 100cfm and Bathroom 50 cfm intermittent

5.3 Continuous Mechanical Exhaust - Installed to operate without occupant intervention

5.3.1 Control and Operation

5.3.2. Ventilation Rate - Minimum delivered ventilation rate: Table 5.2 Enclosed Kitchen 5 ach (based on volume) and bathroom 20 cfm during each hour of operation

5.4 Airflow Measurement

- Must be measured using flow hood or another device
- Exception: ducts meeting Prescriptive Duct Sizing requirements in Table 5.3

### **13.15 (6.) Other Requirements**

- 6.1 Adjacent Spaces – prevent contaminants from adjoining spaces such as garages
- 6.1.1 Compliance for Attached Dwelling Units
- 6.2 Instructions and Labeling – information and instruction for system operation and maintenance
- 6.3 Clothes dryers must be exhausted to the outdoors
- 6.4 Combustion and Solid-Fuel Burning Appliances – negative pressure issues from exhaust fan operation. 15cfm/100ft<sup>2</sup> area limit
- 6.5 Air tightness requirements
- 6.5.1 requires air-sealing garage from occupiable space
- 6.5.2 requires duct sealing
- 6.6 ventilation openings
- 6.6.1 habitable space
- 6.6.2 toilets and utility rooms
- 6.7 minimum infiltration
- 6.7.1 filter pressure drop
- 6.8 air inlets
- 6.8.1 ventilation opening
- 6.9 carbon monoxide alarm

### **13.16 (7.) Air Moving Equipment**

- All air – moving equipment used must comply with this standard
- 7.1 Selection and Installation
- 7.2 Sound rating
- 7.2.1 Dwelling unit ventilation or continuous local exhaust fans
- 7.2.2 Demand controlled local exhaust fans
- 7.3 Exhaust ducts
- 7.3.1 Multiple exhaust fans using one duct
- 7.3.2 Single exhaust fan ducted to multiple inlets
- 7.4 Supply ducts

### **13.17 References: Normative Appendix A: Existing Buildings (ASHRAE 62.2-2016)**

#### **A1. Summary**

- Provides alternative compliance options for existing buildings and the associated ventilation equipment in the existing building
- Intended for buildings that have already been occupied without meeting the standard (such as WX units)

#### **A2. Dwelling Unit Mechanical Ventilation Rate**

Required mechanical rate shall be:

- Ventilation rate in section 4.1
- Plus additional airflow calculated from local exhaust deficit
- Minus Infiltration credit

#### **A3. Local Exhaust**

- A3.1 Initial room airflow deficit
- A3.2 Window opening credit (20cfm)
- A3.3 Required Additional Airflow

#### **A4. Air Moving Equipment**

- A4.1 Selection installation and sound rating
- A4.2 Airflow rating
  - A4.2.1 Existing fans intended for use as dwelling unit mechanical ventilation must be measured consistent with requirements of section 4.3
  - A4.2.2 Existing fans intended for local exhaust only shall be measured consistent with requirements of section 5.4
    - Exception: if the fan flow rate cannot be measured and the fan airflow rating at .25" of water (62.5 Pa) are not available, but fan airflow rating is available for .1" of water (25 Pa) and the duct sizing requirement of Table 5.3 can be verified, those ratings may be used provided they are reduced by 25%.

### **13.18 New or Existing Buildings: ASHRAE Formula – Eq. 4.1a**

$cfm_{fan} = 0.03A_{floor} + 7.5 (\text{Number of bedrooms} + 1) + (\text{alternative compliance supplement}) - (\text{Infiltration credit})$

A = conditioned floor area; "the part of the building that is capable of being thermally conditioned for the comfort of occupants." (ASHRAE 62.2)

- Assumes two occupants in master bedroom and one each in the other bedrooms. Over this density, increase ventilation by 7.5 cfm/person.
- Whole building, intermittently operating ventilation may be used under some conditions for compliance.
- Ventilation air must come directly from the outdoors.
- Credit is allowed for envelope air leakage in some cases, based on ASHRAE 62.2.

### **13.19 ASHRAE 62.2 for Retrofits**

- Option One Use this Formula:

- $\text{cfm} = \text{Floor area} \times .03 + (\# \text{ of bedrooms} + 1) \times 7.5$
- Option Two use the Table:

Floor Area (S.F.)	Number of Bedrooms				
	1	2	3	4	5
< 500	30	38	45	53	60
501-1000	45	53	60	68	75
1001-1500	60	68	75	83	90
1501-2000	75	83	90	98	105
2001-2500	90	98	105	113	120
2501-3000	105	113	120	128	135
3001-3500	120	128	135	143	150
3501-4000	135	143	150	158	165
4001-4500	150	158	165	173	180
4501-5000	165	173	180	188	195

### **13.20 ASHRAE 62.2 for Retrofits: Additional Requirements**

- The Local (Spot) Ventilation Requirement
  1. ASHRAE 62.2 requires local spot ventilation
  2. Fan Deficit Rule
  3. Deficit may not be below zero for any bathroom or kitchen

### **13.21 Calculating the Infiltration Credit**

- Measured Post cfm50 Infiltration
- Infiltration Credit Formula

### **13.22 Measured Infiltration**

- $\text{Measured Infiltration} = 0.052 \times \text{cfm } 50 \times S \times \text{SWF}$   
Where: S equals: building story factor and SWF equals: wind and shielding factor

### **13.23 Alternative Compliance Supplement for Existing Dwellings**

- Appendix A of ASHRAE 62.2

### **13.24 Alternative Compliance Path**

- For existing dwellings only.
- Provides an alternative method of meeting Local exhaust requirements in kitchens and bathrooms that do not have existing ventilation as required by ASHRAE 62.2.
- For existing fans being used, 62.2 sound and ducting requirements are not applicable.
- You must measure flow if ratings don't exist and duct sizing cannot be verified. If you only have a rating at .10 IWC, not .25 IWC, you can reduce the rating at .10 IWC by 25%.
- If you cannot measure flow or determine ratings, you must assume a zero flow for the fan.

### **13.25 Calculating Intermittent Flow Rates**

- Refer to Sections 4.5, 4.5.1, 4.5.2, 4.5.3 and 4.6 of ASHRAE 62.2 Standard

Ventilation sample to illustrate continuous vs. intermittent

**Assumptions** (I know it's not this simple – but keep it simple)

- Pollutant – continuous source every hour same amount added
- 1 ach dilutes pollutants by  $\frac{1}{2}$
- The 3 homes are the identical except ventilation

HOUSE A - Continuous Ventilation – 1 ach thus 24 air changes in day

HOUSE B - Intermittent ventilation 1 – fan is turned on one hour per day with 24 ach (same air exchange as continuous)

HOUSE C - Intermittent ventilation 2 – fan is turned on at noon and midnight with 12 ach (same air exchange as continuous)

“WHICH HOUSE DO YOU WANT TO LIVE IN? “

Example: 1000 ft<sup>2</sup> home with 3 bedrooms

40 cfm Continuous needed

Intermittent Rate:

Fan runs 50% of the time

With a cycle time of 1 hour

(fan runs 30 minutes per hour)

$40\text{cfm} \div (0.5 \times 1) = 80 \text{ cfm}$

40 cfm Continuous needed

Intermittent Rate:

Fan runs 33% of the time

With a cycle time of 1 hour

(fan runs 20 minutes per hour)

$40\text{cfm} \div 33 = 122 \text{ cfm}$

### **13.26 Prescriptive Duct Sizing**

Refer to ASHRAE standard Table 5.3. This table assumes no elbows. Deduct 15' of allowable duct length for each elbow.

### **13.27 Other Requirements**

- 6.1 Adjacent Spaces: Measures shall be taken to minimize air movement across envelope components separating dwelling units from garages, unconditioned crawlspaces, unconditioned attics, and other dwelling units. Pressure boundary wall, ceiling and floor penetrations shall be sealed as shall any vertical chases adjacent to dwelling units. Doors between dwelling units and common hallways shall be gasketed or made substantially airtight. Supply and balanced ventilation systems shall be designed and constructed to provide ventilation air directly from the outdoors.

- 6.1.1 Compliance for attached dwelling units: one method of demonstrating compliance with section 6.1 shall be to verify a leakage rate below a maximum of .3 cfm per square foot (150 L/s per 100m<sup>2</sup>) of the dwelling unit envelope area (i.e. the sum of the area of the walls between the dwelling units, exterior walls, ceilings and floor) at a test pressure of 50 Pa by a blower door test conducted in accordance with either ANSI/ASTM-E779<sup>2</sup> or ANSI/ASTM-E1827<sup>6</sup>. The test shall be conducted with the dwelling unit as if it were exposed to outdoor air on all sides, top, and bottom by opening doors and windows of adjacent units.
- 6.2 Instructions and Labeling: Information on the ventilation design and/or ventilation systems installed, instructions on their proper operation to meet the requirements of this standard, and instructions detailing required maintenance (similar to that provided for HVAC systems) shall be provided to the owner and the occupant of the dwelling unit. Controls shall be labeled as to their function (unless the function is obvious, such as a toilet exhaust fan switch). See section 13 of ASHRAE guideline 24<sup>5</sup> for information on instructions and labeling.
- 6.3 Clothes dryers. Clothes dryers shall be exhausted directly to the outdoors. Exception: condensing dryers plumbed to a drain.
- 6.4 Combustion and Solid Fuel Burning Devices:  
The standard requires the following:
  1. Adequate combustion and ventilation air.
  2. That the vent system for all combustion appliances be properly installed.
  3. Maximum exhaust flow: The two largest exhaust fans cannot exceed 15 cfm/ 100 ft<sup>2</sup> if there are atmospherically vented appliances inside the home. If the total net flow exceeds this limit, the net exhaust flow must be reduced by reducing the exhaust flow or providing compensating outdoor air.

### **13.28 (6.5) Air Tightness Requirements**

- 6.5.1 Garages: When an occupiable space adjoins a garage, all walls, floors and ceilings that separate the garage from the occupiable space must be air sealed.
- 6.5.2 Duct systems: All duct work outside the conditioned space shall be sealed. If the air handler and/or ducts are located in the garage, the garage door to the outside must be open when the duct leakage is tested.
- 6.6 Ventilation opening area: Spaces shall have ventilation openings as listed in the following subsections. Such openings shall meet the requirement of Section 6.8. Exceptions: attached dwelling units and spaces that meet local ventilation requirements set for bathrooms in section 5.
  - 6.6.1 Habitable space: Each habitable space shall be provided with ventilation openings with an openable area not less than 4% of the floor area or less than 5 ft<sup>2</sup>.
  - 6.6.2 Toilets and Utility Rooms: Toilets and utility rooms shall be provided with ventilation openings with an openable area not less than 4% of the floor area or less than 1.5 ft<sup>2</sup>.  
Exceptions:
    - 1. Utility rooms with a dryer exhaust duct
    - 2. Toilet compartment in bathrooms

### **13.29 (6.7) Minimum Filtration:**

- Mechanical systems that supply air to an occupiable space through ductwork exceeding 10 feet in length shall be provided with a filter having a designated minimum efficiency of MERV 6 or better.

6.8 Air Inlets: Requires that air inlets as part of the ventilation design are not within 10 ft of known source of contamination such as stack, vent, exhaust hood or vehicle exhaust.

6.8.1 Ventilation Openings Operable windows, skylights, through-the-wall inlets, window air inlets, or similar devices shall be readily accessible to occupants.

6.9 Carbon monoxide alarms: A carbon monoxide alarm shall be installed in each dwelling unit in accordance with NFPA 720.

#### **Key Points to Remember:**

- Don't oversize fans
- Use the most efficient equipment available.
- Use the most durable equipment available.
- Set the post ventilation rate as low as possible. Utilize the window credit whenever possible.
- Verify fan rate setting for accuracy after post blower door.
- Take ownership of the process.

### **13.30 Indoor Air Quality and Ventilation-Required Evaluator Procedures**

The evaluation shall include inspection of air infiltration sources, air barriers and ventilation. Specifically, the evaluation shall:

1. Identify existing sources of indoor air pollution for occupants.
2. Evaluate terminations of all exhaust fans and clothes dryers and determine whether the exhaust fans and clothes dryers vent to outdoors.
3. For houses with an attached or "tuck under" garage, identify joints, seams, penetrations, openings between door assemblies and their respective jambs and framing, and other **sources** of air leakage through walls and ceilings separating the garage from the residence and its attic area
4. Conduct a review of any existing ventilation systems in the dwelling. If it is available, refer to any ventilation system documentation provided by the equipment manufacturer, system designer or installer that could identify the type of systems, location, designed and tested performance, and/or specifications of the equipment.
5. Determine the ventilation requirements as outlined in the following section. Consider the house ventilation as a system, including both whole-building ventilation and local exhaust ventilation
  - a. Determine the required whole-building ventilation rate. Calculate the whole-building mechanical ventilation requirement using the approach in ANSI/ASHRAE 62.2-2016: Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, Section 4. The nominal fan size to provide continuous airflow in cubic feet per minute (cfm) is

based on the number of bedrooms and the conditioned floor area of the home.  
Determine the minimum required flow rate in cfm (based on continuous operation)  
using this formula:

$$Q_{\text{tot}} = (0.03 \times \text{conditioned floor area}) + (7.5 \times (\text{number of bedrooms} + 1))$$

- b. Determine the required local ventilation for each kitchen and for each full bath (any bathroom including either a tub, shower or sauna) as follows:
  - i. Each kitchen must have a demand-controlled exhaust fan that operates at a minimum of 100 cfm, for downdraft units in a non-enclosed kitchen it is 300 cfm; in an enclosed kitchen, it is 300 cfm or a capacity of 5 ach and each bath must have a demand-controlled exhaust fan that operates at a minimum of 50 cfm or 20 cfm continuous.
  - ii. Measure the flow rate of any existing kitchen and bath fan(s) that exhaust to outdoors.
  - iii. For each kitchen and bath, determine the shortfall by subtracting the measured flow from the required flow rate.
6. For each kitchen and bath, any shortfall in the existing ventilation flow may be addressed by adding a new fan, replacing an existing fan, upgrading the fan or ducts to increase flow, or supplementing it with another fan.
  - A. **Alternate:** For previously occupied buildings, the alternative compliance path specified in ANSI/ASHRAE 62.2-2016: Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, Appendix A – Existing Buildings, may be used to address a shortfall in local exhaust flow(s). If Appendix A is used, the required whole-building flow rate  $Q_{\text{tot}}$ , shall be adjusted and any existing fans may be left in place. If chosen, apply the alternative compliance path as follows:
    - i. For any kitchen or bathroom with an operable window (regardless of how many), 20 cfm may be subtracted as a credit against the shortfall. The result is referred to as the local exhaust deficit for that room. The 20-cfm credit applies to each kitchen or bathroom independently; an operable window can only reduce the cfm requirement for the room containing the window. For each room, the deficit shall not be less than zero.
    - ii. Total the deficits of all kitchens and baths for which Appendix A will be used and divide the result by 4. This is the alternative compliance supplement.
    - iii. Add the final supplement in cfm to the required whole-building continuous ventilation rate,  $Q_{\text{tot}}$ . For example: A house has an existing kitchen fan with a measured flow rate of 50 cfm, and an operable window exists in the kitchen. The house has one bathroom with no window, and a measured flow rate of 40 cfm. The deficit is  $(100 - 50 - 20) + (50 - 40) = 40$  cfm. The supplement to the whole-building requirement is  $40 \div 4 = 10$  cfm. Thus 10 cfm would be added to the whole-building ventilation rate,  $Q_{\text{tot}}$ .

- iv. The alternative compliance supplement must be added to the whole-building ventilation rate,  $Q_{tot}$ , before the infiltration credit  $Q_{inf}$  (calculated as outlined in the following section) is subtracted.

7. Infiltration Credit:  $Q_{tot}$  may be further adjusted if a blower door test has been performed.

**Note:** This credit must be based on the final blower door testing upon completion of any air sealing completed in the dwelling. The following formula can be used to determine the infiltration credit:

$$Q_{inf} = 0.052 \times Q_{50} \times S \times wsf$$

**Where:**

- $Q_{inf}$  = Infiltration credit in cfm
- $Q_{50}$  = blower door measurement
- $S$  = Story factor
- $wsf$  = weather and shielding factor for nearest weather station from ANSI/ASHRAE 62.2-2016: Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, Appendix B

Number of stories	Story Factor (S)
1	1
1.5	1.18
2	1.32
2.5	1.44
3	1.55

**For existing buildings,  $Q_{fan} = Q_{tot} - Q_{inf}$**

**Where:**

- $Q_{fan}$  = required mechanical ventilation rate, cfm
  - $Q_{tot}$  = Total required ventilation rate, cfm (including any alternative compliance supplement added in accordance with Section 8.5.3.1 of BPI Standard 1200S201X)
  - $Q_{inf}$  = Infiltration credit in cfm
8. After adjusting the whole building ventilation requirements for local ventilation deficits and infiltration credits, and accounting for existing conditions in the home, determine one or more design strategies that can provide the amount of whole-building ventilation needed, as follows:
- i. The system may consist of one or more exhaust or supply fans, balanced fans, heat or energy recovery ventilators, or outdoor air ducts supplied to the return side of the air handler if the manufacturer's requirements for return air temperature are met. Local exhaust fans such as a bathroom or kitchen fan may be used as the whole-building ventilation system. **Note:** If a bathroom exhaust fan is operated continuously to satisfy the whole-building ventilation rate, the air flow requirement



for that bath fan may be reduced from 50 cfm to the whole-building rate, or to 20 cfm, whichever is larger.

- ii. The whole-building ventilation system may run intermittently, but the fan flow rate must be adjusted. As long as the fan and controls can provide the required average cfm at least once in every three-hour period, the delivered flow rate is simply the actual fan flow rate times the fractional on time. For example, if 50 cfm is needed to satisfy  $Q_{fan}$ , a 100-cfm fan that runs 30 minutes per hour meets the requirement. If cycle times are longer than three hours, (including both on- and off- periods), the flow rate in cfm shall be adjusted in accordance with ASHRAE 62.2-2016, Section 4.5.2.
  - iii. The system must have a readily accessible and appropriately labeled override switch that allows occupants to suspend normal system operation.
  - iv. Ventilation products must be tested and certified for airflow and sound level in compliance with ANSI/ASHRAE Standard 51/AMCA 210 ANSI/AMCA Standard 210-07 | ANSI/ASHRAE 51-07: Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating and rated in accordance with the airflow and sound rating procedures of the Home Ventilating Institute (HVI) and they must carry a certification label such as HVI. (Label should be visible inside the housing.)
  - v. Newly installed local exhaust fans that run continuously and all whole-building ventilation fans must have a sound rating of 1.0 sone or less. **Exceptions:** remotely mounted fans or systems utilizing a central air handler fan have no sound rating requirement.
  - vi. Newly installed local exhaust ventilation systems that are not run continuously must have a sound rating of 3.0 sones or less. **Exceptions:** remotely mounted fans or fans with a maximum rating of at least 400 cfm have no sound rating requirement.
9. Ventilation systems must be tested for airflow after installation.
- a. Testing may be done with a flow hood, flow grid, or other flow measuring device. (For example, a flow box with a calibrated opening connected to a manometer can be used to measure exhaust flows.)
  - b. Test to ensure that each newly installed, upgraded or modified local exhaust fan provides the cfm airflow required as determined in paragraph 8 of section 14.31.

### **13.31 Normative Appendix B**

Normative Appendix B—

Infiltration Effectiveness

Weather and Shielding Factors

Reference: ASHRAE 62.2-2016 Normative Appendix B

**TABLE B1 US Climates**

<b>TMY3</b>	<b>wsf</b>	<b>Weather Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>State</b>
724210	.50	Cincinnati, Northern KY AP	39.05	-84.67	Kentucky
724220	.48	Lexington Bluegrass AP	38.03	-84.60	Kentucky
724230	.47	Louisville Standiford Field	38.18	-85.73	Kentucky
7244235	.41	Louisville Bowman Field	38.23	-85.67	Kentucky
724236	.38	Jackson Julian Carroll AP	37.58	-83.32	Kentucky
724238	.47	Henderson City	37.82	-87.68	Kentucky
724240	.45	Fort Knox Godman AAF	37.90	-85.97	Kentucky
724243	.42	London-Corbin AP	37.08	-84.08	Kentucky
724350	.46	Paducah Barkley Regional AP	37.05	-88.77	Kentucky
724354	.38	Somerset (AWOS)	38.00	-84.60	Kentucky
746710	.44	Fort Campbell AAF	36.67	-87.48	Kentucky
746716	.43	Bowling Green Warren Co AP	36.98	-86.43	Kentucky

**13.32 Client Education Requirements:**

- Provide client with information on functions, use, and maintenance of ventilation system and components.
  - Include a disclaimer that ASHRAE 62.2 does not account for high polluting sources or guarantee indoor air quality.
- Obtain signed documents proving delivery of the above materials to the client.

### *Definitions of WAP Terms*

- **200 percent of Poverty:** At or below 200 percent of the poverty level as determined in accordance with criteria established by the Director of the U.S. Office of Management and Budget for the Commonwealth of Kentucky.
- **Acceptable Indoor Air Quality (IAQ):** air toward which a substantial majority of occupants express no dissatisfaction with respect to odor and sensory irritation and in which there are not likely to be contaminants at concentrations that are known to pose a health risk.
- **Adjustments:** Anything that is found after the initial work measures were first performed and reported as a completion. These units do not constitute a new completion; it is an Adjustment to the original completion. Adjustments can only be allowed to units that have not been reported as completions in the current quarter. All Adjustments must have KHC approval. Please note Service Costs Adjustments to Labor and Materials can only be done in the quarter the job was recorded as Complete.
- **Air Cleaning:** the use of equipment that removes particulate, microbial, or gaseous contaminants (including odors) from air.
- **Air, Exhaust:** air discharged from any space to the outside by an exhaust system.
- **Air, Indoor:** air in an occupiable space.
- **Air, Outdoor:** air from outside the building taken into a ventilation system or air from outside the building that enters a space through infiltration or natural ventilation openings.
- **Air, Transfer:** air moved from one occupiable space to another, usually through doorways or grilles.
- **Air, Ventilation:** outdoor air delivered to a space that is intended to dilute airborne contaminants.
- **Air Change Rate:** airflow in volume units per hour divided by the volume of the space on which the air change rate is based in identical units (normally expressed in air changes per hour [ach]).
- **Annual Exposure:** the time-integrated concentration taken over one year that would occur for a constant source strength.
- **Balanced System:** one or more fans that supply outdoor air and exhaust building air at substantially equal rates.
- **Bathroom:** any room containing a bathtub, a shower, a spa, or similar source of moisture.
- **Cancelled Unit:** This type of job status is client driven and usually applies after work has begun at the unit. Examples of a cancelled job would be: client denies reentry, client denies ECM, client puts house on the market, etc. Labor and Material Service Costs can be billed for reimbursement.
- **Climate, hot humid:** climate in which the wet-bulb temperature is 670 F or higher for 3500 hours or more, or 730 F or higher for 1750h or more, during the warmest six consecutive months of a year that is typical for that geographic area. See section 8.

- **Climate, very cold:** climates that have more than 9000 annual heating degree-days base 65 degrees F.
- **Completed Jobs:** dwellings that have received regular weatherization and health and safety services and have been inspected by a certified DNE/Energy Auditor or QCI.
- **Conditioned space:** the part of the building that is capable of being thermally conditioned for the comfort of occupants.
- **Contaminant:** a constituent of air that may reduce acceptability of that air.
- **Deferral/Walk Away:** occur when agencies encounter problems at the unit that are beyond the scope of the Weatherization Assistance Program (WAP). These units have been inspected by a qualified person who has determined that conditions are present which prohibit rendering service. Only Material Service Costs can be billed for reimbursement. The need for this type of job status is agency driven.
- **Department of Energy Glossary:** [Link](#) to Weatherization Assistance Program Standardized Training Curricula and terms.
- **DOE Weatherized Unit:** Per WPN 04-1, 2003 (p. 25): To assist State and local agencies in determining what a DOE weatherized unit is, DOE offers the following definition. A DOE Weatherized unit is: A dwelling unit on which a DOE-approved energy audit or priority list has been applied and weatherization work has been completed. As funds allow, the DOE measures installed on this unit have a Savings-to-Investment Ratio (SIR) of 1.0 or greater, but also may include any necessary energy-related health and safety measures. The use of DOE funds on this unit may include, but are not limited to, auditing, testing, measure installation, inspection, or use of DOE equipment and/or vehicles, or if DOE provides the training and/or administrative funds. Therefore, a dwelling unit that meets both the definition of a DOE weatherized unit and has DOE funds used directly on it must be counted as a DOE completed unit.  
The above definition is not intended to impede or otherwise cause difficulties to States and local agencies that have entered into a leveraging partnership where other sources of funds are involved. If there is uncertainty in determining how best to account for the completed weatherized units under such an arrangement, contact your respective Regional Office for guidance.
- **Dwelling Unit:** a single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.
- **Dwelling Unit, attached:** a dwelling unit sharing demising walls, floors, ceilings, or common corridors with another dwelling unit or occupiable space.
- **Effective annual average infiltration rate:** the constant air infiltration rate that would result in the same average indoor pollutant concentration over the annual period as actually occurs under varying conditions.
- **Environmental intervention blood lead level (EIBLL):** a confirmed concentration of lead in whole blood equal to or greater than 20 µg/dL (micrograms of lead per deciliter) for a single test or 15-19 µg/dL in two tests taken at least 3 months apart.
- **Exhaust system:** one or more fans that remove air from the building, causing outdoor air to enter by ventilation inlets or normal leakage paths through the building envelope.
- **Exhaust flow, net:** flow through an exhaust system minus the compensation outdoor through any supply system that is interlocked to the exhaust system.

- **Floor area:** all above- and below-grade finished areas as defined in ANSI Standard Z765<sup>1</sup>.
- **Habitable space:** building space intended for continual human occupancy; such space generally included areas used for living, sleeping, dining, and cooking but does not generally included bathrooms, toilets, hallways storage areas, closets, or utility rooms.
- **Heating degree -day:** the difference in temperature between the outdoor mean temperature over a 24 h period and a given base temperature of a building space; that is, for heating degree-day base 65° F (18° C), for any one day, when the mean temperature is less than 65° F (18° C), there are as many heating degree-days as degrees Fahrenheit (Celsius) temperature difference between the mean temperature for the day and 65° F (18° C). Annual heating degree-days are the sum of the heating degree-days over a calendar year.
- **High-polluting events:** isolated and occupant-controllable events that release pollutants in excess quantities. Typical cooking, bathing, and laundry activities are not considered high polluting events.
- **In-Progress Jobs:** dwellings that have received, at minimum, an initial inspection but are not yet to the Completed job standards.
- **Infiltration:** uncontrolled inward leakage of air through cracks and interstices in any building element and around windows and doors of a building.
- **Intermittent ventilation:** intermittently operated whole-building ventilation that is automatically controlled.
- **Kitchen:** any room containing cooking appliances.
- **Kitchen, enclosed:** a kitchen whose permanent openings to interior adjacent spaces do not exceed a total of 60 ft<sup>2</sup> (6 m<sup>2</sup>).
- **Mechanical cooling:** reducing the temperature of a fluid by using vapor compression method – AC.
- **Mechanical ventilation:** the active process of supplying or removing air to or from an indoor space by powered equipment such as motor-driven fans and blowers.
- **Mixed-use building:** a building containing commercial space (corridors, parking garages, and other common spaces may be present but are not classified as commercial space) in addition to dwelling units.
- **Natural ventilation:** ventilation occurring as a result of only natural forces, such as wind pressures or differences in air density, through intentional openings such as open windows and doors.
- **New Completion:** a dwelling unit that has received Energy Systems (Health and Safety) repair or replacement (if necessary) and Regular Weatherization measures.
- **Non-transient:** occupancy of a dwelling unit or sleeping unit for more than 30 days.
- **Occupiable space:** any enclosed space inside the pressure boundary and intended for the human activities, including, but not limited to, all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas.
- **Owner Occupied Unit:** Any single-family home in which the occupant and applicant can be verified as the sole owner by a deed or a will.

- **Pressure boundary:** primary air enclosure boundary separating the indoor and outdoor air. For example: a volume that has more leakage to the outside than to the conditioned space would be considered outside the pressure boundary. Exposed earth in a crawlspace or basement shall not be part of the pressure boundary.
- **Recreational Vehicles(s) (RV) (s) and/or Camper(s):** are not eligible for services provided by the Weatherization Assistance Program. RVs or Campers means a trailer, semitrailer, truck camper or motor home primarily designed and originally constructed to provide temporary living quarters for recreational, camping, or travel use. These vehicles have temporary utility hook up ability and are designed to be transported on a regular basis with or without licensure or permit. Some manufacturers of these vehicles have identification designations that describe them as a mobile home, but a manufacturer's designation does not qualify for proof of eligibility status.
- **Rental Unit:** Any single-family homes, duplexes, tri-plex or four-plex and multifamily structures for which rent is charged.
- **Readily accessible:** capable of being quickly and easily reached for operation, maintenance, and inspection.
- **Residential occupancies:** occupancies that are not classified as institutional by the authority having jurisdiction and that also contain permanent provisions for sleeping.
- **Re-Work:** KHC monitoring staff identified corrective actions or findings relative to site deficiencies. A WX710 can be submitted to show the corrective action Re-Work has been completed. (Re-weatherized and Re-Work are not the same.)
- **ReWX (Re-weatherization) Completion:** A dwelling unit weatherized prior to September 30, 1994, or has been damaged by fire, flood, or act of God, and repair of the damage to weatherization materials is not paid for by insurance, is eligible for further assistance. These types of units shall be reported as re-weatherized completions. NOTE: 10 CFR 440.18(f)(2)(ii); or (2) "the dwelling units partially weatherized under [WAP] or under other Federal programs during the period September 30, 1975, through September 30, 1994, may receive further financial assistance for weatherization. . ." 10 CFR 440.18(f)(2)(iii).
- **Sleeping unit:** a room or space in which people sleep that can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.
- **Source:** an indoor object, person, or activity from which indoor air contaminants are released; or a route of entry of contaminants from outdoors or sub-building soil.
- **Supply system:** one or more fans that supply outdoor air to the building, causing air to leave by normal leakage paths in the building envelope.
- **System:** equipment and other components that collectively perform a specific function, such as mechanical cooling or ventilation.
- **Time average airflow rate:** the total volume of air provided during a period of time divided by the time period.
- **Toilet:** space containing a toilet, water closet, urinal, or similar sanitary service.
- **Utility:** laundry, lavatory, or other utility room containing sinks or washing equipment.

- **Ventilation:** the process of supplying outdoor air to or removing indoor air from a dwelling by natural or mechanical means. Such air may or may not be conditioned.
- **Walk Away:** See Deferral/Walk Away above.

## *12 Steps to Working with Lead Based Paint*

Weatherization workers are covered by 2 regulations: DOE (LSW) and EPA (RRP)

1. Complete the required DOE-approved training for lead based paint and other training as required, including Certified Renovator training.
2. Determine the age of the property. If 1978 or earlier, use lead safe practices.
3. Determine if lead based paint is present in the home by either making a written attestation by a Certified Renovator that Lead Paint is assumed to be in the home or by using an EPA approved test swab kit, or by collecting a paint chip from the components to be disturbed for laboratory analysis. In addition, test **all areas** that will be disturbed by the work you will be doing.
4. Educate the client and give them the “Renovate Right” booklet and get a signature to prove they received the booklet. LSW always requires either Level 1 or Level 2 containment. If less than 6 ft<sup>2</sup> on the inside and/or less than 20 ft<sup>2</sup> on the outside, you will do a LEVEL 1 containment which involves putting plastic on the floor. If greater than 6 ft<sup>2</sup> and/or 20 ft<sup>2</sup> or if it involves windows or doors, you will have to perform a LEVEL 2 containment which involves full containment procedures on the area(s) being worked on. Under RRP no containment is required if the 6 ft<sup>2</sup> and 20 ft<sup>2</sup> conditions are satisfied. Full containment (Level 2) is required if the 6 ft<sup>2</sup> and 20 ft<sup>2</sup> conditions are not satisfied.
5. Place signs and barriers around the affected work area worded as “Caution, Lead Safe Weatherization is being performed. Do not enter this work area.” LSW recommends a barrier setback of at least 5 feet on an interior setup and 20 feet for an exterior setup, but RRP **does not** have a setback requirement.
6. Perform containment activities for each affected work area. Follow LSW and RRP guidelines. Basically, it means keeping the dust from getting out of your work area.
7. Use personal protective equipment, (PPE) while performing all work. This equipment should include: a protective suit that has a hood attached, safety glasses/goggles, disposable gloves attached to the sleeves with duct tape, a pair of booties fastened to the suit legs with duct tape, a half face mask rated at least at N-100, R-100, or P-100) which is a HEPA type filter. This mask also must be fit tested to ensure you have an air tight seal over your nose and mouth.
8. Be aware of prohibited practices. See LSW and RRP lists. Under LSW, if using power tools, you must follow Level 2 containment if not using a shroud over them attached to a HEPA vacuum. Under RRP you cannot perform power sanding, power grinding, power planing, use needle guns, nor perform abrasive blasting without a shroud and a HEPA vacuum attachment. Also: RRP totally prohibits using torching/burning and prohibits using a heat gun with a temperature greater than 1100 degrees Fahrenheit.
9. Cleanup and teardown. When mopping, use a two-bucket method. For vacuuming, use a HEPA vacuum with a beater bar, mist all plastic covers with water, fold them with the dirty side inward and place each section folded up in an air tight bag before removing from the work area, wipe off all protective suits with wet wipes and dispose of the wipes in an air-tight bag. Any vertical surfaces should be wet wiped.

10. Check your work after you are finished. Only a Certified Renovator can do a visual inspection. You must use a flashlight to inspect the areas. If you don't find anything during the visual inspection, you can move on to the cleanup verification process which also can only be performed by a Certified Renovator. This involves using a two-mop system and going over your work area in an "S" motion up to a 40 ft<sup>2</sup> maximum area, and then hold up your mop to the cleaning verification chart. If the chart shows the mop is clean, you can move on to the next step. If it does not, you must repeat the process again until the test is satisfied.
11. Waste disposal. All waste must go into a heavy-duty plastic bag and the bag must be closed air tight by goose necking the end of the bag, and then wrapping that end tightly with duct tape. Take all bags to a secured waste disposal site. Water generated during the job must have all solids filtered out and disposed of as stated above. You can then flush the water down a toilet.
12. Recordkeeping. All records generated before the job must be kept on site at the job site during the work and then all records must be retained for a minimum of 3 years. Secure these documents with a Certified Renovator Firm. You should take pictures of the work site before, during, and after the work is performed to provide additional proof and documentation you have followed procedures properly.



### *DNE Step-By-Step Checklist*

Date of Inspection: \_\_\_\_\_

Agency: \_\_\_\_\_

Evaluator/Energy Auditor Name: \_\_\_\_\_

Client Name: \_\_\_\_\_ Job # \_\_\_\_\_

1. At time of arrival, the evaluator/energy auditor tells the client about the program, explains the procedures, explains program goals, explains that any health and safety issues found will be brought to their attention, etc.
2. Evaluator/energy auditor inspects the refrigerator in client's home and determines if metering must be performed. Base load record is filled out. If metering is required, the meter will be connected to the refrigerator and metered for a minimum of 2 hours.
3. Evaluator/energy auditor checks to see if the home was built before 1978, and determines if **Lead-Based Paint, Asbestos, or Mold** is actually in the home or assumed to be in the home.
4. Evaluator/energy auditor determines if any other health and safety issues/problems exist in the home: raw sewage, pests, electrical problems, construction related problems, client health problems, etc. and determines if the problems can be corrected or if the home must be treated as a deferral.
5. Evaluator/energy auditor performs Health and Safety inspections on the main heating unit, vent systems, water heater, cooking stove, and any secondary heating systems. The appropriate WX900 inspection checklist is followed and filled out properly.

<input type="checkbox"/> Visual inspection of unit	<input type="checkbox"/> CO in oven
<input type="checkbox"/> Check gas pipe	<input type="checkbox"/> Check vent system
<input type="checkbox"/> Shutoff valves	<input type="checkbox"/> Check chimney for liner
<input type="checkbox"/> Sediment trap "T"	<input type="checkbox"/> Electrical voltage/amp tests
<input type="checkbox"/> Gas leak tests	<input type="checkbox"/> Check breakers in breaker box and compare to data plate
<input type="checkbox"/> CO tests	<input type="checkbox"/> Check wiring, wire size
<input type="checkbox"/> Stack temperature	<input type="checkbox"/> Determine if any units are in confined space, etc.
<input type="checkbox"/> Clock meter	<input type="checkbox"/> Test all drop-out safety valves for proper operation.
<input type="checkbox"/> Temperature rise	
<input type="checkbox"/> Test burners in cook stove	
6. Evaluator/energy auditor inspects the inside and outside of home, checks for existing insulation in the attic, walls, and floors with an infrared camera following program protocols, and drills inspection holes to verify/assess if needed but **only** drills inspection holes if it has been determined in **Step 3** that lead paint **is not** in the home, mold **is not** in the home, **and** asbestos **is not** in the home. If asbestos is found, do not handle any asbestos, nor remove any asbestos siding.
7. Evaluator/energy auditor checks for air bypasses in the attic and interior/exterior of home as applicable including plumbing chases, open wall cavities, dropped ceilings, etc. Evaluator/energy auditor checks to see if the home has platform or balloon framing.
8. If the home has been determined to have lead paint, **and** if any areas will be disturbed by WX work, the evaluator/energy auditor must test all areas of the interior/exterior of home where

work will be performed with an EPA approved Lead Paint Test Swab Kit, and determine the square footage of area that will be disturbed by weatherization work.

9. If applicable, the evaluator/energy auditor must state that Lead Safe Work Practices per EPA Final Rule, 40 CFR Part 745, Sub part E must be followed during all weatherization work performed on the home. Depending on the square footage being disturbed, either a **Level 1** or **Level 2** containment will be required.
10. If the home is determined to have asbestos in it, the evaluator/energy auditor must determine if the home can be weatherized without disturbing the asbestos or if the home must be treated as a deferral.
11. If the home is determined to have mold in it, the evaluator/energy auditor must determine if the home can be weatherized or must be treated as a deferral.
12. Following the procedures of ASHRAE 62.2 standards, the evaluator/energy auditor inspects all existing mechanical ventilation/exhaust fan systems in the kitchen and bathrooms, checking for proper operation and condition. Using a flow hood and properly configured digital manometer, the evaluator/energy auditor will measure actual cfm flow rates of each system and will record each reading in their audit work papers.
13. Evaluator/energy auditor sets up the blower door system properly and runs the blower door test following program protocols.
14. If applicable, the evaluator/energy auditor sets up the pressure pan and conducts pressure pan tests on the duct system of the heating/cooling system.
15. If applicable, the evaluator/energy auditor sets up the duct tester and conducts a total leakage and leakage to outside duct test.
16. The evaluator/energy auditor conducts zone pressure diagnostic tests in all applicable zones of the home per the Kentucky Weatherization Field Guide and Standard Work Specifications.
17. If applicable, the evaluator/energy auditor must perform worst case scenario CAZ tests on all combustion appliances in the home per procedures outlined in the Kentucky Weatherization Field Guide and Standard Work Specifications. Results of the tests will determine whether corrective measures must be performed on the home. All test results/comments must be documented.
18. Evaluator/energy auditor takes pictures of the interior/exterior of the home, takes measurements of all exterior walls of home, measures doors and windows, and makes general comments about the condition of the home in his/her notes.
19. Evaluator/energy auditor writes up all proposed measures on a notepad or other document for health and safety, base load, and regular weatherization.
20. If the refrigerator was metered, the evaluator/energy auditor records the meter reading and unhooks the unit from the refrigerator.
21. The evaluator/energy auditor finishes the inspection, gathers tools/equipment, and prepares a summary of the inspection.
22. The evaluator/energy auditor tells the client his/her findings/recommendations from the inspection.
23. The evaluator/energy auditor notifies the client of any health and safety issues/problems found during the evaluation, and if applicable fills out the appropriate forms, signs them, and obtains client signatures.
24. If the home is treated as a deferral, the evaluator/energy auditor explains why, and fills out the proper forms, signs them, and obtains signatures from the client.

25. If work is to proceed on the home, the evaluator/energy auditor explains that actual work performed will be based on the recommended work measures generated by the NEAT/MHEA audit.
26. The evaluator/energy auditor gives the client a copy of and explains the Mold and Moisture pamphlet, Lead Paint/Renovate Right pamphlet, other required client education materials and other applicable handouts.
27. The evaluator/energy auditor obtains client signatures to show proof of delivery of the Mold and Moisture pamphlet, Lead Paint/Renovate Right pamphlet, and other applicable client education forms or handouts.
28. The evaluator/energy auditor explains how the work will be performed, approximately when the work will be performed, that a post inspection/quality control inspection will be performed after each phase of work is completed, and the client's presence at the home is required during each post inspection/quality control inspection.
29. Evaluator/energy auditor returns to the office and keys in the inspection/home information to the NEAT/MHEA audit and enters all information completely and correctly.
30. Evaluator/energy auditor prints the NEAT/MHEA audit and report of recommended work measures, and reviews the report for accuracy and verifies that all work measures (excluding Health and Safety measures) have an SIR of at least 1.0.
31. Evaluator/energy auditor generates a work order from the NEAT/MHEA audit which will include an **estimate, crew copy/contractor bidding copy, and actual work measures/actual costs copy**.  
NOTE: all work measures performed must exactly follow the NEAT/MHEA report of recommended work measures.

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I, the undersigned Dwelling Needs Evaluator/Energy Auditor do hereby certify that all items on this DNE checklist has been completed as they apply to this home, and that all inspections and client education/client disclosures have been performed in compliance with the Kentucky Housing Corporation and DOE Weatherization Assistance Program requirements.

\_\_\_\_\_ Date: \_\_\_\_\_

Dwelling Needs /Energy Auditor

## *Pressure Pan Diagnostic Guidelines*

### **For Duct Systems Located in Unconditioned Attic, Crawl Space, and Garage**

#### **1.0 Overview**

A pressure pan is used to measure the difference between house pressure and duct pressure, thereby indicating the relative degree of leakage in each duct run. Duct leakage is not quantified, but pressure pan readings can help prioritize duct leakage sealing. Pressure pan diagnostics are used for duct systems outside the living space (in the attic, crawl space and garage).

Pressure pan testing is performed by placing a gasketed pan over each supply register and return grille, one at a time, with the air handler off and the blower door pressurizing (or depressurizing) the house to 50 Pa. The larger the pressure difference between the duct pressure and the house pressure, the leakier the duct run/branch being tested is—and the pattern of pressure pan readings often allows for quick identification of major leakage sites.

If the duct system is perfectly tight, the pressure pan readings will be zero (because house pressure is 50 Pa and duct pressure is 50 Pa). If a duct is completely disconnected, the pressure pan reading could be 50 Pa (because house pressure is 50 Pa and duct pressure is the same as outdoors, which is zero). Pressure pan readings are commonly in the 0 Pa to 20 Pa range. “Tight” systems have readings under 1 Pa.

#### **2.0 Field Procedure**

Refer to KWFG chapter 8 starting with section 8.14.1 for testing procedures.

##### **2.1 *Measuring Duct Air Leakage with a Duct tester***

*Refer to the KWFG chapter 8 section 8.14.2 for testing procedures.*

*Health and Safety Client and Home Screening Questionnaire*

**KHC Weatherization Assistance Program**

Date: \_\_\_\_\_ Applicant Name: \_\_\_\_\_

Interviewer: \_\_\_\_\_

**High Risk Household Members**

- 1. Any family members less than 4 years old? Yes\_\_\_\_ No\_\_\_\_
- 2. Any family members 60 years old or older? Yes\_\_\_\_ No\_\_\_\_
- 3. Is anyone living in the house pregnant? Yes\_\_\_\_ No\_\_\_\_
- 4. Any household members with asthma,  
Respiratory problems or flu-like symptoms? Yes\_\_\_\_ No\_\_\_\_
- 5. Any household members with sensitivity or allergies to  
Fiberglass or cellulose based materials? Yes\_\_\_\_ No\_\_\_\_

**Source of Contaminants/Pollutants**

How old is the house? \_\_\_\_\_

- 5. Any paint peeling or flaking on floors, walls or ceiling? Yes\_\_\_\_ No\_\_\_\_
- 6. Has carpet ever been water soaked? Yes\_\_\_\_ No\_\_\_\_
- 7. Is carpet covering a concrete floor? Yes\_\_\_\_ No\_\_\_\_
- 8. Are unvented combustion appliances used? Yes\_\_\_\_ No\_\_\_\_
- 9. Are portable electric space heaters used? Yes\_\_\_\_ No\_\_\_\_
- 10. Do cars park in an attached garage? Yes\_\_\_\_ No\_\_\_\_
- 11. Seasonal water pooling in crawl space? Yes\_\_\_\_ No\_\_\_\_
- 12. Any plumbing leaks in the crawl space? Yes\_\_\_\_ No\_\_\_\_

- 13. Any noticeable leaks or water staining on ceilings  
or walls? Yes\_\_\_\_ No\_\_\_\_
- 14. Any indoor pets? Yes\_\_\_\_ No\_\_\_\_
- 15. Paints, solvents, thinners, pesticides stored in home? Yes\_\_\_\_ No\_\_\_\_
- 16. Any clutter problems or unsanitary conditions? Yes\_\_\_\_ No\_\_\_\_
- 17. Has this house been tested for Radon? Yes\_\_\_\_ No\_\_\_\_
- 18. Are insecticides or rodenticides used in the home? Yes\_\_\_\_ No\_\_\_\_
- 19. Any other problems? Yes\_\_\_\_ No\_\_\_\_
- 20. Any unusual odors in the house? Yes\_\_\_\_ No\_\_\_\_
- 21. Is moisture noticeable on windows? Yes\_\_\_\_ No\_\_\_\_
- 22. Is there any visible mold anywhere in the house? Yes\_\_\_\_ No\_\_\_\_
- 23. Is the home temperature unusually warm or cold? Yes\_\_\_\_ No\_\_\_\_
- 24. Are humidity levels unusually high? Yes\_\_\_\_ No\_\_\_\_
- 25. Is indoor smoking allowed in the home? Yes\_\_\_\_ No\_\_\_\_
- 26. Has the home been tested for asbestos presence? Yes\_\_\_\_ No\_\_\_\_
- 27. Has the home been tested for lead paint presence? Yes\_\_\_\_ No\_\_\_\_

Applicant Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I have reviewed this form and do hereby affirm that no new health and safety concerns were present at the home during the Dwelling Needs Evaluation/Energy Audit except those indicated above.

Signature of Evaluator/Energy Auditor \_\_\_\_\_ Date: \_\_\_\_\_

**Checklist of Weatherization Client Education/Owner's Manual Documents**

**For each document required, a signed proof of delivery receipt is required and must be kept in the client's file.**

Check Yes/No/N/A for Each Document Listed Below

	YES	NO	N/A
" A Brief Guide to Mold, Moisture and Your Home"			
"Lead-Safe Certified Guide to Renovate Right"			
EPA HTML Publication: "Asbestos in Your Home"			
EPA publication: A Citizens Guide to Radon			
CPSC Guide to Home Wiring Hazards			
DOE/EERE "Guide to Home Ventilation"			
"What You Should Know About Space Heaters"			
Combustion Equipment Safety and Hazards			
How to Maintain a Clean Home and Correct Unsanitary Conditions----->			
EPA Indoor Air Pollutants Brochure			
Disclaimer for Unvented Space Heaters?			
Disclaimer for Portable Electric Space Heaters			

**Are any of the following owner's manuals and operating/maintenance instructions required to be given to the client?**

	YES	NO	N/A
New Furnace or Space Heater Installed			
Carbon Monoxide/Smoke Detectors			
New Refrigerator Installed			
New Water Heater			

I certify that each client education document/owner's manual has been given to the client and that each document has been explained to the client.

\_\_\_\_\_

Signature of Dwelling Needs Evaluator/Energy Auditor                      Date

I certify that each client education document checked with a YES above has been given to me AND that each document was clearly explained to me.

\_\_\_\_\_

Signature of Weatherization Client    Date

*Acronyms Used in the WAP Manual*

<b>Acronym</b>	<b>Full Phrase</b>
AFUE	Annual Fuel Utilization Efficiency
AHERA	Asbestos Hazard Emergency Response Act
AWG	American Wire Gauge
BAQ	Building Analysis and Qualifications
BLL	Blood Lead Level
BTU	British Thermal Unit
CAZ	Combustion Appliance Zone
cfm	Cubic Feet Per Minute
CFR	Code of Federal Regulations
CMF	Construction Management Fee
COI	Conflict of Interest
CO	Carbon Monoxide
CPU	Cost Per Unit
CWSR	Consolidated Weatherization Status Report
DHW	Domestic Hot Water
DUNS	Data Universal Numbering System
EA-QUIP	Energy Audit Using the Queens Information Packet
EBT	Electronic Benefit Transfer
EDR	Equivalent Direct Radiation
EEO	Equal Employment Opportunity
EER	Energy Efficiency Rating



EIBLL	Environmental Intervention Blood Lead Level
EMS	Energy Management System
ESCO	Energy Service Company
FFVR	Fiscal Field Visit Report
GFCI	Ground Fault Circuit Interrupter
H&S	Health and Safety
HEAP	Home Energy Assistance Program
HEPA	High-Efficiency Particulate Air (filter)
HERR	Heating Equipment Repair or Replacement
HNAC	Heating Normalized Annual Consumption
HVAC	Heating, Ventilation, Air Conditioning
IAQ	Indoor Air Quality
IRA	Individual Retirement Account
JTA	Job Task Analysis
kWh	Kilowatt Hour
KWFG	Kentucky Weatherization Field Guide
LIHEAP	Low Income Home Energy Assistance Program
LIHTC	Low-Income Housing Tax Credit
LSWP	Lead-Safe Work Practices
MHEA	Manufactured Home Energy Audit
M/WBE	Minority and Women Owned Business Enterprise
MOU	Memorandum of Understanding

MSDS (or SDS)	Material Safety Data Sheet
NEAT	National Energy Audit Tool
NHPA	National Historic Preservation Act
NPA	Non-Public Assistance
Pa	Pascal(s)
PFVR	Program Field Visit Report
POI	Pollution Occurrence Insurance
ppm	Parts Per Million
QCI	Quality Control Inspector
RFP	Request for Proposals
SIR	Savings-to-Investment Ratio
SSE	Steady-State Efficiency
SSI	Supplemental Security Insurance
SWS	Standard Work Specifications
T&TA	Training and Technical Assistance
TIPS	Targeted Investment Protocol System
TREAT	Targeted Retrofit Energy Analysis Tool
WAP PAC	Weatherization Assistance Program Policy Advisory Council
WPN	Weatherization Program Notice
WXPM	Weatherization Policy Manual
ZPP	Zinc Protoporphyrin (test)

*Common WAP Organizations and Their Acronyms*

Acronym	Organization Name
AAMA	American Architectural Manufacturers Association
AEA	Association for Energy Affordability, Inc.
AGA	American Gas Association
AHAM	Association of Home Appliance Manufacturers
AHRI	American Health Research Institute, Inc.
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BPI	Building Performance Institute
CAA	Community Action Agency
CAK	Community Action of Kentucky
CDBG	Community Development Block Grant
CHFS	Cabinet for Health and Family Services
CSBG	Community Service Block Grant
D&B	Dun and Bradstreet
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Protection Agency
HCA	Housing Contract Administration
HEP	Home Energy Professionals

HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
ICC	International Code Council
IRS	Internal Revenue Service
KHC	Kentucky Housing Corporation
MHINCC	Manufactured Housing Institute's National Communities Council
NASCSP	National Association of State Community Service Programs
NFPA	National Fire Protection Association
NFRC	National Fenestration Rating Council
NPC	Neighborhood Preservation Company
NREL	National Renewable Energy Laboratory
OMB	U.S. Office of Management and Budget
OSHA	U.S. Occupational Safety and Health Administration
RPC	Rural Preservation
SHPO	State Historic Preservation Officer
USDA	U.S. Department of Agriculture
WAP	Weatherization Assistance Program
WAPTAC	Weatherization Assistance Program Technical Assistance Center

### ***Weatherization Assistance Program Resources***

All Weatherization Assistance Program forms and resources are on KHC's [Weatherization Assistance Program Resources](#) web page. Please contact the [HCA Help Desk](#) for more information about the Weatherization Assistance Program.