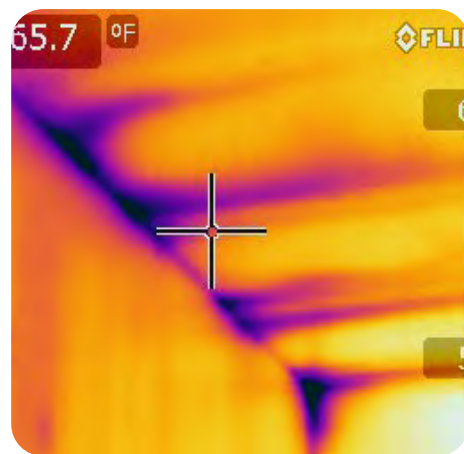
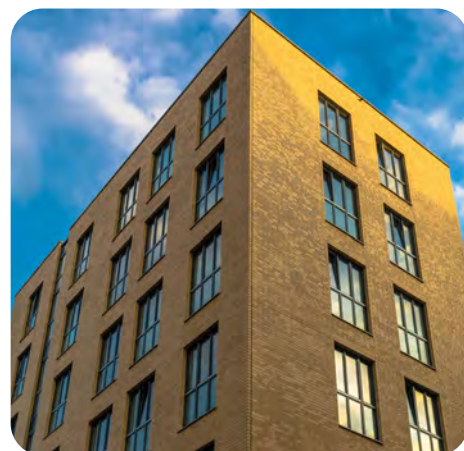




RETROFITTING NEBRASKA

FIELD GUIDE AND INSTALLATION STANDARDS - 2021



Revised 8/2022



Last updated 7 June 2021
Created by the Energy Smart Academy at Santa Fe Community College
For the Weatherization Collaborative
In alignment with the Standard Work Specifications
Created by the National Renewable Energy Laboratory,
found at <https://sws.nrel.gov>

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Chapter 1 - Inspections, Energy Audits, Deferrals and Client Education

Completing a thorough and accurate inspection and energy audit is essential for assessing how much energy a building uses, how the building uses the energy, what measures are cost effective for implementation in the building and how much in energy costs can be saved following implementation.

Utilizing a systematic process of inspecting, documenting, evaluating and analyzing the building and its energy using systems helps ensure the accuracy of the savings-to-investment ratio (*SIR*) calculations for installing energy efficiency measures through the Nebraska Weatherization Assistance Program (NeWAP).

1.01 Inspections

1.0101 Initial On-Site Inspection

Completing an accurate on-site inspection for use in completing an Energy Audit includes but is not limited to:

- Inspecting the exterior of the building and documenting:
 - the exterior sheathing material(s)
 - roof conditions, pitch, materials, and penetrations
 - building exposure, orientation and conditions
 - plumbing or electrical penetrations into the home/building
 - door and window locations, types, conditions, and sizes
- Inspecting the interior of the building and documenting:
 - wall condition, types, and thickness
 - existing insulation types, locations, and R-values
 - sources and signs of moisture and/or *vapor barriers*
 - existing electrical hazards
 - existing lead based paint
 - the location and type of existing Carbon Monoxide (CO), propane, fire detectors and smoke detectors
- Conducting Indoor Air Quality and CO Tests
- Conducting Combustion Safety and Efficiency Tests
- *Completing Combustion Appliance Zone (CAZ) Testing*
- Performing HVAC Distribution Tests
- Evaluating and documenting all existing mechanical systems, including but not limited to:
 - furnaces, boilers, heat pumps, air conditioners, water heaters
 - all system controls
 - all system working conditions
 - wiring or electrical concerns
 - signs of corrosion or rust duct and/or flue conditions or concerns
 - signs of water leakage
- Evaluating and documenting existing ventilation systems
 - existing ventilation equipment, controls and working condition
- Evaluating and documenting existing appliances
 - appliance type, age, condition, hours/patterns of use

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- Evaluating and documenting baseload equipment
 - equipment type, age, condition, hours/patterns of use
- Performing Blower Door Tests
- Verifying and evaluating the adequacy of attic ventilation
 - Use the following tables to calculate the net free area of the existing roof/attic venting:

Roof Vent	Net Free Vent Area
8" diameter	50 square inches
9" diameter	60 square inches
9.5" diameter	70 square inches
10" diameter	80 square inches
13" diameter	144 square inches
Turbine	239 square inches

Rectangular Gable Vent	Net Free Vent Area
8" x 12"	48 square inches
12" x 14"	108 square inches
14" x 24"	168 square inches
18" x 24"	216 square inches
24" x 30"	360 square inches

Soffit Vent	Net Free Vent Area
4" x 16"	32 square inches
8" x 16"	64 square inches
4" x 8"	16 square inches

Triangle Gable Vent	Net Free Vent Area
30" base	82 square inches
48" base	144 square inches
72" base	197 square inches

- Net free vent area for other size rectangular vents may be determined by using the following formula:

$$\text{Net Free Inches} = (\text{Width} \times \text{Height}) \text{ divided by } 2$$
- Net free vent area for other size triangular vents may be determined using the following formula:

$$\text{Net Free Inches} = (\text{Width} \times \text{Height}) \text{ divided by } 4$$

1.0102 Pre-Implementation Inspection

When a crew chief and/or contractors receives the weatherization file review and other related documents:

- Understand what work has been called for and what materials will be needed.

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- Note any mechanical work that was to be completed prior to the start of building shell weatherization activities.
- Know the order in which activities are to be completed.
- Clarify with the auditor anything about the job that is unclear or incomplete.
- Confirm the date/time of arrival at the client's house.
- Verify that all materials, supplies, tools, equipment are on the truck.
- Track inventory items as required.

At the job site greet the owner/tenant, identify yourself, state your purpose, and review the job schedule.

- Manage their expectations as needed.

Walk around the exterior of the home.

- Confirm the information in the audit.
- Note anything not recorded that could affect the completion of installation activities.
- Record any changes to the building exterior or problems that could interfere with installation activities.

Walk through the interior of the home.

- Confirm the information in the audit.
- Note anything not recorded that could affect the completion of installation activities.
- Record any changes to the building interior or problems that could interfere with installation activities.
- Contact your weatherization coordinator or supervisor for further instructions if:
 - The *heating plant* or other combustion appliance is malfunctioning.
 - Household members exhibit symptoms that could be from carbon monoxide poisoning. Open windows or evacuate the house if necessary.
 - There is a strong odor of heating gas or sewer gas. Open windows or evacuate the house if necessary.
 - Existing conditions have changed in ways that would make proposed work difficult or no longer cost-effective. Example: shingles/roof are in such bad shape that attic and/or slanted ceiling insulation could be damaged by water.

Complete initial diagnostics.

- Including, but not limited to, blower door and pressure diagnostics tests.
- Record test results in the client file.

Review proposed work with the client.

- Explain what will be happening, and approximately how long it will take.

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1.0103 Quality Control Inspections

Quality control inspections ensure that weatherization services have been provided in a quality manner and that the home is left in a safe condition. Subgrantees must complete a final *Quality Control Inspection* (QCI) on every unit completed before reporting it to the NDEE as completed and requesting reimbursement. The QCI must be completed by a Building Performance Institute, Inc. (BPI) Certified *Quality Control Inspector* certifying that the work has been completed in accordance with the NeWAP Work Specification Field Guide and Installation Standards, the Standard Work Specification (SWS) and 10 CFR 440.

All Quality Control Inspections will include, but not be limited to:

- ▽ A complete file review verifying:
 - Appropriate lead paint documentation **Form WX3**
 - Completion of a mold and moisture assessment **Form WX5**
 - Appropriate completion and documentation of combustion appliance testing **Form WX9**
 - Appropriate completion and documentation of blower door and pressure diagnostics
- An on-site work inspection/assessment of completed weatherization work including, but not limited to:
 - *Building envelope* insulating and air sealing
 - Installation of venting and damming for high-heat sources and insulation preservation
 - Heating, cooling and water *heating system* repairs and/or replacement
 - Energy related window/door repairs
 - Baseload energy saving work
 - Health & Safety related work
- Client interview(s)
- Core sampling must be completed on a minimum of 5% of all frame homes billed each month in which insulation is installed in an enclosed cavity. Subgrantees must test for proper weight and density by taking a minimum of 3 core samples as indicated below:
 - The core samples must be taken in random locations.
 - In sidewalls, 1 core sample must be taken within 3 feet of the top of the wall.
 - The results of the core samples must be recorded on the inspection form and retained in the client's files.
- Verify that all completed work and installed materials meet minimum state and local codes.
- Verify that all completed work and installed materials are installed according to manufacturer's instructions, unless otherwise specified by the State Plan, the Field Guide and Installation Standards.
 - A copy of the Sub-grantee QCI Documentation is required to be kept in the client file for future state and federal monitoring.

1.02 Energy Audit

NeWAP Subgrantees are responsible for conducting a site-specific inspection and Energy Audit on all frame, masonry, modular, and *manufactured housing* on all weatherization eligible dwelling units for

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both the Department of Energy (DOE) Weatherization Low-Income Assistance Program and the Department of Human Services Low Income Housing Energy Assistance Program (LIHEAP) Weatherization prior to implementing any weatherization work. Completing an accurate Energy Audit requires Auditors to appropriately analyze on-site inspection information and Audit input based on the following NeWAP requirements:

1.0201 Approved Energy Audit Tool

Using the appropriate, most current authorized version, of the NeWAP and DOE approved auditing program to determine what Energy Efficiency Measures must be implemented. The auditing tools currently approved for use in the NeWAP are:

- The Weatherization Assistant (NEAT/MHEA Audit) as approved by the U.S. Department of Energy (DOE) shall be used by all Subgrantees to conduct audits on site-built and manufactured homes. The audit tool will be used in determining the Savings to Investment Ratio (*SIR*) of each weatherization measure and the correct priority of weatherization improvements for each dwelling unit.
- The current version to be used is: Version 8.9.0.5 5, the NeWAP received a conditional approval to use the Weatherization Assistant version 8.9 (NEAT/MHEA) from DOE as listed herein on March 31, 2021. The NeWAP conditional approval expires on June 2, 2026.
- The NEAT audit will be used for all site-built single-family homes and buildings with four units or less.
- The MHEA will be used on all manufactured homes.
- Either the NEAT or MHEA audit can be used for manufactured homes where the *building envelope* has been altered with light conventional framing, manufactured homes installed on permanent foundations, *conditioned basements*, and modular homes. Auditors will select the audit tool which will provide the best opportunity to maximize the energy savings for these irregular combined construction types.
- The NeWAP does not have an approved *multi-family* audit tool. Subgrantees should contact the NDEE for guidance prior to accepting any application of a project larger than four units. Multi-family building audits must receive approval from NDEE and DOE prior to implementation.

1.0202 Energy Audit Requirements

Energy Auditors are responsible for ensuring the following requirements are completed and documented in the client file:

- Performing site-specific Energy Audits on all frame, masonry, modular, and *manufactured housing* and verifies that individual Energy Conservation Measures (ECMs) and the “overall” package of measures (including ECMs and all Incidental Repair Measures (IRMs)) are determined by the NEAT/MHEA as cost-effective.
 - Each individual ECM and “overall” package of measures installed in a dwelling unit must have a savings-to- investment ratio (*SIR*) which meets or exceeds 1.0.
 - As per the NEAT/MHEA Recommended Measures report, a measure shall only be implemented where the *SIR* of that measure is a minimum of 1.0 (with the exception of air sealing), and where the “overall” package Cumulative *SIR* is 1.0 or greater.

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- Retaining a copy of the Energy Audit in the client file.
- Using the appropriate NEAT/MHEA weather file (local weather data) when running the site-specific audit based on the physical location of the home.
- Using three-year average state fuel costs when running site-specific audits. The NDEE will provide updated fuel costs to subgrantees on an annual basis.
- Using local material and labor costs when running site-specific audits.
 - If subgrantees cannot use actual material and labor costs, use estimated material and labor costs updated a minimum of every 12 months.
- Performing and documenting accurately in the client file, the tested combustion efficiency of ALL combustion appliances at the dwelling regardless of equipment location, inside or outside the *building envelope*, and regardless of the appliances venting type.
 - The Energy Auditor shall use the testing results to determine whether appliances are operating within safe ranges or if corrections are required and compare the results to the BPI 1200 (2017) Standard. in the Energy Audit for evaluation of system replacement cost effectiveness.
- Using the tested efficiency of the existing *heating plant* in the Energy Audit analysis to verify the cost-effectiveness (*SIR*) of all individual audit measures as well as the cumulative *SIR* of the home.
 - Documenting the tested equipment efficiency in the client file with a copy of the Combustion Analysis testing diagnostic results and associated photographs.

Using, and documenting in the client file, the following efficiency derating formula when addressing an existing systems that utilizes a compressed refrigerant cycle to provide heating or cooling - does not apply to evaporative coolers.

$$\text{Degraded Efficiency} = (\text{Base EFF}) \times .99^{\text{age}}$$

Where:

Base Eff = Typical efficiency of Pre-Retrofit equipment when new
(Seasonal Energy Efficiency Ratio (SEER), Energy Efficiency Ratio (EER) or Heating Season Performance Factor (HSPF))

Age = Age of equipment in years

Example: An existing HVAC unit that is 20 years old, was originally rated at 10 SEER.

$$\text{Degraded SEER} = 10 \times 99^{20}$$

$$\text{Degraded SEER} = 10 \times .818$$

$$\text{Degraded SEER} = 8.18$$

- Verifying that:
 - Energy Audit measures recommended for implementation by the NEAT and MHEA audit have individual *SIRs* of 1.0 or greater,
 - The cumulative *SIR* for the audited home exceeds 1.0, and
 - The installation of measure(s) with a lower *SIR* (without installing others with greater *SIRs*) is not authorized.

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- Verifying and documenting that all additional weatherization mandatory requirements (include Health & Safety Measures, General Heat Waste Measures and Incidental Repair Measures) are included in the Work Order for the project. Any exceptions associated with not completing recommended or required measures must be appropriately documented in the client's file.
- Verifying that all Energy Audits are completed using the Key Parameters and Default Parameters established by the Nebraska Department of Environment and Energy with no modifications unless authorized. Including the following DOE approved Candidate Measures:
 - In single family homes: NEAT Candidate Measures mandated for use by all subgrantees:
 - R-11, R-19, R-30, R-38 and R-49 ceiling/attic insulation
 - Fill ceiling cavity
 - Sill box insulation
 - Foundation wall insulation
 - R-11, R-19 R-30 and R-38 floor insulation
 - Wall and *knee wall* insulation
 - Window sealing
 - Window replacement
 - Storm windows
 - Low E windows
 - Furnace tune up
 - High efficiency boiler
 - High efficiency furnace
 - AC tune up
 - High Efficiency AC replacement
 - Install/replace a high efficiency heat pump
 - Water heater tank and pipe insulation
 - Water heater replacement
 - Refrigerator replacements
 - Lighting retrofits
 - Low flow shower heads
 - In *Manufactured Housing*: MHEA Candidate Measures mandated for use by all subgrantees:
 - General air sealing
 - Add skirting
 - Wall fiberglass batt, loose fill cellulose and fiberglass
 - Wall fiberglass batt, loose fill cellulose and fiberglass in Additions
 - Floor loose fill fiberglass Floor loose fill cellulose and fiberglass in Additions
 - Roof loose fill fiberglass

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- Roof loose fill cellulose and fiberglass in Additions
- Add skirting on Additions
- Replace marked doors (mandatory)
- Replace wooden doors
- Replace wooden doors in Additions
- Storm doors Storm doors in Additions
- Window sealing Window sealing in Additions
- Replace single paned windows
- Replace single paned windows in Additions
- Glass or Plastic storm windows
- Glass or Plastic storm windows in Additions
- Tune *heating system*
- Tune cooling system
- Replace dx (direct expansion) cooling equipment
- Refrigerator replacements
- Lighting retrofits
- Water heater tank and pipe insulation
- Low flow shower heads
- Water heater replacement
- Replace *heating system*

Note: Blown fiberglass insulation is non-corrosive to metal skinned *manufactured housing* and can achieve good R-values and convection resistance at lower densities and weights that won't cause damage to the interior sheeting or underbelly of the home. Installations that include cellulose insulation may be completed only after warrantee information is provided by the installer ensuring no future damage to either the ceiling or underbelly of the home as a result of the use of cellulose insulation.

- The NEAT/MHEA program offers the additional ECMs (listed below) that are not approved for implementation under the NeWAP. Verify that Ineligible Materials/Measures are not recommended for implementation or installed.
 - Shade screens, rigid awnings, louver systems or window films
 - Vestibules
 - Automatic gas ignition systems
 - Microcomputer burner controls
 - Desuperheater/water heaters Energy recovery equipment
 - Whole-house fans
 - Liquefied petroleum gas storage
 - Electric freeze-prevention tape for pipes
 - Stack dampers on gas or oil-fueled water heaters
 - Gas conversion power burners for gas or oil-fueled heating systems

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- Reduce input of burner or derate gas-fueled equipment
- Vent dampers for gas or oil-fueled heating systems
- Reduce excess combustion air by reducing vent connector size of gas-fueled appliances
- Industrial-grade white paint used as a heat-reflective measure on awnings, window louvers, doors and exposed, exterior ductwork
- Verifying, as per DOE Guidance, that all repair costs are appropriately included in the audit, including:
 - The cost of Ancillary items (items necessary for the proper installation of weatherization materials) are to be included within the cost of an individual ECM when calculation the *SIR* for the ECM. And,
 - The cost of Incidental Repair Measures (IRM) (a repair necessary for the effective performance or preservation of newly installed weatherization materials, but not part of a standard installation) are to be added to the cost of the package of weatherization measures to calculate the whole unit *SIR*.
- Verifying that the home complies with ASHRAE Standard 62.2 as per DOE Guidance by Completing pre- and post-weatherization ASHRAE 62.2 evaluations to ensure that the home meets the Standard for Acceptable Indoor Air Quality and including both evaluations in the client file or, if required, verifying that *continuous ventilation* is installed as required.

1.0203 Multi-Family Energy Audits

The NeWAP does not have an approved *multi-family* audit tool. Subgrantees should contact the NDEE for guidance prior to accepting any application of a project larger than four units. *Multi-family* building audits must receive approval from NDEE and DOE prior to implementation. Prior to implementation, Subgrantees must verify that the Nebraska Department of Environment and Energy:

- reviewed the *multi-family* audit submission from the sub-grantee,
- made a compliance determination regarding DOE Guidance as well as whether the proposed measure cost test are reasonable (ex. no manipulation of the costs have occurred to make certain measures allowable),
- submitted the NDEE approval and the project package to the DOE Project Officer requesting DOE approval, and
- provided the appropriate documentation required to proceed with the project.

1.03 Deferrals

The decision to defer work in a dwelling is difficult but necessary in some cases. Subgrantees are expected to pursue reasonable options on behalf of clients and to use good judgment in dealing with difficult situations. Deferral conditions may be found in the Health & Safety Section 2 of this Filed Guide and Installation Standard.

Should any dwelling be determined to be a deferral:

- The client will be advised of the problem, and, if possible, refer them to other service organizations that may be able to assist in solving the problem.

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- Inform the client in writing as to why the dwelling cannot be weatherized and, if there are conditions that the client must correct before weatherization services are provided, those conditions must also be stated in writing.
- Indicate clearly in the client file why the dwelling was given "deferral" status on the NeWAP Weatherization Deferral Notice **Form WX4**.
- Provide and utilize a system for a timely and fair administrative hearing of complaints received from clients denied services. An unreasonable delay in acting on an application for assistance will constitute grounds for a hearing.
- Provide the applicant, at the time of application, written information that outlines the applicant's rights and the method for filing a complaint. All subgrantees are required to adhere to their agency's grievance policies. If the grievance cannot be resolved through the subgrantee's process, the applicant will file a complaint with the Nebraska Department of Environment and Energy.

A "walk-away/deferral" is not a completion. Reimbursement for costs associated with a "walk-away/deferral" must be obtained through the normal monthly billing process. Indicate on the BCJO (Building Check Job Order) that the dwelling is a "walk-away/deferral", not a completion and the client was advised in writing of the conditions determining this status.

Defer all units undergoing remodeling or which have untreated remodeled areas that directly affect the weatherization process.

- Keep the client's application as part of the subgrantee's records until recertification is necessary. Weatherization of the unit may proceed if remodeling is completed to the standards of a completed dwelling unit and the client continues to qualify when the remodel work is completed.

1.04 Client Education

The NeWAP provides subgrantees with the opportunity to educate clients and provide them with some simple, easy and inexpensive energy saving tips to help them save additional energy while improving comfort. Additionally, the NeWAP requires that all clients be provided with educational material specifically associated with Health & Safety issues with documentation of receipt included in the client file. **Form WX2**



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Health & Safety measures must be performed in conjunction with cost-effective weatherization. Allowable Health & Safety activities are those that eliminate hazards that are affected or caused by the installation of weatherization materials.

Major hazards and potentially life-threatening conditions must be corrected before weatherization installers can work in the dwelling unless the installers are making the corrections.

2.01 Health & Safety Determinations/Guidance

2.0101 When Not to Weatherize a Dwelling

There are times when a weatherization agency finds serious safety problems in a client's home or when there are conditions and/or situations under which a sub-grantee must not or may choose not to weatherize an otherwise eligible dwelling unit. Information for making this determination may become evident during either the eligibility process or during the initial inspection. If the sub-grantee makes a determination that there are circumstances that prevent the weatherization process from proceeding, they must:

- Provide information to the client, in writing, describing conditions that must be met in order for weatherization to commence.
- Place a copy of this notification in the client file and, if possible, refer the client to other service organizations that may be able to assist in solving the problem.
- Provide the client with a completed copy of the Nebraska WAP Weatherization Deferral Notice **Form WX4**.
- Clearly indicate in the client file why the dwelling was given "deferral" status.
- Have available a system for a timely and fair administrative hearing of complaints received from clients denied an unreasonable delay in acting on an application for assistance will constitute grounds for a hearing.

At the time of application, the applicant is given a written notice outlining their rights and the method to file a complaint. All subgrantees are required to adhere to their agency's grievance policies. If the grievance cannot be resolved through the subgrantee's process, the applicant may file a complaint with the Nebraska Department of Environment and Energy.

2.0101.01 A sub-grantee must not weatherize if:

- The unit has unitized Federal funds, including DOE, LIHEAP, HUD, or USDA for "weatherization" activities within the last 15.
- The dwelling is vacant. (Exception: multi-family units using DOE funds and the 50% or 66% rule).
- Demolition of the dwelling is scheduled in the next 12 months.
- The dwelling is for sale.
- The dwelling has serious structural problems that make weatherization impossible or impractical.
- The *heating system* has not passed a safety and operational audit and inspection.
- The building is in such state of disrepair that failure is imminent and the conditions cannot be resolved cost-effectively.

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- The house has sewage or other sanitary problems that would endanger the client and weatherization installers if weatherization work were performed.
- The house has been condemned by local or state building or enforcement officials.
- Moisture and/or mold problems are so severe they cannot be resolved cost-effectively.
- The occupant or client is abusive or threatening to the crew, contractors, auditors, inspectors or others who must work on or visit the house.

2.0101.02 A sub-grantee may choose not to weatherize a dwelling unit if:

- The building systems, including electrical and plumbing, are in such state of disrepair that failure is imminent and the conditions cannot be resolved cost-effectively.
- The extent and condition of lead-based paint in or in close proximity to the house would potentially create further Health & Safety hazards.
- In the judgment of the energy auditor, any condition exists which may endanger the health and/or safety of the occupant, work crew or contractor, the work should not proceed until the condition is corrected.
- There are unusual situations which, in the judgment of the auditor/sub-grantee, must be corrected before providing weatherization.

2.0102 Client Health & Safety

There are a number of important Health & Safety issues related to weatherization work that can impact clients as well as weatherization employees. When any of these issues are detected, the client must be informed of the issue and, if possible, addressing these problems should be a top priority.

- All NeWAP subgrantees must complete appropriate safety testing on all combustion appliances. Documentation of the testing results must be included in all client files.
- All moisture problems must be documented and discussed with the client. Subgrantees must ensure that no weatherization work will contribute to making moisture problems worse. Mold and Moisture information must be documented on the Mold Assessment and Release Form **Form WX5** and included in the client file.

2.0102.01 Health & Safety Assessment

Energy Auditors and crews/subcontractors are required to take all reasonable precautions against performing work on homes that will subject workers or clients to Health & Safety risks. The initial home inspection must include a Health & Safety assessment of the dwelling. The assessment must include interviewing the client regarding known health concerns, inspecting the dwelling for present or potential moisture concerns, indoor air quality concerns and other environmental concerns or hazards that may or may not be covered by the NeWAP.

2.0102.02 Health & Safety Home Screening Questionnaire Form WX7

Prior to any on-site work being scheduled in a home, sub-grantee personnel will interview and assist clients in completing a Health & Safety Home Screening Questionnaire as part of the application process. The information collected during this process will be used in determining the best course of action for weatherization of the home and the Energy Auditor will review the Questionnaire with the client at the time of the initial assessment. The survey will be included in the client file for future reference.

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- If it is determined through the Health & Safety Home Screening Questionnaire that someone in the home is sensitive to a product that is intended to be used during the weatherization process, the sensitivity must be documented in the file and, if possible, an alternative product may be used. If no successful alternative is found, the weatherization of the home may proceed without completion of the measure with no impact on weatherization measures with lower SIRs, with prior Nebraska Department of Environment and Energy approval.
- When a client's health is fragile and/or the weatherization activities would constitute a health or safety hazard, the occupants at risk will be required to leave the home during the activities. Request that the client return at least 1 hour (or a reasonable time as determined by the installers) after installers are scheduled to leave to allow for clean-up and appropriate ventilation of the home.
- Weatherization funds cannot be used to relocate clients or reimburse them for such costs incurred because of the requirement to leave during the day. If the client is unable to leave the home and the intended work may exacerbate an occupant's health condition, the home may need to be deferred.
- Subgrantees must take all reasonable precautions against performing work on homes that would subject clients to Health & Safety risks.

Clients will also receive the following publications and/or documents:

- Health & Safety Home Screening Questionnaire **Form WX7**
- Renovate Right (occupants of all buildings built pre-1978)
- Lead Hazard Pre-Renovation Form **Form WX3**
- A Brief Guide to Mold, Moisture and your Home
- Nebraska Mold Assessment and Release Form **Form WX5**
- Consumer Product Safety Asbestos Fact Sheet
- Nebraska WAP Even More Dollar and Energy Savings Brochure
- Weatherization Deferral Notice **Form WX4**
- Client Education Confirmation of Receipt **Form WX2**
- Nebraska Radon Information Fact Sheet Radon Informed Consent **Form WX6**
- EPA's A Citizen's Guide to Radon

2.0103 Worker Health & Safety

Weatherization staff are vitally important, and staff must not be required to work in unsafe and/or unhealthy unsanitary conditions.

- Sub-grantee crews and contractors must comply with Occupational Safety and Health Administration (OSHA) standards and Safety Data Sheets (SDS) and take precautions to ensure the health & safety of themselves and other workers, including the use of personal protection equipment.
- Costs incurred by subgrantees to comply with OSHA requirements may be charged to the Health & Safety budget category.

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- OSHA standards including, but not limited to:
 - respirator protection,
 - techniques for safely lifting heavy objects,
 - electrical equipment safety,
 - ladder safety, and
 - general worker protection.
- SDS documentation for all materials installed through the Nebraska Weatherization Assistance Program must be maintained on site during the weatherization of the home and on file by each program
- Personal protective equipment must be worn when appropriate.
- Worker Health & Safety concerns must be continually addressed, implemented and enforced within the NeWAP.
- First aid supplies must be available in the office and at the job site.
- Costs related to Grantee Health & Safety training must be charged to Training & Technical Assistance.

2.0104 Potential Hazard Considerations

Weatherization services must be provided in a manner that minimizes other potential risks to workers and clients. Awareness of potential hazards is essential in providing quality weatherization services.

2.02 Heating System Guidance

NeWAP subgrantees' *Trained Weatherization Staff or Qualified Heating Technician* must complete inspections, testing and assessments on all combustion appliances within a home to ensure all equipment is operating safely.

2.0201 Budget Category Determination

NeWAP subgrantees must perform a full-DOE approved energy audit prior to deciding how to categorize the cost of space heat repair or replacement. If the measure is an approved NeWAP expenditure and the audit justifies the costs with an *SIR* equal to or greater than 1.0, the measure must be performed and costs charged as an Energy Conservation Measure (ECM). If the measure is not an eligible ECM, and all required additional program requirements are met, the measure may be charged as a Health & Safety (H&S) measure.

2.0202 Code Compliance and Heating System Inspection Requirements

2.0202.1 Code Compliance

Installation of space heating requires knowledge of appropriate industry standards and compliance with the applicable building code(s) in the jurisdiction where the installation is taking place. Building permits shall be secured, where required for all space heater work. This is a program operations cost. Also **Section 2.0505 Code Compliance**.

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2.0202.2 Inspection Requirements

- Prior to weatherizing the *building envelope*, all eligible heating plants must be inspected by a *Qualified Heating Technician*, utility company or *Trained Weatherization Staff* utilizing NeWAP Mechanical System Inspection/Clean & Tune **Form WX17**. A copy of the completed form is to be included in the client file.
- Manufacturer approved initial start-up procedures must be followed before any *heating system* is put into operation.
- Inspect venting of combustion appliances and confirm adequate clearances.
- Inspect for adequate floor protection.
- Units that contain *heating plants* that are *inoperable* or red-tagged at the time of the initial inspection must not be weatherized until the *heating plant* has been repaired or replaced.
- Eligible heating plants that cannot be repaired must be replaced.
- A replacement *heating plant* must be properly vented. If the new *heating plant* will not be vented through the masonry chimney, but the water heater will still be vented through that chimney, a properly sized flue liner must be installed. As an alternative, a power vent may be installed on the water heater.

Testing:

- A backdraft test must be performed at the time of Initial Inspection, the Quality Control and at the end of each work day (utilizing Daily Safety Test Out (DSTO)**Form WX10**) in which envelope or duct sealing measures have been performed, if the project will require more than one day, on all vented naturally drafting combustion appliances.
- A backdraft test must not be performed on solid fuel burning appliances.
- Combustion safety testing is required when combustion appliances are present.
- Test naturally drafting appliances for draft and spillage under worst case conditions before and after air tightening.
- **See 2.04 System Safety Testing, Inspection, Verification, and Documentation**

Client Education:

- When deferral is necessary, provide information to the client, in writing, describing conditions that must be met in order for weatherization to commence. A copy of this notification must also be placed in the client file.
- Provide client with combustion safety and hazards information.
- Provide client with verbal and written information on the use of the CO and smoke detectors.

Deferral Requirements:

- The *building envelope* must not be weatherized if the owner or client refuses a *safety inspection* of the *heating system* or until any *heating system* deficiency has been repaired and/or the *heating plant* replaced.
- Manufactured homes that have non-manufactured home combustion water heaters.
- Manufactured homes that have non-manufactured home or incorrectly installed solid fuel combustion heating homes system

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2.0203 Electric Space Heaters

- Repair, replacement or installation is not allowed.
- Removal is recommended.

Testing:

- Check circuitry to ensure adequate power supply for existing space heaters.

Client Education:

- Inform client of hazards and collect a signed waiver if removal is not allowed.

2.0204 Masonry Chimneys

Masonry chimneys used by vented space heaters should be properly lined in compliance with the International Fuel Gas Code (IFGC). When NeWAP installs new equipment the installation must meet all local and state code requirements.

Masonry chimneys that have been retired (i.e. not being use by existing equipment) should be assessed for energy saving opportunities such as *infiltration* reduction, air sealing and capping to reduce thermal bypass.

2.0205 Solid-Fuel Space Heaters

Space heaters are self-contained devices that are generally used for heating a specific area. These types of heating devices are often associated with fires and carbon monoxide poisoning risks. Solid fueled space heaters including wood stoves, coal stoves, pellet stoves, and fireplaces and wood, coal, and pellet fired furnace and boiler systems are considered by DOE to be vented heating systems.

- Access solid fuel-fired appliances to ensure safe installation prior to weatherization activities taking place.
- Repair or removal of primary and secondary heating units is allowed where occupant Health & Safety is concerned, with prior NDEE approval.
- Replacement of primary heating units is allowed, with prior NDEE approval, but replacement of secondary units is not allowed.
- Install replacement units and flues according to state and local code requirements.
- Repair of flues and verification of proper installation (e.g. protection of combustibles) is required for both primary and secondary solid fuel heating appliances.

Client Education:

- Provide client with safety information.

2.0206 Unvented Gas - and Liquid-Fueled Space Heaters

Primary Heat Sources:

- NeWAP must not provide weatherization services in any residence where the completed unit is heated with an unvented-gas and/or liquid-fueled space heater as the primary *heat source*.
- The primary unit must be replaced with a vented unit prior to weatherization.
- The replacement unit should be sized so it is capable of heating the entire dwelling unit, consistent with audit requirements described in 10 CFR 440.21(e)(2).
- If a dwelling is heated by *unvented combustion space heaters* and an inoperable conventional *heating system* is present, the conventional *heating system* must be

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repaired or replaced to eliminate the need for unvented space heater(s).

Secondary Heat Sources:

- Replacement of or the installation of secondary units is not allowed.
- Existing secondary unvented units that conform to the safety standards on ANSI Z21.11.2 may remain as back-up heat sources.
- Units that do not meet ANSI Z21.11.2 must be removed, and properly disposed of, prior to weatherization but may remain until a replacement *heating system* is in place.
- Secondary unvented units that conform to the safety standards on ANSI Z21.11.2, but are not operating safely, must be removed and properly disposed of.
- Repair of secondary unvented units is not allowed.
- An unvented gas-liquid-fueled space heater that remains in a completed single-family house after weatherization shall:
 - Not have an input rating in excess of 40,000 Btu/hour;
 - Not be located in, or obtain combustion air from sleeping rooms, bathrooms, toilet rooms, or storage closets, except:
 - One listed wall-mounted space heater in a bathroom if permitted by the authority having jurisdiction which:
 - has an input rating that does not exceed 6,000 Btu/hour;
 - Is equipped with an oxygen-depletion sensing safety shut-off system; and
 - The bathroom has adequate combustion air;
 - One listed wall-mounted space heater in a bedroom if permitted by the authority having jurisdiction which:
 - has an input rating that does not exceed 10,000 Btu/hour;
 - Is equipped with an oxygen-depletion sensing safety shut-off system; and
 - The bedroom has adequate combustion air.

Testing:

- Testing for air-free carbon monoxide (CO).
- Check units for ANSI Z21.11.2 label.

Client Education:

- If the need for *unvented combustion space heaters* cannot be eliminated, the sub-grantee must instruct the client regarding the dangers of carbon monoxide and excessive moisture levels.
- Inform client of the dangers of unvented space heaters - CO, moisture, NO . CO can be dangerous even if the CO alarm does not sound.

2.0207 Vented Gas- and Liquid-Fueled Space Heaters

Treat vented gas- and liquid-fueled space heaters the same as furnaces in terms of combustion safety testing, repair and replacement. This policy applies to vented space heaters fueled by natural gas, propane, or oil. Venting should be tested consistent with furnaces.

2.03 Carbon Monoxide Testing, Inspection, Verification, and Documentation

Carbon Monoxide (CO) is released by combustion appliances, automobiles, and cigarettes as a product of incomplete combustion. CO is normally tested in the flue of vented appliances and is usually caused by overfiring, backdrafting of combustion gases smothering the flame, flame

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interference with an object, inadequate combustion air, moving air flame interference or misalignment of the burner.

- A carbon monoxide (CO) test must be performed on all naturally drafting or induced draft combustion appliances, including cooking stoves, at the time of the initial and quality control inspections. The CO levels must be tested in the undiluted flue gases. CO tests must not be performed on solid fuel burning appliances.
- CO testing results must be documented (pre- and post-weatherization) on Form WX9 and included in the client file with associated photo documentation.
- If ambient CO levels do not exceed 70 ppm, testing of other appliances and other audit procedures may continue at the discretion of the auditor.
- Installation of battery operated or plug-in 110 Volt Carbon Monoxide Detectors, as per manufacturer's instructions, is required on initial inspection of the home. Detectors, located one per sleeping level and one adjacent to a combustion appliance, are eligible for reimbursement.
- Unsafe water heaters that cannot be repaired must be replaced. Replacement is allowed on a case by case basis with Nebraska Department of Environment and Energy (NDEE) approval if:
 - the existing unit, tested under BPI ANSI 1200 Standards, indicates a replacement is required, or
 - the unit has scorch marks that indicate past backdrafting occurrences, or the integrity of the water tank has been compromised as shown by signs of leakage.
- Maintenance, repair and replacement of primary indoor heating units is allowed where occupant Health & Safety is concerned, with prior NDEE approval.
- Maintenance and repair of secondary heating units is allowed.
- The home must be deferred if the owner or client refuses a *safety inspection* of the *heating system* or until any *heating system* deficiency has been repaired and/or the *heating plant* replaced.
- Manufactured homes that have non-manufactured home combustion water heaters or improperly installed manufactured home water heaters must be deferred.
- Manufactured homes that have non-manufactured home or incorrectly installed solid fuel combustion heating systems must be deferred.

Client Education:

- When deferral is necessary, provide information to the client, in writing, describing conditions that must be met in order for weatherization to commence. A copy of this notification must also be placed in the client file.
- Provide client with 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.
- Provide client with verbal and written information on the use of the CO detector.

2.04 Heating Plant Safety Testing, Inspection, Verification, and Documentation Requirements

2.0401 General Requirements

- Prior to weatherizing the *building envelope*, all eligible heating plants must be inspected by a *Qualified Heating Technician*, utility company or *Trained Weatherization Staff*.

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- A backdraft test must be performed at the time of Initial Inspection, the Quality Control and at the end of each work day (utilizing Daily Safety Test Out (DSTO) **Form WX10**) in which envelope or duct sealing measures have been performed, if the project will require more than one day, on all vented naturally drafting combustion appliances.
- The State of Nebraska's annual heating degree day normal, over the forty- seven year period from 1970-2017 is 6322, with January average °F high and low temperatures of 35 to 12. Clients in units that contain *heating plants* that are *inoperable* or red-tagged are in danger of frost bite, hypothermia and other life-threatening issues. Therefore, units that contain heating plants that are inoperable or red-tagged at the time of the initial inspection must not be weatherized until the *heating plant* has been repaired or replaced.
- Eligible heating plants that cannot be repaired must be replaced.
- The replacement *heating plant* must be properly vented. If the new *heating plant* will not be vented through the masonry chimney, but the water heater will still be vented through that chimney, a properly sized flue liner must be installed. As an alternative, a power vent may be installed on the water heater.
- If a dwelling is heated by *unvented combustion space heaters* and an inoperable conventional *heating system* is present, the conventional *heating system* must be repaired or replaced to eliminate the need for unvented space heaters. If the need for *unvented combustion space heaters* cannot be eliminated, the sub-grantee must instruct the client regarding the dangers of carbon monoxide and excessive moisture levels, particularly if any unvented space heaters are left in the dwelling as a secondary *heat source*, or emergency back-up.
- If a dwelling utilizes *unvented combustion space heaters* as the primary *heat source*, the *unvented combustion space heaters* must be replaced with a vented combustion *heating system*.
- Existing unvented gas clothes dryers must be vented to the exterior. Gas dryer vent pipe must not be installed with sheet metal screws, rivets or other intrusive fasteners that will collect lint.
- The home must be deferred if the owner or client refuses a *safety inspection* of the *heating system* or until any *heating system* deficiency has been repaired and/or the *heating plant* replaced.
- Manufactured homes that have non-manufactured home combustion water heaters must be deferred.
- Manufactured homes that have non-manufactured home or incorrectly installed solid fuel combustion heating systems must be deferred.

Testing:

- A backdraft test must not be performed on solid fuel burning appliances.
- Combustion safety testing is required when combustion appliances are present.
- Inspect venting of combustion appliances and confirm adequate clearances.
- Test naturally drafting appliances for draft and spillage under worst case conditions before and after air tightening.
- Inspect cooking burners for operability and flame quality.

Client Education:

- When deferral is necessary, provide information to the client, in writing, describing conditions that must be met in order for weatherization to commence. A copy of this notification must also be placed in the client file.

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- Provide client with 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.
- Provide client with verbal and written information on the use of the CO detector.

2.0402 Leak Testing Gas Appliances and Piping

- Conduct a fuel leakage test of the appliance piping and control system downstream of the meter to each appliance.
- An electronic combustible gas detector (gas sniffer) will find all significant gas leaks. Remember that natural gas rises from a leak and propane falls, so position the sensor accordingly.
- If gas leak is detected at the initial inspection, have occupant notify the fuel supplier or a *Qualified Heating Technician*. All gas leaks should be repaired prior to implementation of weatherization services.

Testing:

- Sniff all valves and joints with the gas sniffer.
- Accurately locate leaks using a non-corrosive bubbling liquid, designed for finding gas leaks.

2.0403 Verify the BTU Input on Natural Gas Appliances by Clocking (timing) the Gas Meter

- To verify whether the gas being consumed matches the input of the appliance or to measure the input of a specific appliance:
 - Turn off all gas combustion appliances such as water heaters, dryers, cook stoves, and space heaters that are connected to the meter you are timing, except for the appliance you wish to test.
 - Fire the unit being tested, and watch the dials of the gas meter.
 - Monitor the dials on the gas meter, timing how long it takes to burn a cubic foot of gas.
 - Use the length of time it took to burn a cubic foot of gas (in seconds) in the following formula to calculate BTUs/hour: $(3,600 \times 1,000)/\text{number of seconds}$
 - In this formula 3,600 represents the number of seconds in an hour, and 1,000 is the number of Btu in one cubic foot of natural gas.
 - Compare the BTUs/hour value you calculate at the meter with the input BTUs/hour labeled on the appliance.
 - If the measured input is within 5% or higher or lower than input on the name plate, the gas pressure can be adjusted by a *Qualified Heating Technician*.
- If the measured input is still out of range, the tech should recommend the system be inspected by the gas supplier.

2.0404 Complete Inspection of the Heating System:

Prior to weatherization all eligible heating plants must be inspected and tested by a *Qualified Heating Technician*, utility company or *Trained Weatherization Staff* as per **Section 5.0201**. NeWAP subgrantees or their contractors are required to document the inspection results on the Mechanical Systems Inspection/Clean & Tune Form WX17 and with appropriate photo documentation and include the information in the client file.

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2.0405 Verify, Assess and Document Adequate Combustion Air Supply for All Combustion Zones

Combustion appliances require oxygen or combustion air to operate and some appliances draw combustion air from inside the home or *building envelope*. Completing an assessment on each combustion appliance in a home ensures that a combustion air problem does not interfere with combustion, create carbon monoxide or contribute to spillage or backdrafting. Combustion appliance zones are classified as either un-confined spaces or confined spaces.

- Un-confined spaces are open or connected to enough building volume to provide adequate combustion air.
- Confined spaces are Combustion Appliance Zones with a closed door and sheeted walls and ceiling that create an air barrier between the appliance and other indoor spaces. A confined space is defined as a room containing less than 50 cubic feet of volume for every 1000 Btu per hour of appliance input.
- NeWAP subgrantees must verify and document in each client file that each *Combustion Appliance Zone* in a weatherized home has adequate combustion air supply.
- When additional combustion air is required the following options must:
 - Provide combustion air from adjacent indoor spaces by installing a combustion air vent or grille or under-cutting interior doors. The following is an example of sizing grilles to supply combustion air to a confined space from an adjacent indoor area:

The furnace has an input rating of 100,000 Btu/hour.
The water heater has an input rating of 40,000 Btu/hour.
 - Therefore, there should be 280 in² of net free area of vent between the mechanical room and other rooms in the home. $([100,000 + 40,000] \div 1,000 = 140 \times 2 \text{ in}^2 = 280 \text{ in}^2)$.
- Provide outdoor combustion air into the *Combustion Appliance Zone* (CAZ), or analyze the cost effectiveness of installing direct-vent appliances that utilize outdoor combustion air.

Manufactured housing specific work standards:

- The combustion air sleeves and air conditioner condensates to the underbelly must not be covered.
- The costs associated with installing the make-up fresh air must be charged to Health & Safety.
- Verify that gas water heaters are specifically designed and manufactured for use in manufactured homes and verify that the unit's location in the home meets the installation of the unit meets the combustion supply requirements for the home/unit.

2.0406 Complete Combustion Appliance Zone (CAZ) Testing

- NeWAP subgrantees must complete CAZ testing on all areas within a home that contain one or more *atmospherically vented combustion appliances*.
- CAZ testing must be completed on all weatherized homes, at the time of the initial and quality control inspections, with all testing results documented in the client file using the CAZ Depressurization Test **Form WX9**.

Testing:

CAZ testing must include, but not be limited to:

- Testing for carbon monoxide.
- Measuring CAZ pressure at worst case.

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- Test draft pressures and investigate improving inadequate draft:
 - If measured draft is below minimum draft pressures, investigate the reason for the weak draft. Open a window or door to observe whether the addition of combustion air will improve draft. If this added air strengthens draft, the problem usually is depressurization or lack of combustion air. Options to consider:
 - Return duct leaks.
 - Improper balancing between the supply and return.
 - Large whole house exhaust fans.
 - Attic fans.
 - Lack of appropriate make-up air.
 - If opening a window has no effect, inspect the chimney. The chimney could be blocked, excessively leaky or a chimney liner is needed. Options to consider:
 - Improper sizing of the vent connector and/or chimney.
 - A vent connector or chimney liner that is either too large or too small.
 - Wind causing erratic draft.
 - The masonry chimney is deteriorated.
- Testing CAZ carbon monoxide levels.
 - 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), draft tests should cease for the technician's safety. The combustion zone should be ventilated before draft-testing and diagnosis of CO problems resumes.

2.0407 Inspecting and Testing Gas Ovens

- Over-firing, dirt buildup, and foil installed around oven burners obstructed by dirt or foil are likely to produce CO and must be tested before and after weatherization by *Trained Weatherization Staff or Qualified Heating Technician*.
- Replacement, repair and cleaning of gas ranges and ovens are not eligible expenditures thru the NeWAP.
- Observe the ambient CO levels and discontinue use of the range and oven if the CO level rises above 35 ppm in ambient air.

Testing:

- Inspect cooking burners for operability and flame quality.
- Turn on the oven to bake at high temperature. Sample the CO level in exhaust gases at the oven vent and in the ambient air after 10 minutes.
 - If the CO reading for the oven is over 225 ppm or if the ambient-air reading rises to 35 ppm or more during the test, abort the test and advise the client of hazardous condition.
 - Deficiencies must be corrected before proceeding with weatherization work.

Client Education:

- Provide client with 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.
- Advise the client of the following important operating practices:
 - Never install aluminum foil around a range burner or oven burner.

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- Never use a range burner or gas oven as a space heater.
- Open a window or turn on the kitchen exhaust fan when using the range or oven.
- Keep range burners and ovens clean to prevent dirt from interfering with combustion.

2.0408 Inspecting and Testing Vented Gas Appliances

- Inspect, assess and appropriately document information on existing vented gas appliances within a home to ensure all equipment is operating safely and clients are educated on the proper use of the equipment.
- Verify isolation of water heater closets from *conditioned* spaces in *manufactured housing*.
- Document any work required to prevent combustion gases from entering *living area* and minimize interior pressures caused by equipment and conditions in the water heater closet.

2.05 Additional Program Specific Health & Safety Program Concerns and Guidance

2.0501 Air Conditioning and Heating Systems/Units

2.0501.01 Procedure for unsafe or non-functioning primary heating/cooling systems:

When a space conditioning system does not qualify as an ECM, the following conditions must be met before the unit can be replaced or repaired with Health and Safety funds:

- "Red tagged", *inoperable* or non-existent *heating system* replacement, repair, or installation is an allowable Health & Safety Cost.
- Repair of air conditioning systems is an allowable Health & Safety Cost. Replacement or installation of air conditioning system is not an allowable Health & Safety Cost.
 - A maximum \$500 may be spent to repair heat pumps and central air conditioning systems.
 - In renter occupied homes, if the cost to repair the central air conditioner or heat pump exceeds \$500, the owner may repair or replace the unit. However, if the central air conditioner or heat pump is replaced in accordance with the requirements of this Field Guide and Installation Standards, the Nebraska Weatherization Assistance Program (NeWAP) may contribute a maximum of \$1,500 to the replacement cost.
- Using proper protocols (Manual J, NEAT/MHEA outputs, etc.) based on post-weatherization housing characteristics, including installing mechanical ventilation, when installing or replacing a heating or cooling appliance.
- Unsafe primary units must be repaired, replaced and removed, or rendered inoperable, or deferral is required.

2.0501.02 Procedure for unsafe or non-functioning secondary heating/cooling systems:

- Replacement or installation of secondary units is not allowed.
- Secondary unvented units that conform to the safety standards on ANSI Z21.11.2 may remain as back-up heat sources.
- Units that do not meet ANSI Z21.11.2 must be removed, and properly disposed of, prior to weatherization but may remain until a replacement *heating system* is in place.
- Secondary unvented units that conform to the safety standards on ANSI Z21.11.2, but are not operating safely, must be removed and properly disposed of.

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- Repair of secondary unvented units is not allowed.
- An gas-liquid-fueled space heater that remains in a completed single-family house after weatherization shall:
 - Not have an input rating in excess of 40,000 Btu/hour;
 - Not be located in, or obtain combustion air from sleeping rooms, bathrooms, toilet rooms, or storage closets, except:
 - One listed wall-mounted space heater in a bathroom if permitted by the authority having jurisdiction which:
 - has an input rating that does not exceed 6,000 Btu/hour;
 - Is equipped with an oxygen-depletion sensing safety shut-off system; and
 - The bathroom has adequate combustion air;
 - One listed wall-mounted space heater in a bedroom if permitted by the authority having jurisdiction which:
 - has an input rating that does not exceed 10,000 Btu/hour;
 - Is equipped with an oxygen-depletion sensing safety shut-off system; and
 - the bathroom has adequate combustion air.

2.0501.03 Definition of and documentation required for “at-risk” occupants:

- The State of Nebraska’s annual heating degree day normal, over the forty-eight year period from 1970-2019 is 6322, with January average °F high and low temperatures of 35 to 12. Clients in units that contain heating plants that are inoperable or red-tagged are in danger of frost bite, hypothermia and other life-threatening issues. Therefore, units that contain heating plants that are inoperable or red-tagged at the time of the initial inspection must have the *heating plant* addressed.
- The replacement or installation of air conditioning is not a Health & Safety measure; therefore no at-risk definition is addressed.

2.0501.04 Testing Protocols:

- Verify that systems are present, operable, and performing correctly.
- Run DOE-approved audit to determine if the system can be installed as an energy conservation measure (ECM) prior to replacement as a Health & Safety measure.
- For combustion equipment; inspect chimney and flue and test for *Combustion Appliance Zone* (CAZ) depressurization.
- For solid fuel appliances; look for visual evidence of soot on the walls, mantel or ceiling or creosote staining near the flue pipe.

2.0501.05 Client Education:

- When deferral is necessary, provide information to the client, in writing, describing conditions that must be met in order for weatherization to commence. A copy of this notification must also be placed in the client file.
- Discuss appropriate use and maintenance of units.
- Provide all paperwork and manuals for any installed equipment.
- Where combustion equipment is present, provide a copy of the Combustion Equipment Safety FACTSheet describing how to avoid backdrafting.

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- When bulk fuel tanks are not removed as part of the weatherization work, discuss and provide information on proper disposal.
- Where combustion equipment is present, provide safety information regarding how to recognize depressurization.

2.0502 Asbestos

WAP staff members often encounter asbestos. Asbestos sources include, but are not limited to:

- Siding,
- Pipe or furnace coverings,
- Vermiculite mined from areas known to contain asbestos, or
- Some textured paints and interior finishes.

NeWAP Subgrantees must take all reasonable and necessary precautions to prevent asbestos contamination in the home, including but not limited to:

2.0502.01 Asbestos on Heating, Ventilation and Air Conditioning (HVAC) systems, distribution, venting and other small surfaces that will be disturbed through the course of weatherization work policy

- An appropriately trained crew leader, auditor or inspector shall complete an initial visual inspection of all surfaces and subsurfaces, piping, and equipment for suspected ACM.
- Assume asbestos is present in suspect covering materials.
- In homes where *friable* suspected ACM, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present:
 - The sub-grantee must take precautionary measures as if it contains asbestos, such as utilizing personal air monitoring.
 - Blower door testing must not be completed.
 - The costs associated with asbestos testing, abatement or encapsulation not eligible expenditures in the Nebraska Weatherization Assistance Program.
- In homes with asbestos, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present, encapsulated and in good condition:
 - Weatherization work may continue.
 - Blower door testing, using either negative or positive pressure techniques, must be completed

2.0502.02 Asbestos in attics, walls, floors, roofs and foundations that will be disturbed through the course of weatherization work policy

- In homes where *friable* suspected ACM siding, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present:
 - The sub-grantee must take precautionary measures as if it contains asbestos, such as utilizing personal air monitoring.
 - Wall insulation measure work must be completed from the interior of the home.
 - The costs associated with asbestos testing, abatement or replacement with new siding are not eligible expenditures in the Nebraska Weatherization Assistance Program.

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- In homes with asbestos siding, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present and in good condition:
 - Installing *dense-pack* insulation from the exterior is allowed.
- Removal of siding is allowed to perform energy conservation measures; however precautions must be taken not to damage the siding. Asbestos siding should never be cut, sanded or drilled. Where possible, insulate the exterior walls through the interior of the home.
- The costs associated with asbestos testing are not eligible expenditures in the Nebraska Weatherization Assistance Program.

2.0502.03 Vermiculite that will be disturbed through the course of weatherization work policy

- Visual inspections of all surfaces and subsurfaces, piping, and equipment for suspected ACM.
- Assume asbestos is present in suspect covering materials.
- In homes where *friable* suspected ACM, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present:
 - The sub-grantee must take precautionary measures as if it contains asbestos, such as utilizing personal air monitoring.
 - The costs associated with asbestos testing, abatement or encapsulation not eligible expenditures in the Nebraska Weatherization Assistance Program.
- In homes with asbestos, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present, encapsulated and in good condition:
 - Weatherization work may continue.

2.0502.04 Blower door testing policy when asbestos/vermiculite is present:

- In Siding, walls, ceilings, etc.
 - In homes where *friable* suspected ACM siding, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present, blower door testing, using positive pressure techniques, must be completed.
 - In homes with asbestos siding, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present and in good condition, blower door testing, using either negative or positive pressure techniques, must be completed.
- In vermiculite
 - If the presence of asbestos has been previously confirmed or if the sub-grantee believes that vermiculite insulation is present, when blower door tests are performed, it must be performed using pressurization instead of depressurization.
- On pipes, furnaces, or other small covered surfaces
 - In homes where *friable* suspected ACM, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present, blower door testing must not be completed.
 - In homes with asbestos, as determined by an appropriately trained crew leader, auditor or inspector or testing, is present, encapsulated and in good condition, blower door testing, using either negative or positive pressure techniques, must be completed.
- Testing protocols
 - Visual inspections of all surfaces and subsurfaces, piping, and equipment for suspected ACM.

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- AHERA sample collection and testing must be conducted by a certified tester and is an eligible expenditure in the Nebraska Weatherization Assistance Program.
 - Subgrantees are limited to a maximum cost of \$150 for vermiculite testing.
- Cost incurred by subgrantees to comply with asbestos training requirements may be charged to the Health & Safety budget category.
- Documentation requirements
 - Documentation regarding the presence of asbestos material by an appropriately trained crew leader, auditor or inspector or testing must be maintained in the client file.
 - Any testing results used to support the installation of ECM associated with the exterior walls of the homes or when deferral is necessary due to asbestos, the home owner/occupant must provide remediation documentation indicating the remediation was completed by an Asbestos Hazard Emergency Response Act of 1986 (AHERA) certified professional, prior to weatherization. A copy of the documentation must be included in the client file.
- Client Education
 - Inform the client in writing if suspected ACMs are present and what precautions will be taken to ensure the occupants' and workers' safety during weatherization.
 - Instruct client in writing not to disturb suspected ACM.
 - Provide a copy of the Asbestos FACTSheet information to the client.
 - When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.

2.0503 Biological and Unsanitary Conditions (e.g., Odors, Bacteria, Viruses, Raw Sewage, Rotting Wood) in dwelling policy:

Remediation of minor conditions that may lead to or promote biological concerns and unsanitary conditions is allowed. Subgrantees are limited to a maximum cost of \$300 to remediate these minor conditions, although approval to exceed this limitation will be reviewed on a case by case basis by the Nebraska Department of Environment and Energy prior to any work being implemented.

- Addressing bacteria, viruses or major biological and/or unsanitary conditions is not an allowable reimbursable cost.
- Deferral may be necessary in cases where conditions in the home pose a health risk to occupants and/or weatherization workers.

2.0503.01 Testing protocols:

- Sensory and visual inspection.

2.0503.02 Client Education:

- Inform client in writing of observed conditions.
- Provide information on how to maintain a sanitary home.
- When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.

2.0504 Building Structure and Roofing (e.g., roofing, wall, foundation)

Program workers frequently encounter homes in poor structural condition; however, building rehabilitation is beyond the scope of the Weatherization Assistance Program. Weatherization services

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may be delayed until the dwelling can be made safe for crews and occupants. Incidental repairs necessary for the effective performance or preservation of weatherization materials are allowed.

2.0504.01 Structural issues in dwellings:

- Building rehabilitation is beyond the scope of the Nebraska Weatherization Assistance Program.

2.0504.02 Define and quantify minor or allowable structure and roofing issues. At what point are these considered beyond the scope of weatherization?

- When necessary to effectively weatherize the home, subgrantees may make minor repairs to allow for the implementation of weatherization measures. Subgrantees are limited to a maximum cost of \$300 to implement these minor repairs, although approval to exceed this limitation will be reviewed on a case by case basis by the Nebraska Department of Environment and Energy prior to any work being implement.

2.0504.03 Client Education:

- Notify client in writing of structurally compromised areas.
- When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.

2.0505 Code Compliance

The Nebraska Weatherization Program does not fund the costs of bringing homes "up to" the latest building code requirements. However, any eligible energy efficiency work that is completed as part of the weatherization work must meet all state and local building code requirements.

2.0505.01 Code compliance issues in dwelling policy:

- Correction of preexisting code compliance issues is not an allowable cost unless triggered by weatherization measures being installed in a specific room or area of the home.
 - Examples of eligible costs associated with cost-effective Weatherization Measures include, but are not limited to: the installation of fans to provide appropriate ventilation in the home, appropriate disconnect switching and clearance requirements on furnace installations, installation of appropriately sized chimney liner when water heaters are orphaned by a high efficiency furnace installation, etc. Costs associated with the purchase of any required permits are eligible
- It is each subgrantee's responsibility to ensure that weatherization-related work conforms with the applicable codes in jurisdictions where the work is being performed.
- Follow State and local codes while installing weatherization measures, including H&S measures.
- Condemned properties and properties where "red tagged" Health & Safety conditions exist that cannot be corrected under this guidance must be deferred.
- The cost of permits must not be passed on to the client.
- When correction of preexisting code compliance issues is triggered and paid for with WAP funds, cite specific code requirements with reference to the weatherization measure(s) that triggered the code compliance issue in the client file.

2.0505.02 Client Education:

- Inform client in writing of observed code compliance issues when it results in a deferral.
- When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.

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2.0506 Combustion Gases

When combustion gas issues are discovered during testing, including those that require immediate response, Auditors, Crew leaders and crews are directed to contact their weatherization coordinator or supervisor immediately. If during their time on-site, the following issues occur:

- the *heating plant* or other combustion appliance is malfunctioning.
- Household members exhibit symptoms that could be from carbon monoxide poisoning. Open windows or evacuate the house if necessary.
- There is a strong odor of heating gas or sewer gas. Open windows or evacuate the house if necessary.
- Existing conditions have changed in ways that would make proposed work difficult, dangerous or no longer cost-effective.

2.0506.01 Testing protocols:

- Combustion safety testing is required when combustion appliances are present.
- Test naturally drafting appliances for spillage and CO during CAZ depressurization pre- and post-weatherization and before leaving the home on any day when work has been done that could affect draft (e.g. tightening the home, adding exhaust) Include copies of all required CAZ Depressurization Test **WX9** and Daily Safety Test Out **WX10** testing WX forms in client file requirement.
- Inspect venting of combustion appliances and confirm adequate clearances.
- Run DOE-approved audit to determine if the appliance can be justified as an ECM prior to replacement as a Health & Safety measure.

2.0506.02 Client Education:

- Provide the client with a copy of the Combustion Equipment Safety FACTSheet with combustion safety and hazards information.

2.0507 Electrical Issues/Concerns:

The two primary energy-related Health & Safety electrical concerns associated with weatherization work are insulating homes that contain knob & tube wiring and identifying overloaded electrical. Electrical safety is a basic need that impacts home weatherization and repair.

2.0507.01 Knob & Tube wiring, in dwellings policy:

The Nebraska State Electrical Board does not permit directly covering knob & tube wiring with insulation. Under the NeWAP, attics with existing, active knob & tube wiring must be evaluated for insulation energy efficiency cost-effectiveness and insulated as per **Section 4.0101.2**. In homes with existing, active knob & tube wiring in the *knee wall* and exterior walls cost-effectiveness determinations and insulating to be completed as per **Section 4.0203.2**.

2.0507.02 Overloaded Electrical, Fuses and Splices:

- Serious electrical hazards exist when gross overloads such as over usage, overloaded outlets and/or oversized fuses are present. Should auditors and crews find such existing problems, they should notify the owner and note the problem in the client file. Weatherization measures that involve the installation of new equipment such as air conditioners, heat pumps or electric water heaters can exacerbate previously marginal overload problems to hazardous levels. Rewiring of a home is outside the scope of the weatherization.

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- Wiring splices must be enclosed in metal or plastic electrical boxes, fitted with cover plates.
- Electrical boxes in attics must be marked with a flag that is visible above the insulation. *Type S-Fuses* must be sized according to the smallest gauge of wire in the circuit to be protected. The following table shows the gauge wire required for the following fuse sizes:

Wire Gauge	Fuse Size
12 gauge wire	20 amp fuse
14 gauge wire	15 amp fuse

- If no insulation is being installed in a home the existing fuses must remain intact. In homes that utilize fuses where attic insulation is being installed the State Electrical Board recommends the use of a licensed electrician for the installation of safety *Type S-Fuses* as indicated in the National Electrical Code.
- When the H&S of the occupant/worker(s) is at risk, minor repairs may be completed as necessary to allow for the implementation of weatherization measures.
- Evaluate and if necessary provide sufficient over-current protection and damming (if required) prior to insulating building components containing knob & tube wiring, as required by the authority having jurisdiction.
- Subgrantees are limited to a maximum cost of \$300 to implement these minor repairs, although approval to exceed this limitation will be reviewed on a case by case basis by the Nebraska Department of Environment and Energy prior to any work being implemented.

2.0507.03 Client Education:

- When electrical issues are the cause of a deferral, provide information to client on over-current protection, overloading circuits, and basic electrical safety/risks.

2.0508 Formaldehyde, Volatile Organic Compounds (VOCs), and other Air Pollutants

2.0508.01 Formaldehyde, VOCs, flammable liquids and other air pollutants in dwellings policy:

- Removal of pollutants is allowed and 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.

2.0508.02 Testing protocols:

- Sensory inspection.

2.0508.03 Client Education:

- Inform client in writing of observed hazardous condition and associated risks.
- Provide client written materials on safety and proper disposal of household pollutants.
- When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.

2.0509 Fuel Leaks

2.0509.01 Fuel leak remediation protocols:

- Notify utility and temporarily halt work when leaks are discovered that are the responsibility of the utility to address.
- Fuel leaks found on the property, but after (or behind) the meter must be repaired before weatherizing a unit.

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- Fuel leaks found on the property, but after (or behind) the meter must be repaired before weatherizing a unit.
- When a minor gas leak is found on the property, but before (or in front) of the meter, the utility service must be contacted before work can proceed.

2.0509.02 Testing protocols:

- Test exposed gas lines for fuel leaks from utility coupling into, and throughout the home.
- Conduct sensory inspection on bulk fuels to determine if leaks exist.

2.0509.03 Client Education:

- Inform client in writing if fuel leaks are detected.

2.0510 Gas Ovens/Stovetops/Ranges

2.0510.01 Unsafe gas range/ovens policy:

- Maintenance on or repair gas cooktops and stoves is not allowed.
- Replacement is not allowed.

2.0510.02 Testing protocols:

- Test gas ovens for CO.
- Inspect cooking burners and ovens for operability and flame quality.

2.0510.03 Client Education:

- Inform client of the importance of using exhaust ventilation when cooking and the importance of keeping burners clean to limit the production of CO.
- Provide the client with a copy of the Combustion Equipment Safety FACTSheet.
- Provide client with verbal and written information on the use of the CO detector.

2.0511 Hazardous Materials Disposal – (Refrigerant, Asbestos, Lead, Mercury, including CFLs/Fluorescents, etc.) disposal policy (existing material/appliance and hazardous material):

Hazardous Waste Materials generated in the course of weatherization work shall be disposed of according to local laws, regulations and/or Federal guidelines, as applicable.

2.0511.01 Documentation requirements:

- Document proper disposal requirements in contract language with responsible party.
- In the case of Lead, documentation in the client file must include Certified Renovator certification: any training provided on-site; description of specific actions taken; lead testing and assessment documentation; and, photos of site containment set up. Include the location of photos if it is not referenced in the file.

2.0511.02 Client Education:

- Inform client in writing of hazards associated with hazardous waste materials being generated/handled in the home.

2.0512 Injury Prevention of Occupants and Weatherization Workers (e.g., Repairing Stairs, Replacing Handrails, etc.)

Weatherization staff must not work in unsafe and/or excessively unsanitary conditions. Occupational Safety and Health Administration (OSHA) standards, Construction Trade Safety Standards, as well as company safety standards must be observed by everyone in the NeWAP.

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2.0512.01 Injury prevention measures policy:

- When necessary to effectively weatherize the home, workers may make minor repairs and installations to allow for the implementation of weatherization measures.
- Subgrantees are limited to a maximum cost of \$200 to implement these minor repairs, although approval to exceed this limitation will be reviewed on a case by case basis by the Nebraska Department of Environment and Energy prior to any work being implemented.

2.0512.02 Client Education:

- Inform client in writing of observed condition/hazard and its associated risks.
- When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.

2.0513 Lead Based Paint

On April 10, 2010, the Environmental Protection Agency (EPA) "Lead; Renovation, Repair and Painting Program" (LRRPP) Final Rule became effective in the Weatherization Program. By adopting basic safety precautions workers and the occupants of the homes they weatherize will be protected from lead exposure. The U.S. Department of Energy requires subgrantees to follow specified EPA and Occupational Safety and Health Administration (OSHA) standards for worker safety.

Installation Standards 2.1 & 2.2

2.0513.01 Work protocols:

- Installers must follow EPA's Lead; Renovation, Repair and Painting Program (RPP) when working in pre-1978 housing unless testing confirms the work area to be lead free.
- Deferral is required when the extent and condition of the lead-based paint in the house would potentially create further Health & Safety hazards, the sub-grantee will inform the client of the of the issues associated with a deferral in the Weatherization Deferral Notice (Form WX4) completed by the Weatherization Representative and signed by the client or building owner.
- Only those costs directly associated with the testing and lead safe practices for surfaces directly disturbed during weatherization activities are allowable

2.0513.02 Testing protocols:

- Testing to determine the presence of lead in paint that will be disturbed by WAP measure installation is allowed with EPA-approved testing methods.
- Testing methods must be economically feasible and justified.
- Job site set up and cleaning verification by a Certified Renovator is required.
- Grantees must verify that crews are using lead safe work practices during monitoring.

2.0513.03 Documentation requirements:

- Documentation in the client file must include Certified Renovator certification: any training provided on-site; description of specific actions taken; lead testing and assessment documentation; and, photos of site containment set up. Include the location of photos referenced is not in the file.

2.0513.04 Client Education:

- Follow pre-renovation education provisions for RRP.

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- When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.
- Provide a Weatherization Deferral Notice **Form WX4** completed by the Weatherization Representative and signed by the client or building owner.

2.0514 Mold and Moisture - Including but not limited to: gutters, down spouts, extensions, flashing, leaking roofs, vapor retarders, moisture barriers, etc.

Water moves easily as a liquid or vapor from the ground through porous building materials like concrete and wood and a high groundwater table can channel moisture into a home. The most common ground-moisture source is water vapor rising through the soil or liquid water moving up through the soil by capillary action. To prevent this, all crawl spaces should have ground moisture barriers. Install or improve air barriers and *vapor barriers* to prevent air leakage and vapor diffusion from transporting moisture into building cavities. Alleviating drainage and major drainage issues are beyond the scope of the Nebraska WAP, however the following should be considered during the initial inspection and implementation of the work if drainage issues are encountered and presented to the client or home owner:

- A missing or malfunctioning sump pump: they are often the most effective solution when ground water continually seeps into a *basement or crawl space* and collects there as standing water. Serious groundwater problems may require excavating and installing drainpipe and gravel to disperse accumulations of groundwater between a home and nearby hillside. Rainwater flowing from roofs often plays a major role in dampening foundations. Installing rain gutters with downspouts that drain roof water away from the foundation can alleviate the moisture.

SWS 2.0201

2.0514.01 Mold and moisture policy:

- Subgrantees must ensure that weatherization work is performed in a manner that does not cause or contribute to mold problems, and when the work is performed properly, may alleviate mold conditions.
- Where severe Mold and Moistures cannot be addressed, deferral is required.
- Mold cleanup is not an allowed Health & Safety cost.
- Surface preparation where weatherization measures are being installed (e.g., cleaning mold off window trim in order to apply caulk) must be charged as part of the ECM, not to the Health & Safety budget category.
- All clothes dryers and exhaust fans must be vented to the exterior.
- The NeWAP requires a full ground laid moisture barrier must be installed whenever possible in accessible crawl spaces and under manufactured and modular homes except when one exists, or the space has a concrete floor.
 - The moisture barrier must be a Class I *vapor retarder*, a minimum of 6 mils thick, extended up the walls and the support columns at least 12 inches and the joints must overlap a minimum of 12 inches.
 - When installing insulated skirting without adequate clearance to install a full ground laid moisture barrier, the moisture barrier must extend a minimum of 24 inches beyond the insulation.

SWS 2.0202.1 SWS 2.0202.2 SWS 2.0202.3

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- Limited water damage repairs and Minor source control work that can be addressed by weatherization workers and are allowed when necessary in order to weatherize the home and to ensure the long-term stability and durability of the measures.
 - Subgrantees are limited to a maximum cost of \$300 to implement these limited repairs, although approval to exceed this limitation will be reviewed on a case by case basis by the Nebraska Department of Environment and Energy prior to any work being implemented.
 - Subgrantees are limited to a maximum cost of \$300 to implement this minor source control work, although approval to exceed this limitation will be reviewed on a case by case basis by the Nebraska Department of Environment and Energy prior to any work being implemented.

2.0515 Pests

2.0515.01 Pests and pest intrusion prevention policy:

- Pest removal is allowed only where infestation would prevent weatherization. Subgrantees are limited to a maximum cost of \$300 for pest removal, although approval to exceed this limitation will be reviewed on a case by case basis by the Nebraska Department of Environment and Energy prior to any work being implemented. Pest removal issues that would exceed the maximum cost of \$300 to remedy must be deferred and information must be provided to the client in writing describing conditions that must be addressed in order for weatherization to commence.
- Infestation of pests may be cause for deferral where it cannot be reasonably removed or poses H&S concern for workers.
- Screening of windows and points of access to prevent intrusion is allowed.

2.515.02 Client Education:

- Inform client in writing of observed condition and associated risks.
- When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.

2.0516 Radon

Radon is a natural radioactive gas found in areas of Nebraska. Radon can't be seen, smelled or tasted and has been linked to certain types of cancers.

2.0516.01 Procedures for radon in dwellings:

- The following radon precautions will be implemented in all weatherized homes to reduce the possibility of exacerbating any potential radon issues:
 - Whenever site conditions permit, cover exposed dirt floors within the pressure/thermal boundary with 6 mil (or greater) polyethylene sheeting, lapped at least 12" and sealed with appropriate sealants at all seams, walls and penetrations.
SWS 2.0202.1 SWS 2.0202.2 SWS 2.0202.3
 - Air seal existing sumps in such a way that water can drain from above and below the sump cover.
SWS 3.0104.4
 - Seal and caulk visible, accessible penetrations, openings or cracks in below-grade walls and floors that contact the ground with a sealant that meets the requirements of ASTM C920.

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- Other precautions may include, but are not limited to, sealing any observed floor and/or foundations penetrations isolating the *basement* from the *conditioned* space, and ensuring crawlspace venting is installed.
- The following additional radon precautions will be implemented in all weatherized homes equipped with active radon mitigation systems:
 - Verify that the radon vent fan is operating.
- If a previously installed radon mitigation system is not operating correctly advise the client to consult the system installer of the state radon office.
- Radon mitigation is not an allowable Health & Safety cost.

2.0516.02 Testing protocols:

- Radon testing is not an allowable cost.

2.0516.03 Client Education and Documentation Requirements:

- Provide all clients EPA's A Citizen's Guide to Radon and inform them of radon related risks.
- Review with all clients the radon informed consent/consent to perform work form (WX6). The form must be signed with a copy of the included in the client file prior to receiving weatherization services.

2.0517 Safety Devices: Smoke, Carbon Monoxide Detectors, Fire Extinguishers

Installation or replacement policy for the following safety devices:

2.0517.01 Smoke Detectors:

- Battery operated smoke alarms may be installed where alarms are not present or are inoperable.
- Installation of Smoke Alarms and Carbon Monoxide Detectors, as per manufacturer's instructions, is required on initial inspection of the home. Battery (10-year) operated or plug-in 110 Volt Detectors, located one per sleeping level and one adjacent to a combustion appliance, are eligible for reimbursement.

SWS 2.0101.2

2.0517.02 Carbon Monoxide Alarms:

- CO detectors must be installed where detectors are not present or are inoperable.
- Replacement of operable CO Detectors is not an allowable cost.
- Installation of Smoke Alarms and Carbon Monoxide Detectors, as per manufacturer's instructions, is required on initial inspection of the home. Battery (10-year) operated or plug-in 110 Volt Detectors, located outside of each dwelling unit sleeping area, on every occupiable level and other areas as required by local code.

SWS 2.0102.1

2.0517.03 Propane Gas Detectors:

- must be installed in homes and *manufactured housing* on permanent foundations that have propane combustion appliances. The gas detectors must be permanently installed according to the manufacturer's instructions and 110 volts.

Fire Extinguishers:

- The costs associated with providing fire extinguishers are not allowable Health & Safety Costs.

2.0517.04 Testing protocols:

- Check existing smoke alarms for operation.

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- Check for operation of existing CO detectors.
- Verify operation of installed alarms.

2.0517.05 Client Education:

- Provide the client with verbal and written information on the use of smoke detectors and CO detectors.
- Provide client with a copy of the Combustion Equipment Safety FACTSheet.

2.0518 Ventilation and Indoor Air Quality

NDEE requires ventilation be installed to meet the latest DOE approved version of American Society of Heating Refrigeration and Air-conditioning Engineers (ASHRAE) 62.2.

2.0518.01 Procedures for complying with implemented ASHRAE standard:

- Subgrantees are required to complete pre- and post-weatherization ASHRAE 62.2 evaluations (Redcalc) to ensure that the home meets the Standard for Acceptable Indoor Air Quality and include both evaluations in the client file.
- If the ASHRAE normative Appendix A is employed and an existing fan is being replaced or upgraded to meet whole-house ventilation requirements, take actions to prevent zonal pressure differences greater than 3 pascals across the closed door, if one exists.
- Exhaust fans must be vented to the outdoors, and never into building attics or crawl spaces. They should have tight-fitting backdraft dampers.

2.0518.02 Testing protocols

- Measure the fan flow of existing fans and of installed equipment to verify performance.
- Complete ASHRAE 62.2 evaluations, as discussed above, to determine required ventilation and fan flow requirements.

2.0518.03 Client Education:

- Provide client with information on function, use, and maintenance (including location of service switch and cleaning instructions) of ventilation system and components.
- Provide client with equipment manuals for installed equipment.
- Include disclaimer that ASHRAE 62.2 does not account for high polluting sources or guarantee indoor air quality.
- Provide the client with a copy of the ASHRAE 62.2 FACTSheet.

2.0519 Window Repair, Door Repair

2.0519.01 Window repair and door repair H&S policy:

- Replacement, repair, or installation of Windows and Doors is not an allowable Health & Safety measures through the NeWAP.

2.0519.02 Client Education:

- Provide information on lead risks wherever issues are identified.

2.0520 Worker Safety (e.g., OSHA)

2.0520.01 Federal, state and local worker safety requirements policy:

- Sub-grantee crews and contractors must comply with Occupational Safety and Health Administration (OSHA) standards and Material Safety Data Sheets (MSDS) and take precautions

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to ensure the health & safety of themselves and other workers, including the use of personal protection equipment.

- Costs incurred by subgrantees to comply with OSHA requirements may be charged to the Health & Safety budget category.
- OSHA standards including, but not limited to:
 - respirator protection,
 - techniques for safely lifting heavy objects,
 - electrical equipment safety,
 - ladder safety, and
 - general worker protection

2.0521 Infectious Disease Preparedness and Response

2.0521.01 Federal, state and local worker safety requirements policy:

- Prior to sending workers to a home Subgrantees are required to complete a supplementary screening, in addition to the Home Health and Safety Screening Questionnaire referenced in **Section 5.0** to provide additional information regarding suspected health concerns associated with other infectious diseases. The health and safety of local crew and contractors depends on this type of screening during any other infectious disease outbreak, and clients who are not feeling well or who have contracted a virus can be put on a deferred waitlist. Screening should be complete via telephone (instead of traveling to any client dwelling) during in the application process and again within 24 hours prior to beginning any on-site work. Screening questions should include, but not be limited to:
 - Has anyone in the household tested positive or are presumed positive for COVID-19 or other infectious disease? If so, have they met the CDC criteria to be around others per the section “When it’s safe to be around others: ending home isolation?”
 - Has anyone in your household experienced fever, cough or shortness of breath in the last two weeks?
 - Has anyone in your household been in contact with someone who has had a fever, cough or shortness of breath in the last two weeks?
 - Does anyone in the household have underlying medical conditions or are they in frequent contact with someone who has underlying medical conditions

2.0521.02 Procedures for Sub-grantee weatherization staff associated with Infectious Diseases when state and local health department Directed Health Measures (DHM) are issued:

- Allow and encourage appropriate physical distancing and avoid groups of people as allowed in state and local Health Department Directed Health Measures (DHM)
- Encourage staff participation in virtual training conferences, meetings etc.
- Minimize non-essential travel and adhere to CDC guidelines regarding isolation following travel.
- Require sick employees to stay home.
- Do not attend onsite training and/or meetings and conferences sooner than allowed per state and local Health Department Directed Health Measures (DHM)
- Collect applications remotely, if possible, and in instances where remote applications are not plausible, identify and implement strict distancing protocols.

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- Complete program intake and eligibility determination, including client signing application verifying accuracy of information utilizing all efforts to minimize client exposure and maximize client services.
- Place eligible vulnerable clients on a waitlist, giving them priority once the state or local jurisdiction is implementing standard weatherization services. All vulnerable individuals should continue to shelter in place throughout the outbreak, these individuals are defined as:
 - Elderly individuals.
 - Individuals with serious underlying health conditions, including high blood pressure, chronic lung disease, diabetes, obesity, asthma, and those whose immune system is compromised such as by chemotherapy for cancer and other conditions requiring such therapy.

2.0521.03 Procedure for Subgrantees during the implementation weatherization measures when working in homes during a low-risk state and local health department Directed Health Measures (DHM):

- Sub-Grantee and Grantee weatherization staff must follow with the EPA's Guidance for Cleaning and Disinfecting Public Spaces, Workplaces, Businesses, Schools, and Homes.
- Sub-grantees must implement the following Infectious Disease Preparedness and Response policies and procedures for all crew and contractor on-site work completed during a disease outbreak:
 - Mandate all field workers to use appropriate Personal Protective Equipment (PPE) as per the required training referenced below including removal, and cleaning to avoid contamination (and cross-contamination).
 - Provide the necessary supplies to maintain clean surfaces in client homes both before and after they are performing work.
 - Limit off site trips during the delivery of weatherization services.
 - Provide all vehicles and crew members with hand sanitizer containing at least 60% alcohol.
 - Prioritize the completion of all exterior work prior to addressing the interior work in the client home.
 - Practice social distancing.
 - Minimize the number of crew and clients simultaneously in the home at the time of interior work.
 - During interior work asks clients if they can leave the home, isolate themselves into one room or install a physical barrier (i.e. clear sheet of plastic, or zip wall) while work is being conducted.
 - Offer face masks to clients to contain respiratory secretions.
 - Limit contact by allowing one driver per vehicle per day and disinfect the vehicle before and after use.
 - If the installer determines that a client is exhibiting respiratory illness, they should contact the Agency Weatherization Director or Executive Director to inform them of the concern and allow the client to be moved to a waitlist for an appropriate time period to ensure worker safety.

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2.0522 Occupant Pre-Existing or Potential Health Conditions and Hazard Identification and Notification Forms

All products used in Weatherization Services must be approved by the U.S. Department of Energy. Some products used may have an odor (Volatile Organic Compound or VOC) that some people may find objectionable or to which some people may experience sensitivity. If any family member or a sub-grantee believes that someone in the home may be hypersensitive to, or may otherwise object to the use in the home of any of the common weatherization building material, the issue must be documented and resolved prior to the start on the work.

2.0522.01 Procedure for soliciting occupants' health and safety concerns related to components of their homes:

- Prior to any on-site inspection work being scheduled in a home, sub-grantee intake personnel will assist clients in completing a Weatherization Client Questionnaire **WX13** as part of the application process.
 - (See <https://neo.ne.gov/programs/wx/wx-forms/wx13-client-questionnaire.pdf>)
 - The questionnaire provides information on concerns or issues such as non-working furnaces, foundation issues, leaks, debris, pet/pest issues, broken glazing, etc. in the home that impact not only the client's safety but the safety of weatherization workers.
- The questionnaire will be included in the client file for future reference.

2.0522.02 Procedure for determining whether occupants suffer from health conditions which may be negatively impacted by the act of weatherizing their dwelling:

- If it is determined through the Health & Safety Home Screening Questionnaire that someone in the home is sensitive to a product that is intended to be used during the weatherization process, the sensitivity must be documented in the file and, if possible, an alternative product may be used. If no successful alternative is found, the weatherization of the home may proceed without completion of the measure with no impact on weatherization measures with lower SIRs, with prior Nebraska Department of Environment and Energy approval.

2.0522.03 Procedure for addressing potential health concerns including pre-existing health conditions when they are identified:

- When a client's health is fragile and/or the weatherization activities would constitute a health or safety hazard, the occupants at risk will be required to leave the home during the activities and requested to return at least 1 hour (or a reasonable time as determined by the installers) after installers are scheduled to leave to allow for clean-up and appropriate ventilation of the home.
- Weatherization funds cannot be used to relocate clients or reimburse them for such costs incurred as a result of the requirement to leave during the day. If the client is unable to leave the home and the intended work may exacerbate an occupant's health condition, the home may need to be deferred.
- Sub-grantees must take all reasonable precautions against performing work on homes that would subject clients to Health & Safety risks

2.0523 Fireplaces

Fireplaces present special hazards that are affected by weatherization. If draft is poor, smoke may downdraft into living space causing poor indoor air quality, which can be appropriately ventilated by

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the client. However, near the end of a wood fire glowing coals remain, radiating heat; while the draft lowers and allows the top of the chimney to cool, further reducing draft. The reduced draft also reduces oxygen available to glowing coals causing production of CO without the smoke that encourages appropriate space ventilation. This creates a dangerous situation as the CO enters the living space due to the lowered draft, causing drowsiness, and sometimes more dangerous situations for the occupants.

- Manufactured homes that have non-manufactured home or incorrectly installed solid fuel combustion heating systems must be deferred.

2.0523.01 Inspection Requirements

- Fireplaces must be inspected pre- and post-weatherization.
- The inspection shall include, but not be limited to:
 - System clearances to combustibles, inside and outside of the home.
 - The type and condition of the flooring material where the unit is installed.
 - Visual signs of wear or missing or malfunctioning components.
 - Evidence of ash deposit build-out.
 - Evidence of creosote build-up.
 - Signs of structural failure.
 - Evidence of blockage, restriction, leakage, corrosion and/or flame roll-out.
 - Visual evidence of soot on the walls, mantel or ceiling or hearth.

2.0523.02 System Evaluation

- Assessing solid fuel fired appliances involves inspecting the venting/chimney and the overall installation to ensure it adheres to applicable state and local codes.
- State code requires that the flue areas and chimney requirements of masonry fireplaces meet the following requirements:
 - Flue area requirements of masonry fireplaces (excluding sealed combustion/direct vented units) must meet the following requirement:
 - Round chimney flues shall have a minimum cross-sectional area of at least 1/12 of the fireplace opening.
 - Square chimney flues shall have a minimum cross-sectional area of at least 1/10 of the fireplace opening.
 - Rectangular chimney flues with an aspect ratio less than 2 to 1 shall have a minimum cross-sectional area of at least 1/10 of the fireplace opening.
 - Rectangular chimney flues with an aspect ratio of 2 to 1 or more shall have a minimum cross-sectional area of at least 1/8 of the fireplace opening.

Cross-sectional areas of round, square and rectangular flue sizes are provided in the tables included on the following page.
 - State code requires chimney terminations extend at least 2 feet higher than any portion of a building within 10 feet, but shall not be less than 3 feet above the highest point where the chimney passes through the roof.
 - Appropriate chimney caps and/or rain caps must be in place.

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Net Cross-sectional Area of Round Flue Sizes

Flue Size, Inside Diameter (Inches)	Cross-sectional Area (square inches)
6	28
7	38
8	50
10	78
10.75	90
12	113
15	176
18	254

Net Cross-sectional Area of Square and Rectangular Flue Sizes

Flue Size, Outside Nominal Dimensions (Inches)	Cross-sectional Area (square inches)
4.5 X 8.5	23
4.5 X 13	34
8 X 8	42
8.5 X 8.5	49
8 X 12	67
8.5 X 13	76
12 X 12	102
8.5 X 18	101
13 X 13	127
12 X 16	131
13 X 18	173
16 X 16	181
16 X 20	222
18 X 18	233
20 X 20	298
20 X 24	335
24 X 24	431

- Homes with fireplaces and solid fuel fired appliances that do not meet state and local code requirements regarding flue area and chimney terminations must not be weatherized.
- Homes with fireplaces and solid fuel fired appliances that are indicated in the pre-inspection of having any deficiency that could cause an unsafe condition must not be weatherized.

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2.0523.03 Testing Gas Fireplaces

- Non-sealed combustion type and venting into a conventional chimney with or without a pre-constructed liner.
 - A spillage test is required and is to be performed when the CAZ is under worst case depressurization.
 - Complete using moving a smoke stick directly in front of the fireplace in a traverse-like pattern.
 - Any spillage after one minute is a failure.
 - If spillage occurs under worst case depressurization, spillage testing would then be performed under natural conditions.
 - CO is to be tested in ambient air directly in front of and above the fireplace if the inspector is unable to place the test probe in the exhaust vent or exterior termination point.
- Sealed combustion insert.
 - A spillage test is not required, but it is recommended to use a smoke stick directly in front of the fireplace while operating. Any sign of spillage may indicate an issue and should be appropriately documented.
 - CO is to be tested in ambient air directly in front of and above the unit if the inspector is unable to place the test probe in the exhaust vent or exterior termination point.

2.0523.04 Testing Gas Stoves

- If the gas stove is specified for use as a heating appliance:
 - A spillage test is required and is to be performed when the CAZ is under worst case depressurization.
 - Any spillage after one minute is a failure.
 - If spillage occurs under worst case depressurization, spillage testing would then be performed under natural conditions.
 - If the vent pipe is accessible, carbon monoxide testing is required.
 - If the vent pipe is accessible, draft testing is required.

2.0523.05 Testing Wood Fireplaces and Pellet Stoves

- Non-sealed combustion type and venting into a conventional chimney.
 - A backdraft test must not be performed on wood fireplaces and pellet stoves.
 - A spillage test must not be performed on wood fireplaces and pellet stoves.
 - CO tests must not be performed on wood fireplaces and pellet stoves.

2.0523.06 Testing Weatherized homes containing wood, gas or pellet fireplaces and/or stoves

- Must be evaluated for the impact of their operation on other combustion appliances. A blower door must be set to run at 300 CFM (set up as for depressurization testing) to mimic the worst-case airflow dynamics likely when a fireplace or stove is in use.
- If spillage occurs in the other combustion appliances under the worst-case depressurization test, spillage testing would then be performed under natural conditions and Carbon Monoxide Detectors will be installed, as per manufacturer's instructions, located adjacent to the fireplace and the back-drafting appliance.

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2.0523.07 Client Education:

- When deferral is necessary, provide information to the client, in writing, describing conditions that must be met in order for weatherization to commence. A copy of this notification must also be placed in the client file.
- Provide client with verbal and written information on the use of the CO and smoke detectors.

2.0524 Manufactured Homes - Special Considerations

Manufactured Home Construction Safety Standards require all fuel-burning, heat producing appliances, except ranges and ovens, to be vented to the outside. All fuel burning appliances in manufactured homes (excluding ranges, ovens, illuminating appliances, clothes dryers, solid fuel-burning fireplaces and solid fuel-burning stoves) must be installed to provide separation of the combustion system from the interior atmosphere of the home (i.e. to draw their combustion air from the outside).

- Replacement gas water heaters in manufactured homes must be specifically designed as *manufactured housing* water heaters.
- Replacement furnaces in manufactured homes must be specifically designed as *manufactured housing*
- See Chapter 5 Heating and Cooling and Chapter 7 Baseload for additional Heating and Water Heating System requirements.

2.0524.01 Testing:

- See 2.04 System Safety Testing, Inspection, Verification, and Documentation

2.0524.02 Client Education:

- When deferral is necessary, provide information to the client, in writing, describing conditions that must be met in order for weatherization to commence. A copy of this notification must also be placed in the client file.



Chapter 3 - Infiltration and Air Sealing

Air infiltration can account for 30 percent or more of a home's heating and cooling costs and can contribute to additional problems with moisture, noise, dust, indoor air quality, and pests. Appropriate air sealing can reduce *infiltration* significantly to reduce heating and cooling costs, improve building durability and longevity, and create a healthier indoor environment.

3.01 Identify the Air and Thermal Boundaries of the Building Envelope

To complete appropriate air sealing you must identify the location of both the air and the thermal boundaries of the home. Generally, ceilings, walls, and floor/foundation separate the inside *conditioned* space from the outside or *unconditioned* space forming both the air barrier and the thermal barrier for the house, but that is not always the case.

For example, the thermal boundary of a home's *crawl space* may be the insulation located in the floor cavities while the foundation walls actually provide the air barrier. A visual inspection is used to verify the thermal barrier while blower door testing of the pressure planes within the home is one of the most accurate ways of identifying the air boundaries of a home.

3.02 Blower Door Testing

Blower door testing is used to determine the overall air tightness of a home. Appropriate testing helps you to determine the most cost-effective air sealing options, locate leaks, determine approximately how big the leaks are, and whether the leaks are located in areas that may significantly impact the indoor air quality of the home and the health of its residents. Pre- and post-weatherization blower door testing must be completed on all homes weatherized through the NeWAP. Documentation of the test results must be appropriately included in all client files.

3.03 Air Sealing Homes

The Nebraska Weatherization Assistance Program (NeWAP) recognizes that using blower door guided air sealing can be a cost-effective air sealing procedure to determine when to continue and when to stop air sealing a dwelling.

Energy Auditors are responsible for establishing an air sealing target for the contractor performing the air sealing tasks. However, experience (documented in the past two calendar years) in the NeWAP shows that in 44% of all homes weatherized (and 89% of the weatherized homes constructed since 1980) the initial test *CFM* of the home is below or within 10% of the Required Mechanical Ventilation *CFM* Rate established in the ASHRAE 62.2 by the Energy Auditor. Therefore, the NeWAP requires in homes where:

- the initial test *CFM* of the home is below or within 10% of the Required Mechanical Ventilation *CFM* Rate established in the ASHRAE 62.2 the Energy Auditor will provide contractors/crews with written and photo documentation of the Minor Air Sealing **See Section 3.0301** bypasses to be sealed such as, but not limited to:
 - Holes/openings in walls,
 - Plumbing and/or heating chases or building entry points,
 - Joints in sill plate (mud sill) and around utility openings in foundation,

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- Missing or severely cracked glass in exterior walls,
- Sealing the box sill area (if this work is not completed as an Energy Efficiency Measure), and
- Door weatherstripping and/or sweeps.
- the initial test *CFM* of the home is greater than 10% of the Required Mechanical Ventilation *CFM* Rate established in the ASHRAE 62.2, Major Air Sealing work will be completed using Blower Door Guided Air Sealing See Section 3.0302

3.0301 Minor Air Sealing Requirements

- Cracks in exterior window and door frames can be sealed to keep water out. If the crack is deeper than 5/16-inch, it must be backed with an appropriately sized backer rod and then sealed with caulk. Any existing loose or brittle material must be removed before the crack is re-caulked.
- Holes and cracks in masonry surfaces may be sealed with a cement-patching compound or mortar mix if blower door testing indicates substantial leakage.
- Air Sealing Material Standards installed through the NeWAP must form a permanent and airtight seal, must match the existing surfaces as closely as possible, and meet the following requirements:
 - Caulking:
 - Must be paintable and must be clear or a color complementary to the surface to which it is applied.
 - Installed around heat-producing sources must be specifically manufactured for installation around heat sources.
 - Openings wider than ¼ inch and deeper than 5/16-inch must be packed with material specifically designed as a packing material prior to caulking.
 - Packing material must be compatible with the type of caulking used.
 - Expanding and non-expanding foam sealant may be used as an air sealing material.
 - If mortar or mortar patch is used, it must be a color complementary to the surface to which it is applied and be textured to match the surrounding surface as close as possible.
 - *Spray-applied* insulation may be used as an air sealing material.

SWS 3.0101.1

- Interior joints including where baseboard, crown molding and/or casing meet the wall/ceiling/floor surfaces. Gaps around surface-mounted or recessed light fixtures and ventilation fans should also be caulked if appropriate.

SWS 3.0102.1

Manufactured Housing Air Sealing requirements:

- Exterior water heater compartments to be sealed and isolated from the interior of the home.
- All openings from the water heater compartment into the *conditioned* space to be sealed with metal or 5/8" fire code gypsum board.
- Water heater compartment doors that are beyond repair may be replaced. Appropriate photo and written documentation regarding the condition of the door must be included in the client file.

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Subgrantees must complete all Energy Auditor directed air sealing opportunities and all project files must provide clear and adequate documentation of the installer's results and/or efforts to appropriately air seal the home.

3.0302 Major Air Sealing Requirements

Seal the largest openings first, progressively working to the smaller openings. Stack effects the thermal boundary of the home and makes it most effective to start air sealing at the top of the structure and work your way down to the lower areas of the home. The following locations/building areas provide special sealing challenges and should always be confirmed in your air sealing process:

- Plumbing walls and wiring penetrations
Installation Standard 3.6
- Chase ways around chimneys
Installation Standard 3.3 Installation Standard 4.1 SWS 3.0101.1 SWS 3.0102.2
- Cantilevered floors
- Kitchen or bathroom soffits
Installation Standard 3.2
- Joints between the porch and the house
SWS 3.0102.11 SWS3.0102.3
- Balloon framed exterior wall bypasses
Installation Standard 3.4
- Rim joists
Installation Standard 3.14
- Tops and bottoms of interior walls
Installation Standard 3.1
- Pocket Door
- Dropped ceilings
Installation Standard 3.2 SWS 3.0102.9 SWS 3.0102.10
- Joist cavities under knee walls in finished attics
Installation Standard 3.11
- Outlet and switchplate insulators may be installed on exterior and interior walls.
 - Insulators must not be installed if the outlet or switch has aluminum wiring.
- Bathtub and shower surrounds
- Recessed light fixtures
Installation Standard 3.5 Installation Standard 3.9
SWS 3.0102.1 SWS 3.0102.2
- Duct boots and registers
- Adjusting and/or installing door weather-stripping, thresholds and sweeps.
Installation Standard 3.12 Installation Standard 3.13
- Tightening and/or installing window weather-stripping.
SWS 3.0201.1

Chapter 3 - Infiltration and Air Sealing

3.0303 Blower Door Guided Air Sealing

Utilizing blower door guided air sealing allows you to locate and seal the largest sources of leakage and helps you to determine the effectiveness of your sealing work by providing an instantaneous reduction in the home's CFM50 Reading. The CFM50 reduction should be checked at the end of each air sealing measure, or step completed, to determine cost effectiveness. As the air sealing work progresses the amount of CFM50 reduction experienced diminishes, you are able to determine the point where continued air sealing is no longer cost-effective.

Cost Effective Blower Door Guided Air Sealing is air sealing guided by calculating effectiveness after each round of *infiltration* repair work completed. See example below:

Example process for:

Cost Effective Blower Door Guided Air Sealing

First Blower Door reading:	5500 CFM ⁵⁰
Air Sealing Work Done:	Close opening above and around interior pocket door and hole in the wall behind the kitchen range
Materials Used:	1/2 sheet of dry wall, 1/4 roll R-11 batt, 2 tubes caulking, drywall tape, mud and screws.
Labor Cost:	2.5 hours at \$25.00 = \$62.50
Material Cost:	\$63.00
Total:	\$125.50
Second Blower Door reading:	4100 CFM ⁵⁰ - A reduction of 1400 CFM ⁵⁰
Savings ratio:	$\$125.50 \div 1400 \text{ CFM}^{50} \times 100 = \$8.96 \text{ per } 100 \text{ CFM}^{50}$
The ratio is less than \$50 per 100 CFM ⁵⁰ . Keep looking for air sealing opportunities.	

Second Blower Door reading:	4100 CFM ⁵⁰
Air Sealing Work Done:	Seal around furnace flue and fire place chimney (at attic insulation line
Materials Used:	10 sf tin, 6 tubes of high temp caulk, screws, and 1 small "L" bracket to secure tin to masonry chimney
Labor Cost:	3 hours at \$25.00 = \$75.00
Material Cost:	\$140.00
Total:	\$215.00
Third Blower Door reading:	3450 CFM ⁵⁰ a reduction of 650 CFM ⁵⁰
Saving ratio:	$\$215.00 \div 650 \text{ CFM}^{50} \times 100 = \$33.07 \text{ per } 100 \text{ CFM}^{50}$
The ratio is less than \$50.00 per 100 CFM ⁵⁰ . Keep looking for air sealing opportunities.	

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Third Blower Door reading:	3450 CFM ⁵⁰
Air Sealing Work Done:	Caulk interior window and door trim, install window rope pulley covers, caulk attic access trim
Materials Used:	10 sf tin, 6 tubes of high temp caulk, screws, and 1 small "L" bracket to secure tin to masonry chimney
Labor Cost:	2-1/2 hours at \$25.00 = \$62.50
Material Cost:	11 tubes of caulking @ \$4.50, 20 pulley covers @ \$3.50, and 25 feet backer rod @ \$1.00 total materials cost \$123.50
Total:	\$186
Fourth Blower Door reading:	2700 CFM ⁵⁰ a reduction of 750 CFM ⁵⁰
Saving ratio:	$\$186.00 \div 750 \text{ CFM}^{50} \times 100 = \$24.80 \text{ per } 100 \text{ CFM}^{50}$
The ratio is less than \$50.00 per 100 CFM ⁵⁰ . Keep looking for air sealing opportunities.	

Fourth Blower Door reading:	2700 CFM ⁵⁰
Air Sealing Work Done:	Seal rim joist and seal unused coal chute.
Materials Used:	13 tubes of caulking @ \$4.50, 20 feet of backer rod @ \$1.50 = total materials \$88.50
Labor Cost:	2 hours at \$35.00 = \$70.00
Total:	\$158.50
Fifth Blower Door reading:	2400 CFM ⁵⁰ a reduction of 300 CFM ⁵⁰
Saving ratio:	$\$158.50 \div 300 \text{ CFM}^{50} \times 100 = \$52.80 \text{ per } 100 \text{ CFM}^{50}$
The ratio is more than \$50.00 per 100 CFM ⁵⁰ . Stop air sealing.	

- Air sealing blower door readings should be appropriately recorded in the client file.

NeWAP provides reduction reimbursement of the costs directly associated with blower door air sealing as an Energy Efficiency Measure based on cost-effectiveness, Savings-to-Investment Ratio (SIR) of 1.0 or better) as indicated in the Energy Audit of the home. Payment for blower door air sealing requires documentation verifying the costs of *infiltration* reduction (materials and labor) work completed, for which reimbursement is being requested and that are directly associated with blower door guided air sealing.

Chapter 3 - Infiltration and Air Sealing

3.0304 Air Sealing Exceptions

Some dwellings may not reach the air sealing standards because of structural conditions or other factors. Exceptions are allowed when:

- All reasonable attempts have been made to reach the standard, or
- Further air sealing is not cost-effective

Subgrantees must complete all cost-effective air sealing opportunities and all project files must provide clear and adequate documentation of the installer's efforts to appropriately air seal the home.

Section 3.0301 Section 3.0302 Section 3.0303

[Installation Standards 3.1](#) thru [Installation Standard 3.9](#)

3.04 Windows and Doors

Window and door replacements completed through the NeWAP, using Department of Energy (DOE) funding, must be shown as cost-effective through the home's Energy Audit based on energy savings. Replacements may be completed, using non-DOE funds, if the unit(s) is appropriately documented in the client file as "beyond repair".

The NeWAP also covers costs associated with cost-effective repair and air sealing work on exterior doors, exterior windows, storm doors and storm windows.

3.0401 Maintenance, Repair, and Sealing

All work related to window and door repair/replacement must be completed using lead-safe weatherization practices.

[Installation Standard 2.1](#) [Installation Standard 2.2](#)

3.0401.01 Window and Door Repairing/Replacing Cracked and Broken Glass

Window and door air tightening and repair measures such as caulking, glazing, weatherstripping and re-weatherstripping, sash locks, or glass replacement are considered air sealing measures and are eligible General Heat Loss Measure expenditures in the NeWAP. The following issues must be considered prior to implementation:

- When feasible, windows must be repaired, rather than replaced.
- Replace missing or broken glass that is severely cracked and noticeably separated that affects the structural integrity of the window.
- A window with a cracked pane of glass, where degradation of the frame or sash is not occurring, will have only the glass repaired or replaced as an air sealing measure.
- Cloudiness inside existing *insulated glass* (IG) units because of seal leakage does not constitute "failure" of the window or of the IG unit.
- Window glazing compound shall only be replaced if the existing glazing is deteriorated to the degree that the window glass is in jeopardy of falling out of the sash.
- Window and door repair/glazing work completed as a General Heat Loss Measure shall include, but is not limited to:
 - Window glass must be secured with glazing points and glazing compound, if necessary and the glazing must completely cover the channel.
SWS 3.0201.4
 - Replacement window glass must not be less than "B" grade single strength.

Chapter 3 - Infiltration and Air Sealing

- Window glass over 40 inches in either dimension must not be less than "B" grade double strength.
- Replacement window glass must be tempered when required by state and local code jurisdictions.
- Damaged decorative window glass must be replaced with a standard glass pane.
- If the client refuses a standard window glass pane, the decorative window glass must be repaired with clear silicone caulk.
- If the existing window glass is a thermal pane or *insulated glass* and the interior or exterior pane is cracked, the cracked glass must be removed or repaired.
- If both the interior and exterior panes of thermal pane window glass are broken, the window glass may be replaced with a thermal pane glass or a single glass pane.
- Apply sealants with rated adhesion and movement characteristics to prevent air leakage, condensation, and rain leakage between the window frame and other building materials.

SWS 3.0201.1

- Replacing missing or severely deteriorated window frame components that are beyond repair.
- Apply one coat of primer and one coat of exterior paint, as per manufacturer's installation requirements, to all new wood exposed to the weather.
- Adjusting window stops to reduce leakage between the stop and the jamb and ensuring that the window operates smoothly.
- Replacing or repairing missing or non-functional top and side sash locks, hinges or other hardware.

SWS 3.0202.1 Installation Standard 3.22

3.0401.02 Door Repair and Air Sealing

Doors can be a source of air leakage and, when determined as cost-effective in the Energy Audit, repair and air sealing work on existing exterior doors is an eligible General Heat Loss Measure expenditures using both DOE and non-DOE funds. This work includes, but is not limited to:

- installing or removing and replacing weather-stripping, thresholds, door bottoms and/or door sweeps
 - Weather-strips, thresholds, door bottoms and sweeps must have a vinyl or silicone insert.
 - Weather-strips and sweeps must have the last fastener or screw no more than 2-1/2 inches from the end.
 - Foam or felt tape door weather-strips are not eligible for reimbursement under the NeWAP.

SWS 3.0202.1

- adjusting door hardware to reduce air leakage
- applying sealants with rated adhesion and movement characteristics to prevent air leakage, condensation, and rain leakage
- Outside water heater compartment doors, on manufactured homes, that are beyond repair must be replaced. Appropriate photo and written documentation regarding the condition of the door must be included in the project file.

Chapter 3 - Infiltration and Air Sealing

3.0402 Window and Door Replacement Requirements

3.0402.01 Window Replacement Requirements

The NeWAP replaces windows, using Department of Energy (DOE) funding, only when the window achieves an *SIR* of 1.0. Window that do not meet the *SIR* cost-effective requirement may be replaced when the window is damaged beyond repair, using non-DOE funds, if the unit(s) condition is appropriately documented in the client file as "beyond repair". All windows replaced through the NeWAP in framed or modular homes, or multifamily buildings must have:

- an NFRC (National *Fenestration* Rating Council) tested U-factor of 0.30 or lower.
- damaged framing repaired prior to the installation of the new window.
- the cavities around the window frame insulated and sealed with non-expanding foam sealant.
- the existing casing reinstalled if it is in good condition.
- all new casings matched as closely as possible to the existing in design and dimension.
- any interior and/or exterior walls damaged when replacing the window, repaired with like materials.
- new sash sections match, as closely as possible, the existing in design.

SWS 3.0202.1

- new sash lock(s) installed, if the existing sash was equipped with a sash lock.
- a new sash lock installed, if both the upper and lower sash are replaced.
- Jamb liners may be installed.

Installation Standard 3.20 SWS 3.0201.9

Windows replaced in manufactured homes through the NeWAP

- an NFRC (National *Fenestration* Rating Council) tested U-factor of 0.30 or lower.
- existing putty tape removed and new putty tape ~~omastling~~ installed.
- a drip cap installed above non-manufactured home replacement windows.
- all interior window casings caulked.
- damaged framing repaired prior to installing the new window.
- the cavities around the window frame insulated and sealed with non-expanding foam sealant.
- the existing casing reinstalled if it is in good condition.
- all new casings matched, as closely as possible, to the existing in design and dimension.
- any interior and/or exterior walls damaged when replacing the window, repaired with like materials.
- new sash sections match, as closely as possible, the existing in design.
- new sash lock(s) installed, if the existing sash was equipped with a sash lock.
- a new sash lock installed, if both the upper and lower sash are replaced.
- if the exterior walls in the manufactured home will accept house type replacement windows, they may be installed. jamb liners may be installed.

SWS 3.0201.9

Chapter 3 - Infiltration and Air Sealing

3.0402.02 Storm Window and Screen Repair and Replacement

Storm window and screen replacements are generally not cost-effective energy conservation measures.

- Replace or install storm windows only if they are indicated as cost-effective by achieving an *SIR* of 1.0 or better when evaluated under the "Evaluate All" replacement Option.
- Storm windows repaired or replaced through the NeWAP in single family homes, manufactured homes and multi-family buildings must not be installed over fixed windows.
- When feasible and determined as cost-effective in the energy audit, existing storm windows may be repaired as an air sealing measure.
- Weep holes are not to be sealed shut.
- Screens may be repaired or replaced as a Health & Safety Pest intrusion issue with funds as described in Chapter 2 Health & Safety Section 2.0515.

Storm windows replaced through the NeWAP in manufactured homes must have:

- one-light storms fastened with clips, full-length magnetic strips or using other means that completely seals the window and allow for easy attachment and/or removal.
- self-storing storms in aluminum frame combination windows.
- the storm window installed with a screen insert if the primary window lacks a screen.

SWS 3.0201.7, SWS 3.0201.8

3.0402.03 Door Replacement

The NeWAP replaces doors, using Department of Energy (DOE) funding, only when the door replacement achieves an *SIR* of 1.0. Doors that do not meet the *SIR* cost-effective requirement may be replaced when the door is damaged beyond repair, using non-DOE funds, if the unit(s) condition is appropriately documented in the client file as "beyond repair". All exterior doors replaced through the NeWAP must have:

- an NFRC (National *Fenestration* Rating Council) tested U-factor of 0.17 or lower.
- existing locksets reinstalled on the new door, if possible.
- two (2) keys provided to the client, if a new lockset is installed.

SWS 3.0202.3

- any safety lock installed on the existing door removed and reinstalled on the new door.
- the existing casing reinstalled if it is in good condition.
- all new casings matched, as closely as possible, to the existing in design and dimension.
- the cavities around the door frame insulated and sealed with non-expanding foam sealant.
- all door casings caulked.
- doors that conform to the thickness of the existing jamb.
- three hinges.
- the door bottom trimmed at a 5 degree angle, if trimming is necessary.
- weather-strips, thresholds, door bottoms and sweeps with a vinyl or silicone insert.
- weather-strips and sweeps with the last fastener or screw no more than 2-1/2 inches from the end.
- no foam or felt tape door weather-strips which are not eligible for reimbursement under the NeWAP.

Chapter 3 - Infiltration and Air Sealing

- minor door adjustments such as tightening the hinges or adjusting the strike plate, completed to ensure proper operation.

Installation Standard 3.21, SWS 3.0202.2

Manufactured homes door replacements must have:

- an NFRC (National *Fenestration* Rating Council) tested U-factor of 0.17 or lower.
- a gutter, flashing or a drip cap must be installed.
- existing locksets reinstalled on the new door, if possible.
- two (2) keys provided to the client, if a new lockset is installed.
- any safety lock installed on the existing door removed and reinstalled on the new door.
- the existing casing reinstalled if it is in good condition.
- all new casings matched, as closely as possible, to the existing in design and dimension.
- the cavities around the door frame insulated and sealed with non-expanding foam sealant.
- all door casings caulked.
- doors that conform to the thickness of the existing jamb.
- three hinges.
- the door bottom trimmed at a 5 degree angle, if trimming is necessary.
- weather-strips, thresholds, door bottoms and sweeps with a vinyl or silicone insert.
- weather-strips and sweeps with the last fastener or screw no more than 2-1/2 inches from the end.
- minor door adjustments such as tightening the hinges or adjusting the strike plate, completed to ensure proper operation.

Below and Grade Level doors replaced through the NeWAP in single family, *manufactured housing*, or multi-family buildings must:

- be constructed of ¾ inch pressure treated exterior grade plywood.
- be reinforced with 1x4 inch common lumber and insulated with a minimum R-7 rigid insulation and framed with pressure treated wood, redwood or cedar.
- be attached with a minimum of 2 hinges and a minimum of one latching mechanism.
- be weather-stripped.
- have the bottom of the door appropriately air sealed.
- have a handle on both the interior and exterior of the door.
- have wood or aluminum thresholds.
- be caulked at the sill.
- the door bottom trimmed at a 5 degree angle, if trimming is necessary.
- have weather-strips, thresholds, door bottoms and sweeps with a vinyl or silicone insert.
- have weather-strips and sweeps with the last fastener or screw no more than 2-1/2 inches from the end.
- have minor door adjustments such as tightening the hinges or adjusting the strike plate, completed to ensure proper operation.
- no foam or felt tape door weather-strips which are not eligible for reimbursement under the NeWAP.

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3.05 Floors

Air sealing floors separates the inside *conditioned* space from the outside or *unconditioned* space forming an appropriate air barrier. The following standards must be followed when NeWAP subgrantees air air sealing penetrations in floors

SWS 3.0101.1

3.06 Basements and Crawl Spaces

Air sealing basements and crawl spaces separates the inside *conditioned* space from the outside or *unconditioned* space forming an appropriate air barrier. The following standards must be followed when NeWAP subgrantees are air sealing penetrations in basements and crawl spaces.

SWS 3.0101.1

3.07 Ducts

Sealing, repairing and insulating existing *accessible ductwork* provides Nebraska Weatherization Assistance Program (NeWAP) clients with energy cost reductions and improved comfort. Sealing leaky ducts also help to improve indoor air quality.

3.0701 Duct Preparation

Prior to sealing and/or insulating ducts NeWAP subgrantees must:

- Verify and make reasonable attempts to ensure that duct systems are providing balanced, adequate airflow to living spaces.
- Inspect and evaluate the existing system to ensure that all ducts and plenums are properly fastened, supported and sealed to reduce air leakage.
- Test ducts to determine the size and location of leaks.
- Consider sealing off supply and return registers in unoccupied *basement* rooms

SWS 5.0106.1, SWS 5.0106.2,

When airflow is a problem subgrantees must consider the following options:

- Cleaning the filter or replacing disposable filters.
- Repairing, realigning or replacing bent, damaged, missing or restricted floor registers.
- Realigning and appropriately secure disconnected duct work and floor registers.
- Moving/installing filter racks into an area that is convenient and conducive for the client to access.
- Removing obstructions to registers and ducts.
- Eliminating kinks in flex duct and replacing collapsed ducts with metal duct.
- Installing a transfer grille(s) to improve airflow in the building.
- Undercutting interior doors.

3.0702 Duct Sealing

- *Accessible ductwork* must be sealed before insulating.
- Crossover ducts must be inspected and weatherized.
- Seal leaky joints between supply and return registers and the floor, wall, and ceiling to which they are attached.

SWS 5.0106.1, SWS 5.0106.2,

Chapter 3 - Infiltration and Air Sealing

- Interior doors may need to be *under-cut* to provide adequate return air to the furnace.
- Seal penetrations made by wires or pipes traveling through ducts.
- Use non-toxic and water-resistant mastic.
- Use mesh tape when openings and tears are over 1/8 of an inch.
- Use marked Energy Code compliant (UL181 A (rigid systems) or UL181 B (flex system)) duct sealing tape when the use of mastic is not feasible.
- Install pre-manufactured or site manufactured durable filter slot covers when existing covers are missing or damaged.

Manufactured Housing Specific Standards

- If the connection between the new furnace and the trunk line will not be accessible after installation, the heating contractor must seal the connection.
- When the return air system is blocked and sealed a minimum 16 inch x 24 inch vent must be installed in the furnace compartment door.
- If the vent is not installed, the mobile home floor must not be insulated.

3.08 Special Considerations

Insulated Skirting Installation Requirements

If underbellies or exposed floors are un-insulated and inaccessible, insulated skirting may be installed if it is determined in the Energy Audit to be cost-effective.

- The skirting must be metal, vinyl or pressure treated plywood supported by a wood frame and insulated with a minimum R-13 faced batt or a minimum R-10 foam board.
- The frame must have a pressure treated, redwood or cedar bottom plate and the vertical studs should be placed on a minimum 24-inch centers.
- All seams and joints in the skirting must be caulked.
- The access must be constructed of ¾ inch pressure treated plywood and be a minimum of 20 inches in width. It must be attached with 2 hinges and a latching mechanism. The access must be insulated with minimum R-13 batt or a minimum R-7 rigid insulation and weather-stripped with the last fastener or screw no more than 2-1/2 inches from the end of the weather-strip.
- A manufactured insulating skirting kit may be used. The kit must be a minimum R-8 insulation and include 1 access.

SWS 4.0388.1



Chapter 4 - Insulation

Appropriate installation levels are necessary for insulation to provide energy savings and increase occupant comfort. To provide the most effectiveness, the insulation must be installed:

- in conjunction with an effective air barrier.
- covering the entire area intended for insulation without voids or edge gaps.
- according to manufacturer's instructions, in the case of blown insulation, at sufficient density to resist settling.
- observing lead-safe weatherization practices with all tasks that may disturb paint.

Fiberglass batt insulation installed in a *living area*, with the exception of sill box insulation, must be covered with paneling, plywood, chipboard, hardboard or drywall. If the installed covering is:

- drywall; it must be taped with no more than two (2) coats of drywall mud applied.
- plywood, chipboard or hardboard; the joints must be caulked.
- paneling is installed; it must be a minimum 3/16 inch and the joints must be caulked.

4.01 Attics

4.0101 General Preparation Information

Prior to installing attic insulation subgrantees must evaluate the insulation installation for cost-effectiveness and inspect for, prepare for and address the following issues/concerns:

4.0101.1 Air Sealing

- Complete and document in the client file air-leakage (pressure plane) testing to verify that all attic planes in the home have been appropriately sealed to provide an effective air barrier that allows the attic insulation to be effective.

4.0101.2 Knob & Tube Wiring

The Nebraska State Electrical Board does not permit directly covering knob & tube wiring with insulation. Under the Nebraska Weatherization Assistance Program, attics with existing active knob & tube wiring must be evaluated as cost-effective as discussed below for the installation of attic insulation as follows:

1. Evaluate the removal of the existing knob & tube wiring, the rewiring of the attic and the insulation of the attic installed as per the remaining requirements of this Section, with all completed work installed according to manufacturer's installation standards. Subgrantees and contractors must:
 - comply with all local and state fire, building and electrical safety codes and procedures,
 - ensure that all electrical work is completed by an electrician in the State of Nebraska
 - ensure that, if required, lead safe practices are followed,
 - ensure that appropriate heating and cooling sizing calculations are completed for the sizing of the mechanical equipment using appropriate area/size calculations of replaced and/or active knob & tube wiring attics in the NEAT Energy Audit, and
 - document in the client file the name and contact information of the licensed electrician responsible for the removal and rewiring completed in the home.

If the removal, rewiring and insulation of the attic is not shown as cost-effective then move to evaluation option #2 below.

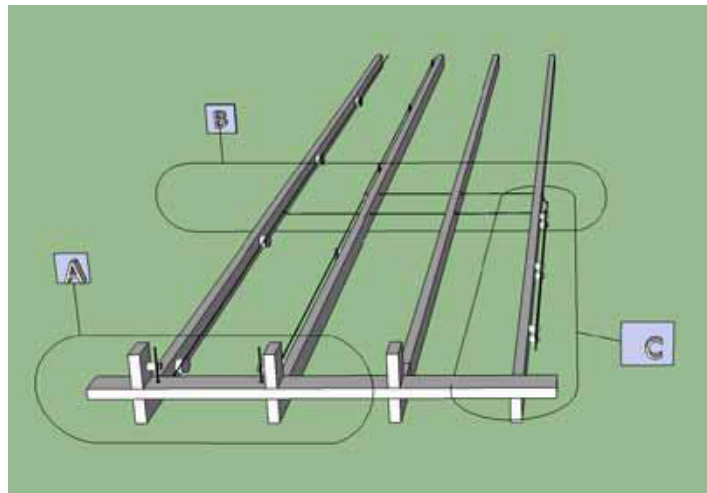
Chapter 4 - Insulation

2. Evaluate the cost-effectiveness of installing an appropriate wire shielding, as described and shown below, to ensure as per the Nebraska State Electrical Board that insulation does not directly cover the active knob & tube wiring. Subgrantees and Contractors must:

- Complete appropriate shielding procedures of any active Knob & Tube Wiring following fire and electrical safety procedures before insulating.
- Inspect all attic areas for knob & tube wiring.
- Attic areas with knob & tube wiring, that are indicated as cost-effective for implementation on the Energy Audit, must be insulated after the wiring has been appropriately covered to prevent direct contact with the insulation and to provide adequate air space (a minimum of 3 ½" clearance) for "cooling" of the wire.

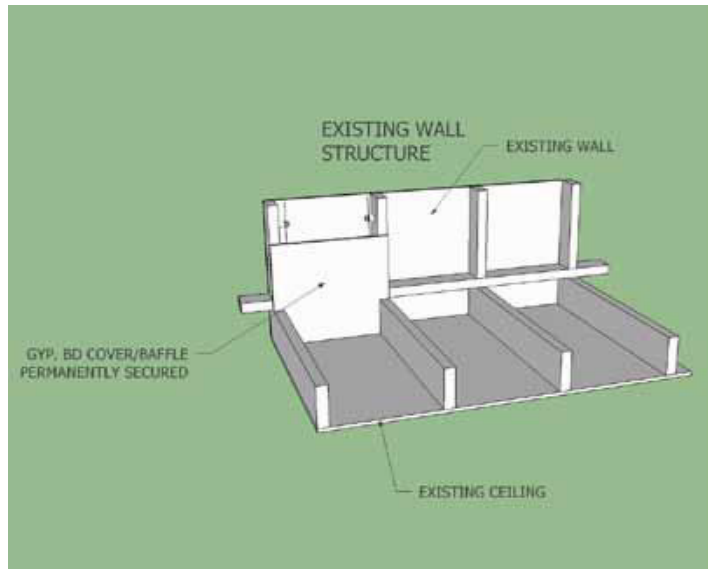
SWS 2.0301.2

- The costs associated with covering the knob & tube wiring should be included in the cost, the *SIR* calculation, and the invoicing of the Measure so that the costs associated with the shielding can be included as an Energy Conservation Measure (ECM) in the BCJO.
- In situations where the additional costs associated with shielding the knob-and-tube wiring impacts the *SIR* of the ECM, making the ECM ineligible, those costs may be evaluated as an *Incidental Repair Measure* (IRM), associated with the attic insulation ECM.
- In situations where the additional costs associated with shielding the knob-and-tube wiring impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, those costs may be invoiced as a Health and Safety cost. (See Details B & C below)

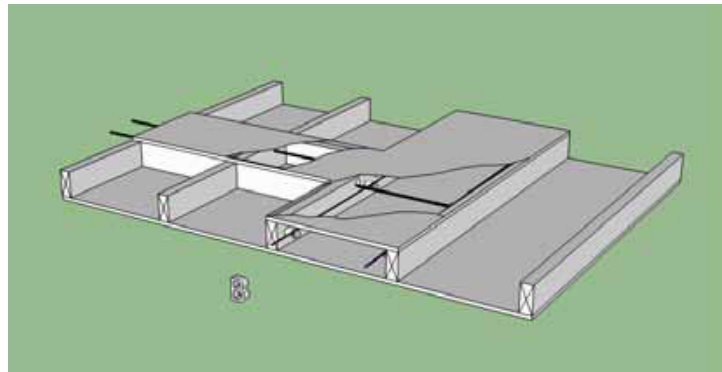


Knob & tube critical wiring points

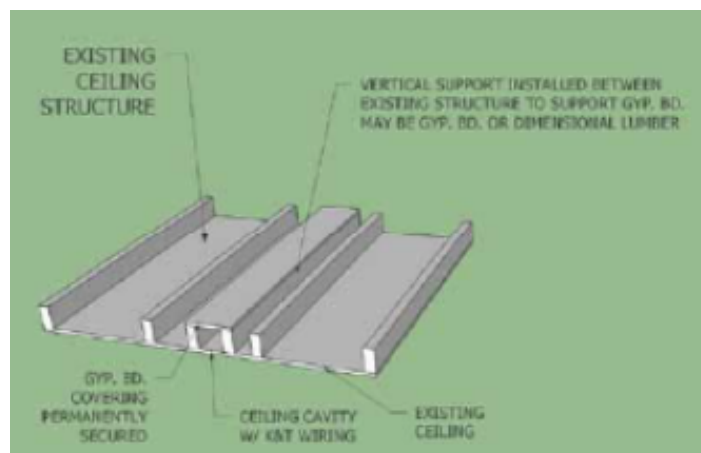
Chapter 4 - Insulation



Detail A



Detail B



Detail C

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- Appropriate shielding materials for concealing the knob & tube wiring must include gypsum board (5/8" or thicker), plywood or oriented strand board.
- Attics where knob & tube wiring has been previously covered with insulation, and the Energy Audit indicates that it is cost-effective to install additional insulation, can be insulated when it has been determined where the wiring is located and that it is actually still "active". This determination may be completed by:
 - a licensed electrician
 - the use of a thermal imager/scanner
 - visually or physically locating the wires or
 - another verifiable option determined by the sub-grantee and approved by the Nebraska Department of Environment and Energy.

Once the determination of the wire locations is documented in the client file, the wiring may be appropriately shielded as indicated above to prevent direct contact with the additional insulation and to provide adequate air movement space for cooling of the wire. Following appropriate shielding, insulation may be installed over the shielding.

- In attic areas where knob & tube wiring penetrates the plane of the attic and extends up into a side or *knee wall*, a fire resistant baffling must be installed around the wire to provide sufficient space for air movement around the wire to provide adequate air space to accommodate the cooling of the wire. (See Detail A)
- If attic insulation is being installed as per the directive above, the Nebraska State Electrical Board recommends the use of a licensed electrician for the installation of safety fuses as is indicated in the National Electrical Code.
- Existing fuses must remain intact if no insulation is being completed in the home.

4.0101.3 Recessed Lighting

- Air seal existing recessed light fixtures by following manufacturer's instructions concerning clearance to combustibles for recessed light fixtures. If there are no instructions available, construct a box from fire code gypsum that is two foot square, two feet high and enclosed (notches may have to be cut to accommodate attic floor joists) and air seal the box. Or install a pre-manufactured unit designed to provide appropriate air sealing and fire protection for non-ic-rated can lights.

Installation Standard 3.9, SWS 3.0102.1

4.0101.4 Shielding, Damming and Junction Boxes

Installation Standard 3.8

- When adding additional insulation to the attic, install shielding around heat and high-heat sources.
- Shielding must be kept a minimum of 3 inches from any *heat source* and a minimum of 6 inches from a *high-heat source*.

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- Sheet metal shielding around heat producing devices or chimneys, must be fastened securely so the barrier won't collapse.
- All shielding must be installed at a height to accommodate the depth of the existing and/or added insulation.
- Install damming around attic accesses, exhaust fans, soffit vents and uninsulated attics adjacent to insulated attics.
- All damming must be installed at a height to accommodate the depth of the existing and/or added insulation.
- Damming must be installed to ensure insulation will be full depth over all exterior top plates of the wall if possible.
- Install chutes, dams, tubes, or other blocking materials to prevent blown insulation from plugging air channels between soffit vents and the attic.
- These devices maximize the amount of insulation installed over top plates and help to prevent the wind-washing of insulation caused by cold air entering soffit vents.
- All junction boxes must have approved covers, and their location must be marked with a flag or other visible marker.

SWS 2.0301.1

Manufactured housing specific work standards

- If a *manufactured home* has a double sleeve flue, the chimney does not need to be shielded.

4.0101.5 Attic Accesses and Hatch Standards

Options for evaluating new attic accesses, in uninsulated attic areas, including weather-stripping, air sealing and rigid insulation board to match the R-value of the adjacent ceiling or wall surface ECMs:

1. The access, including the insulation and the air sealing costs, can be evaluated as part of the uninsulated "attic" Energy Conservation Measure (ECM) to determine the *SIR* for the work "in whole". If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
2. The access, including the insulation and the air sealing costs, can be evaluated as a separate "attic area" Energy Conservation Measure (ECM) to determine the *SIR* for the work. If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
3. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the *SIR* of the ECM(s), making the ECM(s) ineligible, those costs may be evaluated as an *Incidental Repair Measure* (IRM), associated with the "attic area" insulation ECM(s).
4. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 *CFM Infiltration* Reduction cost for the home.
5. In situations where *Infiltration* Reduction funds aren't sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.

Installation Standard 4.2



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- Options for evaluating **existing** attic accesses, that are uninsulated and not weather-stripped, including weather-stripping, air sealing and rigid insulation board to match the R-value of the adjacent ceiling or wall surfaces:
 1. The access, including the insulation and the air sealing costs, should be evaluated as a separate “attic area” Energy Conservation Measure (ECM) to determine the *SIR* for the work. If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
 2. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the *SIR* of the ECM, making the ECM ineligible, those costs may be evaluated as an *Incidental Repair Measure (IRM)*, associated with the “attic area” insulation ECM.
 3. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 *CFM Infiltration* Reduction cost for the home.
 4. In situations where *Infiltration* Reduction funds aren’t sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.
- Options for evaluating an **existing** unsealed, insulated attic accesses, to include appropriate weather-stripping and air sealing:
 1. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 *CFM Infiltration* Reduction cost for the home.
 2. Evaluate the costs associated with weatherstripping and air sealing as an *Incidental Repair Measure (IRM)*, associated with an appropriate recommended ECM.
 3. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.

(See the Attic Access Funding Evaluation Options Table below)

- Install new attic accesses in an area agreeable to the client and conducive to adding insulation.
- Install new attic accesses as per state and local codes.
- The insulation must be attached to the access door.
- Attic and attic access insulation must be installed to provide continuous insulation coverage.
- *Accessible attics* less than 100 square feet of floor area do not require accesses.
- The access must be caulked with a paintable clear caulking or with a color complementary to the surface to which it is applied.
- The access must be finished to match the ceiling where installed as closely as possible.

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Attic Access Funding Evaluation Options Table			
Access Type 	New attic accesses, in uninsulated attic areas, including weatherstripping, air sealing and rigid insulation board to match the R-value of the adjacent ceiling or wall surface ECMs	Existing attic accesses, that are uninsulated and not weatherstripped, including weather-stripping, air sealing and rigid insulation board to match the R-value of the adjacent ceiling or wall surfaces	Existing unsealed, insulated attic accesses, to include appropriate weather-stripping and air sealing
Evaluation Options 			
The access, including the insulation and the air sealing costs, can be evaluated as part of the uninsulated "attic" ECM to determine the <i>SIR</i> for the work "in whole". If the <i>SIR</i> for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.	X		
The access, including the insulation and the air sealing costs, can be evaluated as a separate "attic area" ECM to determine the <i>SIR</i> for the work. If the <i>SIR</i> for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.	X	X	
In situations where the additional costs associated with weatherstripping and air sealing the access impacts the <i>SIR</i> of the ECM(s), making the ECM(s) ineligible, those costs may be evaluated as an <i>Incidental Repair Measure</i> (IRM), associated with the "attic area" insulation ECM(s).	X	X	X
Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 CFM <i>Infiltration</i> Reduction cost for the home. In situations where	X	X	X
In situations where <i>Infiltration</i> Reduction funds aren't sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative <i>SIR</i> of the home, making the IRM and the home ineligible, the home may not be weatherized.	X	X	X

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- Attic accesses must be dammed with 1-inch common lumber or $\frac{3}{4}$ inch plywood fastened securely to the ceiling joists so the damming won't collapse or move.
- The new access must be properly framed and should have a minimum opening of 13 inches x 20 inches and boxed with 1-inch thick common lumber or $\frac{3}{4}$ inch plywood at a height to accommodate the added insulation.
- The access casing must be caulked with a paintable clear caulk or with a color complementary to the surface to which it is applied.
- The access cover must be constructed of $\frac{3}{4}$ inch plywood or particle board.
- If a pull-down ladder access or walk-up access is present it must be dammed with 1-inch common lumber or $\frac{3}{4}$ inch plywood with a hinged $\frac{3}{4}$ inch plywood or equivalent lid, weather-stripped and insulated with rigid insulation board to match the R-value of the adjacent ceiling surface. Access insulation must be installed to provide continuous insulation coverage. Insulation may need to overlap the opening and cover the sides. Hinged lid systems must be provided with a pulley system, countering the weight of the lid, for client access.

Installation Standard 4.3

- Weather-stripping for all interior attic accesses must have the last fastener of the weather-stripping located within 2-1/2 inches from the end of the weather-strip.

SWS 3.0103.1

- Foam or felt tape door weather-strips are not eligible for reimbursement under the NeWAP.

4.0101.6 Worker and Client Safety

- Wear OSHA approved respirators or dust masks while blowing insulation or installing batts.
- Inspect ceilings to ensure that the weight of the added insulation can be supported.
- Ensure that leaks in the roof and penetrations in the ceilings have been repaired prior to insulating the attic.
 - Limited water damage repairs that can be addressed by weatherization workers are allowed when necessary in order to weatherize the home and to ensure the long-term stability and durability of the measures. Subgrantees are limited to a maximum cost of \$300 to implement these limited repairs, although approval to exceed this limitation will be reviewed on a case-by-case basis by the Department of Environment and Energy prior to any work being implemented.
- If roof leaks cannot be appropriately or cost-effectively repaired, don't insulate the attic.

4.0101.7 Ventilation/Attic Ventilation Installation Standards

- All fans must be checked for proper damper operation.
- All kitchen and bath fans must be vented to the exterior of the building.
- Venting must not be installed on metal roofs.

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- Attics with metal roofs that cannot be properly vented must not be insulated.
- Attics must have a minimum of 1 square foot of net free vent area for every 150 square feet of attic area.
- In attics with over 300 square feet of attic area, vents must be located to provide the most adequate venting opportunity.
- Roof vents should not be installed over framing members. If vents must be installed over framing members, care must be taken to ensure that the rafters are not cut. The roof vent opening is to be framed.
- Soffit vents must be installed with the fins facing towards the house with rust proof, pan-headed screws.
- Gable vents must be set in caulking and nailed or screwed in place using rust proof fasteners and be trimmed.
- Gable vents installed in siding without wood sheathing behind it must have the vent framed.
- Roof, turbine and ridge vents must be sealed with roofing tar and attached with large headed roofing nails.
- Roof vents must be centered within 2 feet of the ridge or peak of the roof.
- The shingles must overlap the top half of the roof vent flange. The bottom half of the vent's flange must be exposed on top of the shingles.
- Venting should be evenly spaced and should be divided evenly between high and low or intake and exhaust vents.
- Roof, turbine and ridge vents are considered to be high or exhaust vents, while soffit and gable vents are considered to be low or intake vents.
- Exhaust fans without operating backdraft dampers must be retrofitted with backdraft dampers, or the fan must be replaced.
- PVC, rigid metal, metal flexible or galvanized pipe must be used for venting.
- Exhaust fan vent pipes must be insulated to prevent condensation.
- Flexible plastic ducting must not be used to vent exhaust fans.
- Metal flexible duct used for exhaust fan ventilation must not extend more than 6 feet.

SWS 4.0188.2

4.0101.8 Attic Ceilings

Installing attic insulation appropriately is critical to ensure energy cost savings and client comfort. Insulation should be installed according to manufacturer's installation standards. Generally, in the NeWAP, blown-in insulation is installed in attics because it provides a more continuous coverage and it has the capability of easily filling existing holes and insulation gaps. To avoid settling, the insulation must be installed based on manufacturer's specification, to a uniform depth and density for proper coverage.

The following standards must be met by NeWAP subgrantees installing attic insulation:

Installation Standard 4.4

- Blown insulation specifications must be stapled near the attic access of each *accessible attic*.

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- Appropriate marked and labeled attic insulation markers must be installed every 300 sq. ft. facing the attic access.
- The Insulation Specifications must include:
 - the insulation brand name,
 - thermal resistance chart,
 - certification that the insulation conforms to federal specifications,
 - the name of the company or agency that installed the insulation,
 - the date the insulation was installed, and
 - the R-value.
- A copy of the Insulation Specifications must be included in the sub-grantee client file.
- Insulation must be installed to extend over the top of all exterior plates and be the full R-value.
- Loose fill insulation must be installed over existing batt insulation whenever possible.

SWS 4.0103.4

- Insulation must be installed using the *tube-fill method* to a minimum of 3.5 pounds per cubic foot in enclosed ceilings and floored attics.

SWS 4.0103.6, SWS 4.0102.3

- Enclosed ceilings must be insulated to the full cavity depth.
- If additional batt insulation must be installed, the new batt must be unfaced and installed perpendicular to the existing batt insulation.

SWS 4.0103.1, SWS 4.0103.3

- Spray Polyurethane Foam Insulation to be installed as per manufacturer installation instructions.

SWS 4.0103.5

Manufactured housing specific work standards

- Interior entry holes must be sealed with wood or plastic plugs.
- The plugs must be caulked in place.
- Exterior entry methods must form a permanent and watertight seal.
- Flat roofs or roofs that do not have adequate slope to ensure proper drainage must not be penetrated to install the insulation.
- If a minimum R-11 of additional insulation cannot be installed, the ceiling must not be insulated.

Installation Standard 4.23 Installation Standard 4.24 Installation Standard 4.25

Installation Standard 4.26 Installation Standard 4.27 Installation Standard 4.28

4.0101.9 Attic Floors

Accessible *exposed floors* that have an existing covering to be insulated with blown insulation installed at a minimum of 3.5 pounds per cubic foot. Entry holes must be plugged with wood or plastic plugs and sealed appropriately.

Installation Standard 4.5

4.0101.10 Walk-Up Stair Attic Insulation Preparation and Installation Standards

In attics with walk-up stairs and door, subgrantees must establish a continuous insulation and air barrier over the top of the stairwell or by sealing and insulating the walls of the stairwell and the angled plane of the stair treads/risers and weatherizing the stairwell door.

Installation Standard 4.6

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4.0101.11 Attics with Retractable Stairs - Insulation Preparation and Installation Standards In attics with retractable stairways, subgrantees must build or purchase a cover that air seals the access and accommodates insulating.

Installation Standard 4.3

4.0102 Knee Walls

4.0102.1 Existing Insulated Knee Walls

In *knee wall* attics or attics in one-and-a-half story homes, with existing insulation, subgrantees must evaluate the insulation installation for cost-effectiveness and:

- Adjust all existing batt insulation to ensure it is in full contact with the interior cladding and the top and bottom plates.
- Ensure that existing insulation is appropriately secured. Link to SWS 4.0104.3

4.0102.2 Knee Wall Access Standards



- Options for evaluating **new** or an **existing** unsealed, uninsulated *knee wall* accesses in an existing uninsulated *knee wall*, to include appropriate weather-stripping and air sealing:
 1. The access, including the insulation and the air sealing costs, can be evaluated as part of the uninsulated “*knee wall* insulation” Energy Conservation Measure (ECM) to determine the *SIR* for the work “in whole”. If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
 2. The access, including the insulation and the air sealing costs, should be evaluated as a separate “*knee wall area*” Energy Conservation Measure (ECM) to determine the *SIR* for the work. If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
 3. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the *SIR* of the ECM, making the ECM ineligible, those costs may be evaluated as an *Incidental Repair Measure (IRM)*, associated with the “*knee wall*” insulation ECM.
 4. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 *CFM Infiltration* Reduction cost for the home.
 5. In situations where *Infiltration* Reduction funds aren’t sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.
- Options for evaluating an **existing** unsealed, uninsulated *knee wall* accesses in an existing insulated *knee wall*, to include appropriate weather-stripping and air sealing:
 1. The access, including the insulation and the air sealing costs, should be evaluated as a separate “*knee wall area*” Energy Conservation Measure (ECM) to determine the *SIR* for the work. If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
 2. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the *SIR* of the ECM, making the ECM ineligible, those costs may be evaluated as an *Incidental Repair Measure (IRM)*, associated with the “*knee wall*” insulation ECM.
 3. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 *CFM Infiltration* Reduction cost for the home.

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4. In situations where *Infiltration* Reduction funds aren't sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.
- Options for evaluating an **existing** unsealed, insulated *knee wall* access in an existing insulated *knee wall*, to include appropriate weather-stripping and air sealing:
 1. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 *CFM Infiltration* Reduction cost for the home.
 2. Evaluate the costs associated with weatherstripping and air sealing as an *Incidental Repair Measure* (IRM), associated with an appropriate recommended ECM.
 3. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.
 - Insulate both the attic joist area and the *knee wall* or insulate the entire sloped roof and attic end walls.
 - Insulate knee walls with either batt or blown insulation or *spray-applied insulation*.
[Installation Standard 4.7](#), [Installation Standard 4.9](#), [Installation Standard 4.8](#)
 - New batt *knee wall* insulation must be held in place with an *air infiltration barrier*.
 - Tightly pack the *knee wall* floor and ceiling rafter cavities with batt, blown, rigid or *spray-applied insulation*.
[Installation Standard 3.10](#)
[SWS 4.0104.1](#), [SWS 4.0104.2](#), [SWS 4.0104.5](#), [SWS 4.0104.6](#)
 - If batt insulation is used to seal the base of the knee walls, the batt must be sealed in an enclosed *vapor barrier*.
 - Materials used must form an airtight seal.
 - If *spray-applied insulation* is used, an *air infiltration barrier* is not needed.
 - Access requirements:
 - Provide *accessible knee walls* with a minimum of one access.
 - Locate new access door(s) in an area agreeable to the client and conducive to the installation of the insulation.
 - The last fastener on the weather-stripping must be within 2-1/2 inches from the end of the weather-strip.
 - Foam or felt tape door weather-strips are not eligible for reimbursement under the NeWAP.
 - The trim of the access must be caulked with clear caulking or caulking that is a color complementary to the surface to which it is applied.
 - Provide *accessible kneewalls* with a minimum of one access
(See the *Knee Wall Access Funding Evaluation Options Table* below)
[SWS 3.0103.1](#)
 - New accesses must be properly framed and be a minimum of 13 inches wide and 20 inches in height.
 - New access covers or doors must be minimum ¾ inch plywood or particle board and attached with a minimum of 2 hinges and 2 latching mechanisms.
 - New accesses must be finished to match the wall as closely as possible.

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Knee Wall Access Funding Evaluation Options Table

<p>Access Type </p> <p>Evaluation Options </p>	<p>New or existing knee wall accesses, in uninsulated attic <i>knee wall</i>, including weather-stripping, air sealing and rigid insulation board to match the R-value of the adjacent wall surface ECMs</p>	<p>Existing knee wall accesses, that are uninsulated and not weather stripped, including weather-stripping, air sealing and rigid insulation board to match the R-value of the adjacent <i>knee wall</i> surfaces</p>	<p>Existing unsealed, insulated knee wall accesses, to include appropriate weather-stripping and air sealing</p>
<p>The access, including the insulation and the air sealing costs, can be evaluated as part of the uninsulated <i>"knee wall"</i> ECM to determine the <i>SIR</i> for the work "in whole". If the <i>SIR</i> for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.</p>	<p>X</p>		
<p>The access, including the insulation and the air sealing costs, can be evaluated as a separate <i>"knee wall"</i> ECM to determine the <i>SIR</i> for the work. If the <i>SIR</i> for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.</p>	<p>X</p>	<p>X</p>	
<p>In situations where the additional costs associated with weatherstripping and air sealing the access impacts the <i>SIR</i> of the ECM(s), making the ECM(s) ineligible, those costs may be evaluated as an <i>Incidental Repair Measure (IRM)</i>, associated with the <i>"knee wall"</i> insulation ECM(s).</p>	<p>X</p>	<p>X</p>	<p>X</p>
<p>Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 CFM <i>Infiltration</i> Reduction cost for the home. In situations where</p>	<p>X</p>	<p>X</p>	<p>X</p>
<p>In situations where <i>Infiltration</i> Reduction funds aren't sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative <i>SIR</i> of the home, making the IRM and the home ineligible, the home may not be weatherized.</p>	<p>X</p>	<p>X</p>	<p>X</p>

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4.02 Walls

4.0201 Preparation

Prior to installing wall insulation subgrantees must evaluate the insulation installation for cost-effectiveness and inspect for, repair and document the following issues/concerns:

- Evidence of moisture damage, if condition of the siding, sheathing, or interior wall finish indicates an existing moisture problem, no sidewall insulation should be installed until the moisture problem has been identified and corrected.
- Gaps in external window trim and other areas that may permit water into the wall.
- Ensure that the interior and exterior surfaces of the walls are sealed and capable of withstanding the force of insulation blowing.
- Minor surface repair on interior and exterior surfaces to be completed prior to insulating.
- Interior openings from which insulation may escape, such as pocket doors, balloon framing, un-backed cabinets, interior soffits, and closets to be located and sealed prior to insulating.
- Exterior walls that have active knob & tube wiring must be evaluated for the cost-effectiveness of removing existing wiring, rewiring and being insulated as per Section 4.0203.02. Walls in additions on these homes that do not have active knob & tube wiring must be insulated if the Energy Audit of the home indicates the insulation is cost-effective for implementation.

SWS 3.0102.4

4.0202 Accessible Walls

In homes with accessible/open wall cavities Subgrantees must:

- Insulate with batt, blown or *spray-applied insulation* and cover the cavity.
- Fill the entire cavity.
- If faced batt insulation is installed in an open wall cavity, the *vapor barrier* must be installed to the warm side and fit snugly between the studs and wall.
- Cut the batt insulation to the exact length of the cavity.
- Install the insulation around wiring, piping, etc. by splitting the batt, not by compression. Link to SWS 4.0201.2

4.0203.1 Stick Built Homes - Interior and Exterior Wall Insulation Installation Standards

Appropriate installation of wall insulation is essential to ensuring energy cost savings and client comfort. Insulation should be installed according to manufacturer's installation standards. In homes where exterior wall cavities are being blown, subgrantees must:

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- Remove or drill siding and fill all enclosed wall cavities. Wall cavities that are less than 3 feet in height or where it is not possible to tube fill, may be insulated through a minimum 1 inch entry holes.
- Remove slate siding that may contain asbestos using precaution not to damage the siding, ensuring the siding material does not become *friable*.
- Remove metal or vinyl siding with the aid of an appropriate siding removal tool.
 - Removed siding must be reinstalled using the original fastening system whenever possible. The seam tabs on slate siding must be reinstalled.
 - The entry holes must be sealed with plastic or wood plugs, or covered with felt paper prior to reinstalling the siding if the siding was removed.
 - Seal and plug holes before replacing siding.
- Plug and tape or seal holes with an appropriate material and make ready for paint, in homes insulated from the inside.
- Remove asbestos shingled siding may be carefully removed using precaution not to damage the siding, ensuring the siding material does not become *friable*. Refer to your agency policy and EPA procedures when working with asbestos materials.
- Probe all wall cavities through holes, as they are drilled, to identify fire blocking, diagonal bracing, and other obstacles. After probing, drill whatever additional holes are necessary to ensure complete coverage.
- Insulate stucco walls through either interior or exterior access.
 - Entry holes in stucco or masonry siding must be sealed with mortar or a material specifically manufactured to repair stucco or masonry.
 - Interior entry holes must be made ready for paint.
 - Interior entry holes in drywall or plaster must be plugged and taped or sealed with a material specifically manufactured to repair drywall or plaster.
- Document in the client file back-plastered (two layer) walls that are too difficult to insulate properly.
- Verify and document in the client file the use of lead-safe weatherization procedures.
- Drill 2-to-3-inch diameter holes to access stud cavity.
- Prevent settling of cellulose insulation by using the *tube-fill method* and installing to a minimum density of 3.5 pounds per cubic foot.

SWS 4.0201.3, SWS 4.0202.1

- *Dense pack* wall insulation using blower equipped with separate controls for air and material feed.
- Repair walls using durable and permanent materials, matching the existing area as closely as possible.
- Use materials of suitable grade in areas of high moisture or areas exposed to the weather.
- Paint plugs to match the existing siding color whenever plastic or wood plugs are used on the exterior of the siding.
- Completely seal openings and paint and texture sealing materials to match the surrounding surface.

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- Verify the location of existing supply and return duct systems prior to insulating.
- Seal floor cavities in balloon framed walls by installing insulation plugs (i.e. plastic bags filled with insulation or rigid insulation/air blocks)

[Installation Standard 4-10](#), [Installation Standard 4-11](#), [SWS 4.0201.1](#)

4.0203.2 Stick-Built Homes - Knob & Tube Wiring Installation Standards

The Nebraska State Electrical Board does not permit directly covering knob & tube wiring with insulation. Exterior walls, with existing active knob & tube wiring must be evaluated as cost-effective for the removal of the existing wiring, rewiring and the insulation of the wall, must have insulation installed appropriately as per NeWAP standards. Appropriate installation of wall insulation is essential to ensuring energy cost savings and client comfort. All completed work should be installed according to manufacturer's installation standards and subgrantees and contractors must:

- comply with all local and state fire, building and electrical safety codes and procedures,
- ensure that all electrical work is completed by an electrician in the State of Nebraska
- ensure that, if required, lead safe practices are followed,
- ensure that appropriate heating and cooling sizing calculations are completed for the sizing of the mechanical equipment using appropriate area/size calculations of replaced and/or active knob & tube wiring walls in the NEAT Energy Audit, and
- document in the client file the name and contact information of the licensed electrician responsible for the removal and rewiring completed in the home.

All rewired exterior walls must be prepped, sealed, insulated and finished as per the requirements established in **Section 4.0203.1**.

4.0203.3 Manufactured Housing Walls - Exterior Wall Insulation Installation Standards

Appropriate installation of wall insulation is essential to ensuring energy cost savings and client comfort. Insulation should be installed according to manufacturer's installation standards.

[Installation Standard 4.21](#) [Installation Standard 4.22](#)

4.03 Floors

4.301 Preparation and Inspection Requirements

In homes where a floor serves as an air/thermal boundary, prior to installing floor insulation subgrantees must evaluate the insulation installation for cost-effectiveness and inspect for, prepare for and document the following issues/concerns:

- Sealing of stud cavities if the walls are balloon framed prior to insulating floors.
- Inspection of ceilings of garages to ensure that the weight of the added insulation can be supported.
- Verify the location of existing supply and return duct systems prior to insulating.

4.0302 Accessible Floors

4.0302.1 General Floor Insulation Installation Standards

- Batt insulation must be appropriately cut and installed to reduce voids and gaps in the insulation.
- Floor insulation must be installed to fit tightly to the subfloor and securely fastened to ensure the contact is maintained.

[Installation Standard 4.15](#) [Installation Standard 4.16](#)

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4.0302.2 Accessible Floor Insulation Installation Standards

- *Exposed floors*, except over garages, must be insulated and covered with exterior grade plywood or tar impregnated fiberboard. All seams must be caulked.
SWS 3.0105.1, SWS 4.0301.3, SWS 4.0301.6, SWS 4.0301.1,
SWS 4.0302.1, SWS 4.0302.2, SWS 4.0302.4
- *Exposed floors* over garages must be insulated and covered with fire code drywall as per state and/or local code.
- The drywall must be taped and receive one coat of joint compound or the joints and seams must be caulked to form an airtight seal.
- Accessible *exposed floors* that have an existing covering must be insulated with blown insulation installed at a minimum of 3.5 pounds per cubic foot. Entry holes must be sealed with wood or plastic plugs.

SWS 4.0301.4, SWS 4.0302.3

4.0303 Enclosed Floors

4.0303.1 General Installation Standards

- Cost-effective floor insulation must:
 - Be insulated with either blown cellulose, blown fiberglass or *spray-applied insulation*.
SWS 4.0301.2, SWS 4.0301.5, SWS 4.0302.2, SWS 4.0302.4
- In floors with existing insulation Subgrantees must:
 - Adjust all existing batt insulation to ensure it is in full contact with the floor.

4.0303.2 Manufactured Housing Floor Cavity Insulation - Preparation & Inspection Requirements

In manufactured homes where a floor serves as an air/thermal boundary, prior to installing floor insulation subgrantees must complete an inspection of the floor assembly and document any issues/concerns.

- Prior to weatherizing the underbelly, the owner must repair plumbing leaks that will directly affect the weatherization of the underbelly.
- When 50% or less of the existing insulation is missing, deteriorated or damaged the damaged areas must be repaired.
- When more than 50% of the existing insulation is missing, deteriorated or damaged, the entire underbelly must be reinsulated.
- Existing insulation in undamaged areas does not need to be removed, but additional blown insulation must be installed.
- Insulation must be installed the full cavity depth whenever possible. SWS 4.0302.9
- Replace all deteriorated or damaged insulation with unfaced batt insulation and new *weatherboard* or by replacing the *weatherboard* and then installing blown insulation.
- The *weatherboard* must form an airtight seal and adequately support the insulation.
- If plywood is used as *weatherboard*, the plywood must be exterior grade.
- If insulation is installed through the rim joist, a rigid tube must be used.
- Entry holes in the rim joist must be plugged with wood plugs and glued in place.

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- If insulation is installed through the *weatherboard*, the entry holes must be covered with plastic plugs or 30# felt paper. Both should be sealed with caulking.
- Rim joists that are 2 inches x 4 inches or less in construction must not be drilled.
- Special care needs to be taken not to isolate water pipes outside the envelope.

Insulation Standard 4.29

4.04 Conditioned Basements and Crawl Spaces

4.0401 Band/Rim Joists

4.0401.1 Preparation Requirements

Prior to installing rim joist insulation subgrantees must evaluate the insulation installation for cost-effectiveness, inspect for, prepare for and document the following issues/concerns:

- Sealing of floor cavities in balloon framed walls by installing insulation plugs (i.e. plastic bags filled with insulation or rigid insulation/air blocks).
 - Sealing of all penetrations in the rim prior to installing insulation.
- Rim sealing insulation products that are reimbursable through the NeWAP include:
 - Two-part spray foams or
 - Polystyrene or polyurethane rigid insulation board sealed on all edges.

[Installation Standard 3.14](#), [SWS 4.0401.1](#), [SWS 4.0401.3](#)

4.0401.2 Insulation Installation Requirements

- Rim joist insulation must be installed in all accessible cavities with a depth of 2 inches or more.
- Rim Joist insulation must be a minimum R-10.

[Installation Standard 4.12](#), [SWS 4.0401.1](#), [SWS 4.0401.3](#)

4.0402 Basements and Crawl Space Walls

Insulating *accessible foundations* and sealing the thermal boundary(s) in the lower levels of buildings, can provide significant comfort and energy savings. Sealing at the lower level helps to reduce stack effects that can impact ductwork leakage in lower levels and indoor air quality.

4.0402.1 Preparation and Air Sealing Requirements

Prior to installing foundation insulation subgrantees must inspect for, prepare for and document the following issues/concerns:

- Location of walls between an *unconditioned crawl space* and *conditioned basement* areas that are to be weatherized.

4.0402.2 Foundation Access Requirements

- Options for evaluating **new** or an **existing** unsealed, uninsulated foundation wall accesses in an existing uninsulated foundation wall, to include appropriate weather-stripping and air sealing:
 1. The access, including the insulation and the air sealing costs, can be evaluated as part of the uninsulated “foundation wall insulation” Energy Conservation Measure (ECM) to determine the *SIR* for the work “in whole”. If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
 2. The access, including the insulation and the air sealing costs, should be evaluated as a separate “foundation area” Energy Conservation Measure (ECM) to determine the *SIR* for the work. If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
 3. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the *SIR* of the ECM, making the ECM ineligible, those costs may be evaluated as an *Incidental Repair Measure (IRM)*, associated with the “attic area” insulation ECM.

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4. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 CFM Infiltration Reduction cost for the home.



5. In situations where *Infiltration* Reduction funds aren't sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.

Installation Standard 4.2

- Accessibility to crawl spaces/*accessible foundations*:
 - Accesses must be installed in all accessible crawl spaces.
 - A minimum of one access must be installed.
 - New *crawl space* accesses must be located in an area agreeable to the client and conducive to insulating.
 - New access cover and/or hardware must be installed if necessary.
 - The last fastener of the weather-stripping must be located within 2-1/2 inches from the end of the weather-strip.
- SWS 3.0104.2**
- Evaluating **existing** foundation accesses, that are uninsulated and not weather-stripped, including weather-stripping, air sealing and rigid insulation board to match the R-value of the adjacent foundation wall surface:
 1. The access, including the insulation and the air sealing costs, should be evaluated as a separate "foundation area" Energy Conservation Measure (ECM) to determine the *SIR* for the work. If the *SIR* for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.
 2. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the *SIR* of the ECM, making the ECM ineligible, those costs may be evaluated as an *Incidental Repair* Measure (IRM), associated with the "foundation" insulation ECM.
 3. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 CFM *Infiltration* Reduction cost for the home.
 4. In situations where *Infiltration* Reduction funds aren't sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.
 - Evaluating an **existing** unsealed, insulated attic accesses, to include appropriate weather-stripping and air sealing:
 1. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the *SIR* of the ECM, making the ECM ineligible, those costs may be evaluated as an *Incidental Repair* Measure (IRM), associated with an appropriate recommended ECM.
 2. Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 CFM *Infiltration* Reduction cost for the home.
 3. In situations where the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative *SIR* of the home, making the IRM and the home ineligible, the home may not be weatherized.

(See the Foundation Access Funding Evaluation Options Table below)

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<p>Access Type </p> <p>Evaluation Options </p>	<p>New or existing unsealed, uninsulated foundation access in an existing uninsulated foundation wall, to include weather-stripping, air sealing and rigid insulation board to match the R-value of the adjacent wall surface ECMs</p>	<p>Existing foundation accesses, that are uninsulated and not weather-stripped, including weather-stripping, air sealing to match the R-value of the adjacent foundation wall surfaces</p>	<p>Existing unsealed, insulated foundation access, to include appropriate weather-stripping and air sealing</p>
<p>The access, including the insulation and the air sealing costs, can be evaluated as part of the uninsulated “foundation wall” ECM to determine the SIR for the work “in whole”. If the SIR for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.</p>	<p>X</p>		
<p>The access, including the insulation and the air sealing costs, can be evaluated as a separate “foundation area” ECM to determine the SIR for the work. If the SIR for the ECM is 1.0 or greater, the ECM (including all costs) should be invoiced as an ECM on the BCJO.</p>	<p>X</p>	<p>X</p>	
<p>In situations where the additional costs associated with weatherstripping and air sealing the access impacts the SIR of the ECM(s), making the ECM(s) ineligible, those costs may be evaluated as an Incidental Repair Measure (IRM), associated with the “foundation” insulation ECM(s).</p>	<p>X</p>	<p>X</p>	<p>X</p>
<p>Evaluate whether the costs associated with weatherstripping and air sealing the access can be covered under the \$50/100 CFM Infiltration Reduction cost for the home.</p>	<p>X</p>	<p>X</p>	<p>X</p>
<p>In situations where Infiltration Reduction funds aren’t sufficient and the additional costs associated with weatherstripping and air sealing the access impacts the Cumulative SIR of the home, making the IRM and the home ineligible, the home may not be weatherized.</p>	<p>X</p>	<p>X</p>	<p>X</p>

Chapter 4 - Insulation

- Appropriate air sealing and insulation of exterior accesses to crawl spaces:
 - Foam or felt tape door weather-strips are not eligible for reimbursement under the NeWAP.
 - Hardware may be added if necessary.
 - New exterior accesses must be constructed of $\frac{3}{4}$ inch *pressure treated* plywood, meet the size requirements of state and local codes, and be attached with 2 hinges and a latching mechanism.
 - Existing accesses that do not meet state and local code sizing requirements must be resized to provide appropriate access.
- Any new framing must be *pressure treated*, redwood or cedar.
- New floor accesses must be properly supported.

4.0402.3 General Foundation Insulation Installation Requirements

- Foundation wall insulation products that are reimbursable through the NeWAP include:
 - two-part spray foams, polystyrene or
 - polyurethane rigid insulation board sealed on all edges, or
 - draped batt insulation sealed appropriately, in limited cases when no moisture threats are present.
- SWS 4.0402.1, SWS 4.0402.2, SWS 4.0402.3,
SWS 4.0402.4, SWS 4.0402.5**
- Foundation insulation in basements must be installed as per local and State Code requirements.
 - Installed insulation must have no significant voids or edge gaps.

4.0402.4 Basement Wall Installation Requirements

- If batt insulation is used the wall must be framed to adequately support the insulation.
- If foam board is used the insulation must be attached to the foundation wall with construction adhesive or masonry nails or a combination of the two.
- Insulation must be covered as required by local or state code jurisdiction requirements.
- *Basement* wall insulating systems must be installed according to manufacturer's instructions and be a minimum R-10.

Installation Standard 4.13

4.0402.5 Crawl Space and Ledged Basement Walls Installation Requirements

- *Crawl space* and *ledged basement* wall must be insulated with faced batt, foam board or spray-applied insulation (in non-habitable spaces).
- The insulation must fill the sill box and extend down the foundation wall.
- If faced batt insulation is installed, the *vapor barrier* must be to the warm side.

Installation Standard 4.14

4.05 Ducts

4.0501 General Preparation

Sealing, repairing and insulating existing *accessible ductwork* provides Nebraska Weatherization Assistance Program (NeWAP) clients with reduced energy costs and improved comfort. Sealing leaky ducts also helps to improve indoor air quality.

Prior to sealing and/or insulating ducts NeWAP subgrantees must:

- Inspect and evaluate the existing system to ensure that all ducts and plenums are properly fastened, supported and sealed to reduce air leakage.
- Evaluate/consider sealing supply and return registers in unoccupied basements/rooms.

Chapter 4 - Insulation

Prior to sealing and/or insulating ducts NeWAP subgrantees must verify and make reasonable attempts to ensure that duct systems are providing balanced, adequate airflow to living spaces.

When airflow is a problem subgrantees must consider the following options:

- Cleaning the filter or replacing disposable filters.
- Repairing, realigning or replacing damaged, missing or restricted floor registers.
- Realigning and securing disconnected duct work.
- Moving/installing filter racks into an area that is convenient and conducive for the customer to access.
- Removing obstructions to registers and ducts.
- Eliminating kinks in existing flex duct and replacing collapsed ducts with metal duct.
- Installing a transfer grille(s) to improve airflow in the building.
- Under-cutting interior doors.

4.0502 Duct Insulation

- Insulate supply ducts that run outside the thermal boundary with a minimum of R-8 vinyl, foil faced insulation, manufactured for use as duct insulation, or two-part foam insulation.
SWS 5.0107.1, SWS 5.0107.2
- Do not insulate ducts that run through *conditioned* space unless they cause overheating in winter or condensation in summer.
- Seal the duct work as per Section 4.0501 before insulating.
- Cover all accessible, exposed supply ducts, leaving no areas of uninsulated duct.
- Fasten the insulation by mechanical means such as plastic straps, cord, wire, plastic or nylon bands.
- Use only tape specifically manufactured for covering and securing joints.
[Installation Standard 4.17](#), [Installation Standard 4.18](#),
[Installation Standard 4.19](#), [Installation Standard 4.20](#)



Chapter 5 - Heating and Cooling

5.01 System Replacement Requirements

5.0101 Heating Systems

The following standards must be followed when furnaces are replaced/installed through the Nebraska Weatherization Assistance Program:

- Eligible unsafe heating plants in single family and manufactured homes that cannot be repaired, as determined by a *Qualified Heating Technician* or, *Trained Weatherization Staff* must be replaced.
- If a *Qualified Heating Technician* determines that a unit must be replaced, the unit must receive a second inspection by *Trained Weatherization Staff*, a second *Qualified Heating Technician* or gas utility company.

SWS 5.0109.4

- Units that contain *heating plants* that are inoperable or red-tagged at the time of the initial inspection must not be weatherized until the *heating plant* has been repaired or replaced.
- With Department of Environment and Energy approval, multiple heating plants or motorized dampers may be installed to provide zone heating.
- Unsafe space heaters may be replaced with a forced air system.
- With U.S Department of Energy (if DOE funds are used) and Department of Environment and Energy approval, the *heating plant* may utilize a new fuel source.
- *Unvented combustion space heaters* are not an eligible *heating system* and must not be replaced with new *unvented combustion space heaters*.
- Existing *unvented combustion space heaters* may remain as secondary heat sources.
- Secondary unvented units that conform to the safety standards on ANSI Z21.11.2 may remain as back-up heat sources.
- Units that do not meet ANSI Z21.11.2 must be removed, and properly disposed of, prior to weatherization but may remain until a replacement *heating system* is in place.
- Secondary unvented units that conform to the safety standards on ANSI Z21.11.2, but are not operating safely, must be removed and properly disposed of.
- Repair of secondary unvented units is not allowed.
- An unvented gas-liquid-fueled space heater that remains in a completed single-family house after weatherization shall:
 - Not have an input rating in excess of 40,000 Btu/hour;
 - Not be located in, or obtain combustion air from sleeping rooms, bathrooms, toilet rooms, or storage closets, except:
 - One listed wall-mounted space heater in a bathroom if permitted by the authority having jurisdiction which:
 - has an input rating that does not exceed 6,000 Btu/hour;
 - Is equipped with an oxygen-depletion sensing safety shut-off system; and
 - The bathroom has adequate combustion air;

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- One listed wall-mounted space heater in a bedroom if permitted by the authority having jurisdiction which:
 - has an input rating that does not exceed 10,000 Btu/hour;
 - Is equipped with an oxygen-depletion sensing safety shut-off system; and
 - The bedroom has adequate combustion air.

All locations where equipment is to be installed or replaced must be appropriately prepared for the installation of the new equipment.

Forced air furnaces must have a minimum AFUE of 90 percent, boilers a minimum of 85 percent and wall and console heaters, a minimum of 80 percent.

**SWS 5.0108.4, SWS 5.0203.1, SWS 5.0204.1,
SWS 5.0108.4, SWS 5.0301.3**

- Efficiency ratings for all replacement equipment must be listed in the most current edition of the Air Conditioning, Heating, and Refrigeration Institute (AHRI) Directory of Certified Product Performance.

SWS 5.0108.4, SWS 5.0203.1, SWS 5.0204.1

- Heat exchangers in all replacement heating plants must have a minimum 10-year manufacturer's warranty and a minimum 1-year warranty for materials, workmanship, and serviceability.
- The replacement *heating plant* must be competitively bid and properly sized using the post-weatherization characteristics of the home.
- A service label must be placed on or near the *heating plant* containing the name, business address and phone number of the company or agency performing the work, any repairs that were completed and the date the work was performed.
- Air conditioner evaporator coils of operable air conditioning units must be replaced if they will not fit the new *heating plant*.
- Drip pans in poor condition may be replaced.
- Heat rise (supply temperature minus return temperature) must be within manufacturer's specifications.
- High limit should stop fuel flow within 10% of 200° F. Furnace must not cycle on high limit.
- Fan control should be set to activate fan at 130° to 140° F and deactivate it at 95° to 105° F. Slightly higher settings are acceptable if these recommended settings cause a comfort complaint.
- Static pressure, measured in both supply and return plenums should be within manufacturer's specifications.
- Blower should not be set to operate continuously.
- Seal holes through the jacket of the air handler with mastic or foil tape.

SWS 5.0106.1, SWS 5.0106.2

- Check clearances of heating unit and its vent connector to nearby combustibles, according to the International Fuel Gas Code (IFGC).
- Clock gas meter to insure correct gas input.
- Test gas water heater to insure that it vents properly after installation of a sealed-combustion, 90 + AFUE furnace. Copies of CAZ Depressurization Test (WX9) or Daily Safety Test Out (WX10) forms verifying proper venting of the water heater must be included in the client file.

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- Ensure proper sediment trap on gas line. (dirt leg)

5.0102 Venting, Piping and Ducting

- The replacement *heating plant* must use the existing *distribution system* when possible. Limited new ductwork or *hydronic pipes* may be installed to properly balance the system with prior approval of the Department of Environment and Energy.
- *Hydronic pipes* must be insulated with 1-inch material having a minimum R-4 pipe insulation specifically manufactured as hydronic pipe insulation. Joints and elbows must be insulated.
SWS 5.0202.2
- Flexible ductwork must be no more than 4 lineal feet per run, if possible, with appropriate documentation included in the client file.
- The replacement *heating plant* must be properly vented and use outside air for combustion.
SWS 5.0203.1
- Fuel piping for replacement heating plants must be properly designed and installed as per
SWS 5.0504.1,
- If the replacement *heating plant* is installed with existing central air conditioning, the air conditioner evaporator coil should be a cased coil or be raised and made accessible for periodic service and cleaning.
- The condensate line must be drained to a code approved drain.
SWS 5.0102.1
- The replacement *heating plant* must be properly vented. If the new *heating plant* will not be vented through the masonry chimney but the water heater will still be vented through that chimney, a properly sized flue liner must be installed. As an alternative, a power vent may be installed on the water heater.
- Furnace filter racks on new heating systems must be installed in an area that is convenient and conducive for the customer to access.
- In some instances, with prior Department of Environment and Energy approval, the installer may add return ducts or supply ducts as part of furnace replacement to improve air distribution, to eliminate duct-induced house pressures, and to establish acceptable values for static pressure and heat rise.
- Supply and return plenums must be secure, be mechanically fastened with screws and sealed to air handler with mastic and fabric mesh tape to form an essentially airtight connection on all sides of these important joints.
SWS 5.0106.1, SWS 5.0106.2
- All *accessible ductwork* must be sealed and, if the ductwork is located outside of the *conditioned space*, insulated.
**Installation Standard 4.17, Installation Standard 4.18,
Installation Standard 4.19, Installation Standard 4.20**
- Filters should be appropriately sized, held firmly in place and provide complete coverage of blower intake or return register. Filters should be easy to replace.
- Appropriate filter racks are to be installed, not just a hole cut in the return duct.
- New ducts must not be installed in *unconditioned* spaces without Department of Environment and Energy approval and with appropriate justification located in the client file.

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- New ducts, excluding jump ducts, must be physically connected to the existing *distribution system* or to the furnace.

SWS 5.0105.1, SWS 5.0105.2, SWS 5.0104.1

- Filters should be appropriately sized, held firmly in place and provide complete coverage of blower intake or return register. Filters should be easy to replace.
- Appropriate filter racks are to be installed, not just a hole cut in the return duct.

5.0103 Cooling Systems

Cooling system replacements completed through the NeWAP must be shown as cost-effective through the home's Energy Audit, with appropriate documentation included in the client file, and must not be charged to the health and safety line item. The following standards must be followed for air conditioner or heat pump replacements to be reimbursed as eligible expenditures:

- Replacement central air conditioners must be a minimum 15-SEER (Seasonal Energy Efficiency Factor).

SWS 5.0108.1, SWS 5.0108.2,
SWS 5.0108.3, SWS 5.0301.2

- Replacement heat pumps must be a minimum 15-SEER and 8.5HSPF (Heating Seasonal Performance Factor).
- Heat pumps must be installed with ramp-up type thermostats designed to bring backup heat in stages, and only when the heat pump can no longer keep up with demand, and must be able to differentiate between a demand call and a 'return from setback' call for heat.

SWS 5.0101.1

- Package Terminal Heat Pumps (PTHP) and Mini-Split Heat Pump systems may be eligible for installation through the NeWAP on a case-by-case basis following review and approval of the work prior to any work being implemented.

SWS 5.0301.2

- Replacement central air conditioners or heat pump systems must be properly sized using the post weatherization characteristics of the home with system sizing documentation included in the client file.
- Replacement central air conditioners and heat pumps must be replaced by a *Qualified Heating Technician*.
- A service label must be placed on or near the furnace plenum containing the name, business address and phone number of the company performing the work, any repairs that were completed and the date the work was performed.
- Efficiency ratings for forced air-conditioners and heat pumps must be listed in the most current edition of the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Directory of Certified Product Performance.
- Replaced air conditioners and heat pumps must be properly disposed of and the refrigerant reclaimed in compliance with the Clean Air Act 1990, section 608, as amended by 40 CFR 82, 5/14/93. The vendor, DE manufacturing center or other entity recovering the refrigerant must possess EPA-approved Section 608 type I, II or III universal certification.

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Manufactured housing specific work standards

- The air conditioner condensates and combustion air sleeves to the underbelly must not be covered.

SWS 5.0102.1

5.0104 Boilers (Hot Water and Steam)

The following Standard Work Specifications must be followed when boiler systems are designed, repaired and/or tuned and cleaned through the Nebraska Weatherization Assistance Program.

SWS 5.0203.1, SWS 5.0204.1

5.0105 Thermostats

- Mercury thermostats may be replaced with digital programmable/setback thermostats.
- New thermostats must be calibrated and adjusted and any operable accessories that were installed on the existing *heating system* must be removed and reinstalled on the new *heating system*, if possible.
- If a new thermostat is installed, the wire hole in the wall behind the thermostat must be sealed.
- Mercury thermostats must be properly disposed.

SWS 5.0201.1

SWS 5.0201.1, SWS 5.0101.1

5.02 System Assessments, Inspections and Maintenance

5.0201 Heating System Assessment/Safety Inspection Requirements

Prior to weatherizing the *building envelope*, all eligible heating plants must be inspected by a *Qualified Heating Technician*, utility company or *Trained Weatherization Staff*. During testing, make appropriate efforts to repair and adjust the existing furnace or boiler, before deciding to replace it. Replacement parts like gas valves and controls for older heating units are commonly available.

- If the *safety inspection* was performed by a *Qualified Heating Technician*, the need for replacement must be confirmed by a utility company, a second *Qualified Heating Technician* or *Trained Weatherization Staff*.
- The *building envelope* must not be weatherized if the owner or client refuses a *safety inspection* of the *heating system* or until any *heating system* deficiency has been repaired and/or the *heating plant* replaced.
- Combustion (CAZ) safety testing is required when combustion heating systems are present.
- Inspect venting of combustion heating systems and confirm adequate clearances.
- Clients in units that contain *heating plants* that are *inoperable* or red-tagged are in danger of frost bite, hypothermia and other life-threatening issues.
- Eligible heating plants that cannot be repaired must be replaced.
- If a dwelling is heated by *unvented combustion space heaters* and an inoperable conventional *heating system* is present, the conventional *heating system* must be repaired or replaced to eliminate the need for unvented space heaters. If the need for *unvented combustion space heaters* cannot be eliminated, the sub-grantee must instruct the client regarding the dangers of carbon monoxide and excessive moisture levels, particularly if any unvented space heaters are left in the dwelling as a secondary *heat source*, or emergency back-up.

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- If a dwelling utilizes *unvented combustion space heaters* as the primary *heat source* over 40,000 BTU, the *unvented combustion space heater* must be replaced with a vented combustion *heating system*.
- Filters should be appropriately sized, held firmly in place and provide complete coverage of blower intake or return register. Filters should be easy to replace.
- Appropriate filter racks are to be installed, not just a hole cut in the return duct.
- Conduct a fuel leakage test of the appliance piping and control system downstream of the meter to the appliance.
 - All gas leaks should be repaired prior to weatherization. If gas leak is detected have occupant notify the fuel supplier or a qualified technician.
- Visually inspect the venting system for proper size and horizontal pitch and determine that there is not blockage, vent size reduction or restriction, leakage, corrosion or other deficiencies that could cause an unsafe condition.
- Inspect burners and crossovers for blockage and corrosion.
- Determine that the pilot is burning properly, and that main burner ignition is satisfactory.
- Test the pilot safety device to determine that it is operating properly.
- Visually determine that main burner gas is burning properly.
- If the appliance is equipped with a high and low flame control or flame modulator, check for proper main burner operation at low flame.
- Test for spillage at the draft hood relief opening.
- On furnaces and console heaters, test the heat exchanger for cracks and openings and visually inspect the heat exchanger for excessive corrosion.
 - Look for rust at exhaust ports and vent connector.
 - Look for flame impingement on the heat exchanger during firing.
 - Observe flame movement, change in chimney draft, or change in CO reading as blower is turned on and off.
 - Look for flame-damaged areas near the burner flame.
 - Measure the flue-gas oxygen concentration before the blower starts and just after it has started. There should be no more than a 1% change in the oxygen concentration.
 - Examine the heat exchanger, shining a bright light on one side and looking for light traces on the other using a mirror to peer into tight locations.
- On furnaces and console heaters, check the fan control for proper operation.
- Test and confirm the furnace efficiency operating standards.
 - Check heat rise after 5 minutes of operation. Refer to manufacturer's nameplate for acceptable heat rise (supply temperature minus return temperature).
 - The fan-off temperature should be between 90° and 95° F, with the lower end of the scale being preferable for maximum efficiency.
 - The fan-on temperature should be less than 120° F.
 - The high-limit controller should shut the burner off before the furnace temperature reaches 250°F.
 - On time-activated fan controls, verify that the fan is switched on within 2 minutes of burner ignition and is switched off within 2.5 minutes of the end of the combustion cycle.

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- Boiler inspections to be completed by a *Qualified Heating Technician*.

SWS 5.0204.1

- If accessible, inspect the central air conditioner coils.
- Check the fan and belt condition.
- Inspect for exposed wiring.
- Inspect the refrigerant lines and insulation.

SWS 5.0103.1

- Information verifying completed work to be included on the NeWAP Mechanical System Inspection/Clean & Tune **Form WX17** and included in the client file.

5.0202 Heating System Clean & Tune and Maintenance Requirements

The following standards must be followed when heating systems are repaired and/or tuned and cleaned through the Nebraska Weatherization Assistance Program:

- Tune and clean, indicated as cost-effective in the Energy Audit, may be performed on eligible heating plants, excluding baseboard and/or cove heat.
- In owner occupied homes, if the material and labor to correct deficiencies in eligible heating plants exceeds \$500, the unit must be replaced. However, unique situations may be dealt with on a case by case basis.

SWS 5.0109.4

- In renter occupied homes, if the material and labor to correct deficiencies in eligible heating plants exceeds \$400, the owner must repair or replace the *heating plant*. However, if replacement is made in accordance with the requirements of these installation standards, the Nebraska Weatherization Assistance Program may contribute a maximum of \$1,500 for the replacement of the *heating plant* and flue liner, if one is necessary.
- Weatherization of the *building envelope* must not proceed until the unit has been repaired or replaced.
- A maximum of \$500 may be spent to repair unsafe solid fuel combustion heating systems.
- If a dwelling is heated by *unvented combustion space heaters* and an inoperable eligible *heating system* is present, the eligible *heating system* must be repaired or replaced to eliminate the need for unvented space heaters.
- If the need for *unvented combustion space heaters* cannot be eliminated, the sub-grantee must instruct the client regarding the dangers of carbon monoxide and excessive moisture levels, particularly if any unvented space heaters are left in the dwelling as a *secondary heat source*, or emergency back-up.
- Existing furnaces that will accept dedicated combustion air should be retrofitted.
- Mercury, inoperable or malfunctioning thermostats may be replaced with digital programmable/setback thermostats.

SWS 5.0201.1

5.0203 Cooling System Maintenance Requirements

The NeWAP provides limited funding to complete repair on existing central cooling systems, including:

- A maximum \$500 may be spent to repair heat pumps and central cooling systems
- In renter occupied homes, if the cost to repair the central air conditioner or heat pump exceeds \$500, the owner may repair or replace the unit. However, if the central air conditioner

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or heat pump is replaced in accordance with the requirements of this Field Guide and Installation Standards, the Nebraska Weatherization Assistance Program (NeWAP) may contribute a maximum of \$1,500 to the replacement cost.

- Drip pans in poor condition may be replaced.
- Air conditioner evaporator coils in existing operable units must be replaced if they do not fit in new heating plants installed as part of NeWAP services.
- Prior to completing repair and/or maintenance on existing central cooling systems the existing unit must be inspected and evaluated with appropriate documentation included in the client file.

SWS 5.0109.1,

5.03 System Clean and Tune Requirements

5.0301 Gas Fired Furnaces

- Must be completed by a *Qualified Heating Technician* and must include the following:
 - Lubricating all moving parts
 - Calibrating and adjusting the thermostat
 - Cleaning or replacing the furnace filter
 - Adjusting the conditioned air flow, high limit control, fan control and temperature rise
 - Cleaning and adjusting the burners Removing and cleaning the blower
 - Cleaning and vacuuming the return air and furnace cabinet, filter rack, exhaust port and draft hood
 - Cleaning the heat exchanger
 - Adjusting the belt tension or replace the belt
 - Sealing the thermostat wire penetration
 - Testing the furnace for CO and adjusting or repairing the furnace as needed
 - If accessible, inspecting and cleaning the central air conditioner coils.
- Information verifying completed work to be included on the NeWAP Mechanical System Inspection/Clean & Tune **Form WX17** and included in the client file.

SWS 5.0109.4

5.0302 Electric Furnaces

- Must be completed by a *Qualified Heating Technician* and must include the following:
 - Lubricating all moving parts
 - Calibrating and adjusting the thermostat
 - Cleaning or replacing the furnace filter
 - Adjusting the conditioned air flow, high limit control, fan control and temperature rise
 - Removing and cleaning the blower
 - Cleaning and vacuuming the return air and furnace cabinet, filter rack and electric elements
 - Adjusting the belt tension or replacing the belt
 - Sealing the thermostat wire penetration
 - Testing the heating elements and sequencers
 - Inspecting the interior and exterior wiring inside the cabinet on electric units
 - If accessible, inspecting and cleaning the central air conditioner coils.
- Information verifying completed work to be included on the NeWAP Mechanical System Inspection/Clean & Tune **Form WX17** and included in the client file.

SWS 5.0109.2



Chapter 6 - Ventilation

The Nebraska Weatherization Assistance Program (NeWAP) program follows the latest DOE approved of ASHRAE 62.2 to the greatest extent possible to ensure weatherized homes have adequate ventilation. Mechanical ventilation is primarily used to replace inside air with fresh air from the outside. However, as homes are air sealed to reduce energy costs, it's normal *infiltration* and exfiltration is reduced, and natural forces may be unable to provide ventilation at all times of the year under all weather conditions. Installing mechanical ventilation helps to regulate *infiltration* into the home and can lessen the amount of indoor air pollutants and moisture trapped in the home. The ASHRAE 62.2 Standard requires system testing and calculations be performed to determine a whole building ventilation rate for the home. Additionally, proper sizing of fans is critical to ensure a client's comfort and helps to avoid unnecessary energy costs.

6.01 Local Exhaust Ventilation

Achieving effective exhaust in all buildings requires appropriate design, configuration, connection, insulation (depending on location), equipment and terminations. A local mechanical exhaust system may be installed in bathrooms and/or kitchens if needed. Existing fans do not have to meet the fan flow requirements listed below.

6.02 Fans

NeWAP subgrantees must adhere to the following standards for the purchase and installation of ventilation fans.

- Fans intended for continuous use must have a sone rating of 1.0 or less.
- Fans used on an intermittent basis must have a sone rating of 3.0 or less.
- Existing fans do not have to meet sone requirements.
- If an existing fan is to be used for continuous use, it must be rated for continuous use.

6.03 Appliance Venting Requirements

6.0301 Dryer Vents

Venting dryers indoors, into an attic or other areas of a home can lead to mold to growth, respiratory or more serious health conditions. NeWAP Subgrantees must vent existing unvented or improperly vented clothes dryers to the exterior of the home using the following installation standards:

- Dryer vent pipe shall not be installed with sheet metal screws, rivets or other intrusive fasteners that will collect lint.
- Acceptable fasteners include clamps, straps and duct mastic with mesh tape.
- Dryer vent pipe must be metal and the termination cap must be dampered and attached with rust proof fasteners.
- Dryer vent ductwork must be smooth surfaced and whenever possible, not exceed 14 feet in length.
- No more than two 90 degree elbows may be used in the vent system.

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- Relocation of dryers may need to be considered to meet this vent pipe length limitation.
- Flexible metal (not flexible fabric duct) vent pipe may be used if it does not exceed 8 feet in length. The dryer vent pipe must not be installed with sheet metal \ screws, rivets or other intrusive fasteners that will collect lint.

[Installation Standard 6.2](#), [Installation Standard 6.1](#), [Installation Standard 6.3](#) **SWS 6.0202.1**

6.0302 Kitchen Range Vents

Venting kitchen range vent indoors, into an attic or other areas of a home can lead to mold to growth, respiratory or more serious health conditions. NeWAP Subgrantees must vent existing unvented or improperly vented kitchen range vents to the exterior of the home.

[Installation Standard 6.3](#), **SWS 6.0201.2**

6.0302.01 Venting

- Vent runs shall be as short as possible. Exhaust fans shall be equipped with an operating back-draft damper.

SWS 6.0101.1b

- Smooth, rigid duct vent must be mechanically fastened and shall meet venting requirements of ASHRAE 62.2 table 5.3 (see Appendix J). Ducts should not have traps or reversing horizontal runs and shall be substantially airtight.
- Smooth, rigid ducts must be connected and sealed to termination fitting as follows:
 - Round metal-to-metal must be fastened with a minimum of three equally spaced screws.
 - Other metal-to-metal connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus embedded-fabric systems, or tapes.
 - Other specialized duct fittings must be fastened in accordance with manufacturer specifications.
 - In addition to mechanical fasteners, duct connections must be sealed with UL Underwriters Laboratories 181B or 181B-M listed material.
 - Fasteners must not inhibit damper operation.

SWS 6.0101.1a & 1e

- New ductwork in *unconditioned* spaces must be insulated to a minimum of R-8.

SWS 6.0101.1f

- A termination fitting with an integrated collar must be used. The collar must be at least the same diameter as the exhaust fan outlet; if collar is larger than exhaust fan outlet, a rigid metal transition must be used. Fitting must be appropriate for regional weather conditions and installation location on house so as not to be rendered inoperable.

SWS 6.0101.2

6.0302.02 Terminations

- Fitting must be appropriate for regional weather conditions and installation location on house so as not to be rendered inoperable. Link to [SWS 6.0101.2](#)

Chapter 6 - Ventilation

- Vent terminations shall use screen material with no less than ¼ inch and no greater than 1/2-inch hole size in any direction. Installation must not inhibit damper operation or restrict air flow.
- Dryer vent terminations must not have a pest screen.

SWS 6.0101.2a

- New terminations must be installed:
 - A minimum of 3 feet away from any property line.
 - A minimum of 3 feet away from operable opening to houses.
 - A minimum of 10 feet away from mechanical intake.
 - As required by authority having jurisdiction.

SWS 6.0101.2c

- Installation of vent terminations must be weatherproof.
 - Exterior termination fitting must be flashed, or weather sealed.
 - Installation must not inhibit damper operation.
 - Manufacturer specifications must be followed.

SWS 6.0101.2d

6.04 Whole Building Ventilation

- Complete pre- and post-weatherization ASHRAE 62.2 evaluations to ensure that the home meets the Standard for Acceptable Indoor Air Quality and include both evaluations in the client file.
- Final whole building flow rates that are 15 *cfm* or less do not require whole building ventilation.
- *Continuous ventilation* exhaust fans shall not be installed CAZ zones without written approval from the Department of Environment and Energy.
- Existing systems will be identified, visually inspected, and measured for airflow.
- Install *continuous ventilation* as required using the following standards, air flow requirements, components, sound limitations and client education.
 - The whole building ventilation system may consist of one or more exhaust fans or supply air systems.
 - Local exhaust fans are permitted to be part of the whole building system.
- Controls & Operation: Controls must be provided to allow the whole house ventilation without intervention of the occupant. A readily accessible override control must be provided to the occupant. Controls must be labeled as to their function. Wiring must be installed in accordance with original equipment manufacturer specifications, and local and national electrical and mechanical codes.

SWS 6.0101.4

Chapter 6 - Ventilation

- Controls must be used that:
 - Run fan continuously or intermittently depending upon the intended schedule of operation; and
 - Operate fan to produce the intended flow for each intended flow setting.
- The whole house ventilation system may operate on a continuous or intermittent basis. Continuous run fans must be rated for continuous use.
- Sound Rating: Whole building ventilation or continuous local exhaust shall be rated for sound at a maximum of 1.0 sone.

SWS 6.0302.1

6.05 Air Flow Requirements

- All ASHRAE contributing exhaust fans must be flow tested to determine actual airflow.
- If a fans airflow cannot be measured, the fans flow must be assumed to be zero.
- All fans installed under the program must have flow rates measured and documented in the file. If the fan is used for continuous and local use than the flow rate of each mode must be measured separately.

6.06 Special Requirements/Considerations

- Adjacent spaces: To prevent air movement between *conditioned* spaces and adjacent spaces such as garages, attics and *crawlspace*s, air sealing may be performed between the *conditioned* space and *unconditioned* areas. This could involve sealing penetrations and applying seals (weather stripping) to access doors.
- Instructions and labeling: Instructions as to the proper operation and maintenance of the installed equipment must be supplied to the occupant. All controls for continuous run fans must be labeled as to their function. Homeowners shall be instructed on the operation and proper maintenance of the ventilation system. A label indicating the presence and purpose of the ventilation system must be included or a copy of the system operation guide must be posted at the electrical panel.

SWS 6.0101.4d

- Combustion and solid fuel appliances: When an *atmospherically vented combustion appliance* or solid fuel burning appliance are included anywhere in the structure, pre and post worst-case combustion testing is required ensure that the appliances are drafting adequately. If testing indicates a problem, the sub-grantee must contact NDEE to assist in determining the best course of action to remediate the problem.

6.07 Additional Resources

This section is not all inclusive of all ASHRAE 62.2 requirements. For complete details, refer to the latest DOE approved of ASHRAE 62.2 Standard.



Chapter 7 - Baseloads

Baseload is the energy consumed in the home that is not related to heating and/or cooling the home. Baseloads include the energy used for lighting, appliances, and water heating, but also includes plug loads for televisions, radios, computers, etc. and they are generally consistent from month to month.

7.01 Plug Load

7.0101 Refrigerator Policies

EPA's ENERGY STAR program indicates that certified refrigerators are about 9 percent more energy efficient than models that meet the federal minimum energy efficiency standard. Replacing an old refrigerator with a new ENERGY STAR certified refrigerator can save more than \$200 over the 12-year lifetime of the product.

7.0101.01 Inspection and Audit

Inspect the existing unit, there are two methods allowed to estimate the savings that result from replacing an existing refrigerator. These methods must be incorporated into the initial inspection and energy audit:

- Use a meter to determine the energy use of the appliance, or
- Locate the data plate on the existing unit documenting the Association of Home Appliance Manufacturers (AHAM) information for the unit.

The NEAT/MHEA Audit indicates a minimum of 60 minutes and a maximum of 360 minutes, the appliance must be metered for a minimum of 60 minutes (1 hours). Record the kWh usage and the number of minutes from the data logger on the NEAT/MHEA Input Data Form.

- Caution: If the refrigerator is running when ready to install the power meter, allow refrigerator to sit for a minimum of five (5) minutes before plugging into the Digital line logger. (This will allow compressor pressure to be relieved.)

If no manufacturer and model number information is available on the unit energy use of the existing unit must be verified by installing a digital power meter.

7.0101.02 Replacement Refrigerator

- Replacements will be completed based on the metered usage of the existing unit and/or the estimated usage for that make and model (found in the AHAM look-up table) incorporated into the NEAT/MHEA Energy Audit and a 1.0 or better Savings-to-Investment Ratio (*SIR*) for replacing the unit.
- If the existing refrigerator is non-functional, it is ineligible to be replaced.
- The client must give up possession of the old refrigerator.
- One refrigerator per home may be replaced.
- Appliances located in *unconditioned* areas may not be replaced.
- Refrigerator replacement model(s) must be rated as ENERGY STAR®. All replacement refrigerators must meet the UL-250 standard.

SWS 7.0101.1

Chapter 7 - Baseloads

- When making a straight one for one (1) replacement, the replacement refrigerator must not be larger than the size of the old refrigerator. For situations where two (2) or more refrigerators will be replaced by one (1) refrigerator, the new refrigerator may be a larger capacity than those being replaced if needed in order to meet appropriately documented capacity needs and the unit meets the *SIR* requirement.
- Replacement of an existing side-by-side refrigerator with a side-by-side refrigerator is allowed if the replacement is determined to be cost effective with a 1.0 or better Savings-to-Investment Ratio (*SIR*).
- Existing refrigerators with additional features such as ice makers may be replaced with equivalent features if the replacement is determined to be cost effective with a 1.0 or better Savings-to-Investment Ratio (*SIR*). The cost of disconnecting the water using features must be included in the replacement *SIR* calculation. ***The client is responsible for completing the hook up of any water lines required for an icemaker included with a new appliance.***
- Replacement units with the through-the-door ice and/or water delivery option are not allowed under the NeWAP.
- Replacement refrigerators must include a one-year warranty that will provide a replacement appliance if repeated issues related to health, safety, or performance occur.
- The color of the replacement appliance should be white or off-white, unless the existing appliance is part of a "matched set" and the cost of replacing the refrigerator in a matching color is determined to be cost effective. Subgrantees must include appropriate documentation in the client file if a matching color unit is installed.
- Refrigerator replacement in rental units is allowed if the replacement is determined to be cost effective with a 1.0 or better Savings-to-Investment Ratio (*SIR*).
- Appliance repair is not allowed under the NeWAP.

7.0101.03 Installation

- Permanently remove the old appliance from the home and recycle or dispose of appliance and refrigerant in accordance with local and federal law (the EPA Section 608 of the Clean Air Act (1990)).
- Permanently decommission the old appliance.
- Install appliances in accordance with manufacturer specifications and local codes.
- Any penetrations to the exterior of the home created by the installation of the appliance will be sealed and the cost to complete such work must be included in the Energy Audit cost-effectiveness evaluation.
- Appliance must be ENERGY STAR® rated. Energy-related appliance controls will be demonstrated to the occupant.

7.0101.04 Client Education and Client File Documentation

- Provided specific information on the proper maintenance of the equipment to the occupant.

Chapter 7 - Baseloads

- Provide user's manual, warranty information, installation instructions, and installer contact information to the occupant.
- Appliance will carry a minimum one-year warranty that will provide a replacement appliance if repeated issues relating to health, safety, or performance occur.
- Appliance will fit in the available space without blocking access to light switches, cabinets, etc. and will fit through the smallest opening between the outside and installation location.
- The Refrigerator Appliance Agreement (Wx-23), including the client's signature, lists the replaced existing appliance(s) and the newly installed appliance(s). Give One (1) copy of the signed Form to the client; keep one (1) copy for the agency and give one (1) copy to the appliance vendor.

7.0102 Lighting Replacement Policies

Lighting upgrades are one of the most cost-effective options available for reducing a buildings base load. Replacing traditional lights and upgrading switching can save 75% or more on your client's lighting energy costs. Lighting Measures that are indicated as cost-effective in the Energy Audit must be implemented.

- Lumen output should be matched as closely as possible to the lighting that was removed.

[A-3 Lighting Replacement](#), [SWS 7.0103.1](#)

7.02 Water Conservation

7.0201 Water Conservation Devices - Low-Flow Device

Don't just consider the water they can save; they also save the energy that was used to heat the water being lost.

- Showerhead replacements that are indicated as cost-effective in the Energy Audit must be implemented.

[Installation Standard 7.4](#), [Installation Standard 7.5](#), [SWS 7.0201.1](#)

- Faucet Aerators are a DOE approved General Heat Waste Measure

7.03 Water Heating

The costs associated with water heater repair and/or replacements are eligible for reimbursement through the NeWAP. Water Heating Measures that are indicated as cost-effective in the Energy Audit must be implemented.

7.0301 Thermal Loss Reduction

Water Heater Tank and Pipe Insulation and *Distribution System* improvements help to reduce heat loss. These types of improvements can also help to reduce the amount of time that people wait for hot water after they turn on the faucet or shower.

- Water heater tank insulation must be a minimum R-11 blanket secured with tape and bound with a minimum of 2 wires, cords, plastic or nylon bands on the tank.

[SWS 7.0301.2](#)

- Insulation must not be installed on water heaters if doing so voids the warranty of the unit.

Chapter 7 - Baseloads

- Insulation must not cover the pressure relief valve, end of the drip leg, draft hood, burner air inlet, pilot light access door, thermostat control, drain valve or the top of the water heater on natural gas or propane water heaters.
- Electric water heaters must have the top insulated and the thermostat control access panels accessible or marked and labeled.

Installation Standard 7.1

- Insulation must not cover the pressure relief valve, the drip leg, high limit switch, and plumbing pipes or drain valve on electric water heaters.

Installation Standard 7.2

- Hot and cold water lines must be insulated a minimum of 6 feet (to a maximum of 18 feet, if cost effective) in all directions from the water heater, using properly sized preformed pipe wrap or insulation specifically designed as pipe wrap.

Installation Standard 7.3

- Accessible pipes must be insulated with 1-inch material having a minimum R-4 pipe insulation specifically manufactured as pipe insulation. Joints and elbows must be insulated.

SWS 7.0301.1

- Each section of preformed pipe wrap must be fastened with a minimum of 3 wires, cords, plastic or nylon bands.
- Joints and elbows must be insulated.
- Duct tape must not be used as a means of fastening pipe wrap.
- Maintain a minimum of 6" between combustible pipe insulation and fuel-fired water heater draft hood and/or single wall metal vent materials.
- Water lines that have asbestos pipe wrap must not be insulated or sealed in the area containing the asbestos.
- *In Manufactured Housing: All accessible water lines in the water heater compartment must be insulated using properly sized preformed pipe wrap or insulation specifically designed as pipe wrap.*

SWS 7.0301.1

7.0302 Water Heater Installation - Replacement Unit

- *Unsafe water heaters* that cannot be repaired must be replaced. Weatherization of the building must not proceed until the water heater has been repaired or replaced.
- With Nebraska Department of Environment and Energy approval, replacement water heaters may utilize a new fuel source.
- In owner occupied homes, the replacement of water heaters for energy efficiency reasons may not be charged to the Health & Safety line item.
- New fuel fired water heaters in framed homes will meet Energy Star Version 3.2 standards and have a minimum UEF of 0.67 for units of ≤ 55 Gallons and a minimum UEF of 0.77 for units of >55 Gallons.

SWS 7.0302.2

Chapter 7 - Baseloads

- New electric water heaters in both framed and manufactured homes must have a minimum UEF of 0.93.

SWS 7.0302.1

- All repairs and replacements must be performed by a *Qualified Heating Technician*, a *Qualified Plumbing Technician* or a utility company.
- Provide user's manual, warranty information, installation instructions, and installer contact information to the occupant.
- A service label must be placed on or near the water heater containing the name, business address and phone number of the company or agency performing the work, any repairs that were completed and the date the work was performed.
- Water heater replacements in rental units is allowed if the replacement is determined to be cost effective with a 1.0 or better Savings-to-Investment Ratio (*SIR*). Health & Safety replacements in rental units is not allowed.

In *manufactured housing*:

- Replacement gas water heaters in manufactured homes must be specifically designed as *manufactured home* water heaters and the unit's location in the home must meet the installation of the unit to appropriately provide combustion air to the unit.

SWS 7.0302.2

- New fuel fired water heaters in manufactured homes must have a minimum UEF of .59.

7.0303 Water Heater Maintenance/Inspection/Repair

- Existing unvented gas water heaters must be vented to the exterior.
- Missing or damaged Temperature and Pressure Relief Valves (drip legs) must be replaced as per local, state and national codes and be plumbed within 6 inches of the floor.
- A maximum of \$250 in material and labor may be spent to correct deficiencies in water heaters. If the material and labor exceeds \$250, the unit must be replaced in owner occupied homes.
 - This maximum limitation does not apply to the addition of power vents to existing, operating units where drafting is negatively impacted by air sealing the home thru the weatherization process.
- In renter occupied homes, the owner must repair or replace the water heater if the replacement is required due to Health & Safety concerns. If the Health & Safety replacement is made in accordance to these installation standards the Nebraska Weatherization Assistance Program may contribute a maximum of \$500. Weatherization of the building must not proceed until the water heater has been repaired or replaced.
- All water heaters must have working pressure relief valves with drip legs without threaded bottoms.

SWS 2.0103.1

7.0304 Safety Inspection

The *safety inspection* of water heating systems must include all of the following:

Chapter 7 - Baseloads

- Conduct a fuel leakage test of the appliance piping and control system downstream of the shutoff valve in the supply line to the appliance.
- Visually inspect the venting system for proper size and horizontal pitch and determine that there is not blockage, vent size reduction or restriction, leakage, corrosion or other deficiencies that could cause an unsafe condition.
- Inspect burners and crossovers for blockage and corrosion.
- Determine that the pilot is burning properly and that main burner ignition is satisfactory.
- Test the pilot safety device to determine that it is operating properly.
- Visually determine that main burner gas is burning properly.
- Test for spillage at the draft hood relief opening.
- Verify that the water heater has a pilot access door, pressure relief valve with drip leg and draft hood.
- Inspect for evidence of water or combustion product leaks.
- Inspect for exposed wiring.



Chapter 8 - Definitions

A

Accessible Attic: An attic with a minimum 24-inch clearance measured from the bottom of the top cord or ridge board to the top of the ceiling joists.

Accessible Ductwork/Hydronic Pipes: Ductwork or *hydronic pipes* with a minimum twenty-four (24) inch clearance on a minimum of two (2) sides of the ductwork or *hydronic pipes*.

Accessible Foundation: A foundation with a minimum 24-inch clearance measured from the bottom of the floor joist to the ground.

Accessible Knee Walls: A *knee wall* with a minimum 36-inch clearance measured from the top of the floor joist to the bottom of the rafters and a minimum 36-inch clearance measured from the *knee wall* to the exterior wall.

Air Infiltration Barrier: A covering that will allow moisture out and not allow air into a space or wall cavity.

Atmospherically Vented Combustion Appliance: This common type of gas appliance uses natural ventilation to move the flue gases from the unit out with a vertical metal pipe, sometimes connected to the chimney, where the hot flue gases rise through the draft hood and flue pipe, and out into the atmosphere. The advantage of these types of appliances is the lower cost of the units and installation; however they also generally have a lower efficiency rate than the other systems.

B

Backdraft Damper: A damper that allows air to flow in only one direction.

Basement: The bottom full height story of a building below the first floor. A *basement* may be partially or completely below grade.

Building Envelope: The elements of a building between the interior and exterior environments that includes a combination of both the air and thermal barriers.

C

CFM: Cubic feet per minute of airflow at a 50 Pascal pressure difference between the interior and exterior of a structure.

Combustion Appliance Zone (CAZ): An area containing one or more *atmospherically vented combustion appliances*.

Conditioned: A space or area that contains a source intended specifically to heat or cool that space.

Continuous Ventilation: The process of mechanically removing stale air from a building or room by providing fresh air on a slow, continuous basis.

Cost Effective Blower Door Guided Air Sealing: The process of using a blower door to pressurize a home or building to determine the energy savings ratio between the calculated air sealing cost and *infiltration* reduction.

Chapter 8 - Definitions

Crawl Space: A space below the first floor of a *conditioned* or *unconditioned* building that is less than full story height.

Crossover Duct: Enclosed air pathway to move conditioned air from one side of a doublewide *manufactured home* to the other side or from a *manufactured home* to a frame edition.

D

Dense Pack: The process of installing loose-fill insulation at a density that allows it to reduce air flow and perform to a stated R-value.

Distribution System: The enclosed pathway for *conditioned* air to travel to and from the heating/cooling plant. It must include but is not limited to the metal or fiber duct, panned floor cavity, designated wall cavity and the point where funnels and boots meet the wall or floor.

Direct Vent Appliances: Direct vent units are generally newer units designed to supply outdoor air directly to the sealed combustion chamber and then exhaust the flue gases to the outside of the home. Direct vent units include most condensing furnaces, *manufactured home* furnaces, *manufactured home* water heaters and some space heaters.

Disabled/Inoperable Heating Plants: Heating plants that have had the fuel source disconnected and/or capped and the flue disconnected.

E

Egress Window: A window that people can escape through in an emergency. The location, size and clearance requirements are dictated by the local building jurisdiction.

Eligible Heating Plant: A furnace or boiler that utilizes natural gas, propane, fuel oil or electricity as the fuel/energy source. *Eligible heating plants* include forced air, gravity, wall, floor, electric baseboard, *manufactured home* furnaces, heat pumps and boilers. Gravity furnaces that have been retrofitted with a blower or that have been converted from one fuel source or another are also eligible.

Exposed Floors: A floor that is in direct contact with the outside air (i.e. cantilevers, floors of bay or bow windows, garage ceilings, etc.).

F

Finished Attic: An attic space in a home that has been converted into additional living space.

Fenestration: Openings in the walls of a building structure (i.e. windows, doors, etc.).

Friable: Material that can be crumbled, pulverized, or reduced to powder by the pressure of an ordinary human hand.

Chapter 8 - Definitions

H

Hard Wired Alarms: Alarms (Smoke, Propane, CO, Moisture) that are wired directly into the building's electrical system.

Heat Source: Type-B vent, masonry chimneys that vent natural gas or propane and exhaust fans.

Heating Plant: A boiler or furnace, not including the flue, fuel piping, thermostat, *distribution* system, etc.

Heating System: A *heating plant* and the associated connections necessary for operation including, but not limited to, the flue, fuel piping, thermostat, *distribution* system, etc.

High-Heat Source: Heat produced through the combustion process by solid fuel and/or fuel oil combustion appliances. Recessed lighting is also considered a *high-heat source*.

Hydronic Pipes: Piping system used to distribute water or steam to and from water boilers or steam boilers.

I

Inaccessible Underbellies: A *manufactured home* underbelly with less than 24 inches clearance, measured from the *weatherboard* to the ground at the area to be weatherized.

Incidental Repair Cost: Repair costs related to ensuring the effective performance or preservation of a new or existing weatherization measure.

Infiltration: The uncontrolled passage of outside air into a building through leaks in the *building envelope*.

Insulated Glass: The combination of two or more panes of glass sealed with air or inert gas between the panes.

K

Knee Wall: A vertical wall between an attic and a *conditioned* space.

L

Ledged Basement: A *basement* constructed with a concrete or dirt ledge less than 6 feet front to back, around the perimeter of the foundation. The ledge may be only around a portion of the foundation wall. Ledges more than 6 feet front to back are considered a *crawl space*.

Living Area: An area within the *conditioned building envelope* that is used on a regular basis for sleeping, eating, bathing etc.

M

Manufactured Housing: Commonly known as manufactured homes, is a type of prefabricated home that is assembled in a factory and transported to a site.

MERV (Minimum Efficacy Reporting Value) Filter: A filter that is tested, and rated, for its ability to filter and remove different size particles (pollutants) from the air. Typically, the higher the *MERV* rating, the higher the filtering performance.

Chapter 8 - Definitions

Multi-family Buildings: The U.S. Department of Energy defines *multi-family buildings* based primarily on building size and heating characteristics:

- Small Multi-family: 5-25 units individually heated/cooled, and 3 stories in height
- Large Multi-family: 25+ units, and 4 stories in height and/or 5-25 units centrally heated/cooled, any height

O

Orphaned Equipment: A smaller combustion appliance (e.g., water heater) that remains in place after a larger appliance, that was commonly vented with the remaining unit, is removed or replaced and no longer utilizes the common vent. The larger exhaust flue or chimney that the unit continues to utilize is generally larger than necessary for the remaining smaller appliance.

P

Perm Rating: The measurement of a material's ability to allow the transfer of water vapor through the material.

Pressure Treated: Lumber that has been commercially treated under pressure with a wood preservative to prevent damage from moisture, insects, fungi and other forms of biological decay.

Programmable Thermostat/Setback Thermostat: A thermostat designed to adjust temperature settings according to a series of programmed settings that take effect at different set times of the day.

Q

Qualified Heating Technician: An individual or company that is specifically involved in the installation and/or servicing of residential heating/cooling systems.

Qualified Plumbing Technician: An individual or company that is specifically involved in the installation and/or servicing of residential plumbing systems.

Quality Control Inspection: An inspection that verifies that the work completed on the home complies with quality work standards and program regulations as defined by the Nebraska Department of Environment and Energy and the U.S. Department of Energy.

S

Safety Glass: A type of glass that is designed to resist breaking, and to break in a way that minimizes the risk of injuries in the event the glass cannot withstand the forces on it.

Safety Inspection: An inspection performed by a *Qualified Heating Technician*, a natural gas utility, a propane supplier or *Trained Weatherization Staff*.

SIR (Savings to Investment ratio): A ratio of economic performance as calculated by NEAT/MHEA and MULTEA audits. An *SIR* of 1.0 indicates the weatherization measure will pay for itself one time during its life.

Spray-Applied Insulation: Insulation manufactured specifically to be spray-applied.

Chapter 8 - Definitions

Stack Effect: The tendency for warm air to move upwards in a building or chimney, creating pressure differentials.

T

Tempered Glass: Toughened type of *safety glass* processed by control thermal or chemical treatments to increase its strength compared with normal glass.

Trained Weatherization Staff: A sub-grantee staff person who has successfully completed appropriate training to perform a task in the weatherization program.

Tube-fill Method: An insulation technique developed to install high density blown insulation in enclosed cavities.

Type S-Fuse: A non-removable adapter that is screwed into the fuse socket permitting only one size fuse to be installed.

U

Unconditioned: A space or area having no source of heating or cooling.

Under-cut: To cut the bottom of an interior door to allow return air to flow from that area to the furnace compartment or common return.

Unsafe Water Heater: A unit that

1. has been red tagged by a utility company/supplier or a building code jurisdiction,
2. shows visual signs of deterioration such as scorch marks indicating past backdrafting occurrences,
3. shows signs of compromised water tank integrity as evidenced by signs of leakage, or
4. when tested exceeds 200 ppm as measured in the flue gases or 70 ppm in the ambient air and the CO levels cannot be reduced.

Unvented Combustion Space Heater: An unvented gas heating unit generally intended to supply heat to a small area.

V

Vapor Barrier: A material that retards the passage of water vapor and contains a *perm* rating of less than 1.

Vapor Retarder: A material that slows the passage of water vapor and contains a *perm* rating above 1.

W

Weatherboard: A covering consisting of a minimum # 30 felt paper, exterior grade plywood, fiberboard, an *air infiltration barrier* or a material specifically manufactured as *manufactured home weatherboard* installed on the underside of a *manufactured home* to support and protect the floor insulation.



PERSONAL PROTECTIVE EQUIPMENT (PPE) GUIDE



Safety Glasses



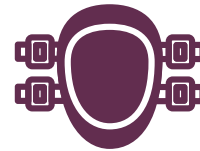
Hearing Protection



Hard Hat



Bump Cap



Knee Pads



Gloves – Leather or Heavy Cloth



Gloves – Nitrile



Tyvek Suit



Boot/Shoe Covering



95
N-95 Mask without Exhale Valve



95
N-95 Mask with Exhale Valve



Half-Face P-100 Respirator



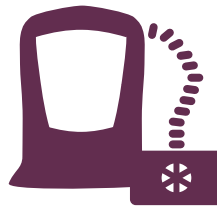
Half-Face P-100 Respirator with OV Valve



Full-Face P-100 Respirator



Full-Face P-100 Respirator with OV Valve



Powered Air Purifying Respirator



Cooling Vest

Installation Standard 2.1

INTERIOR LEAD-SAFE WEATHERIZATION

Aligns with [Lead RRP](#)



BEFORE

✗ Homes built before 1978 have the potential for lead paint and require special considerations during retrofitting



AFTER

- ✓ No lead dust or debris remains inside the home
- ✓ Contaminated materials have been disposed of or cleaned properly
- ✓ Disposal containment is securely closed

TOOLS

- Zip Walls
- HEPA Vacuum
- Hand Tools or Shrouded Power Tools
- Half or Full-face Respirator (Fit-Tested)

MATERIALS

- 6-Mil Plastic Sheeting
- Signage
- Tack Pads
- Painters Tape
- Trash Bags
- Disposable Tyvek Suits
- Booties
- Nitrile Gloves
- P-100 Filters

PPE

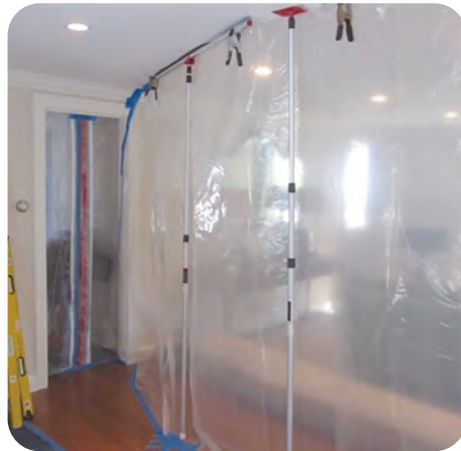


* weather dependent

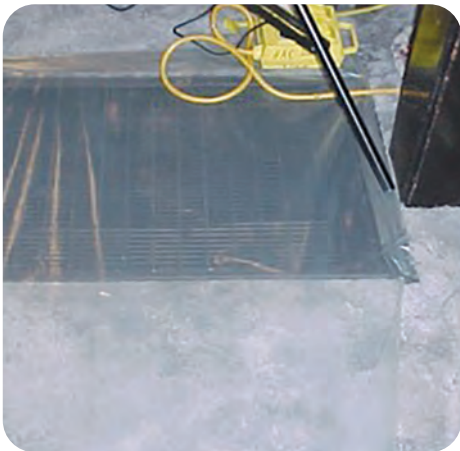
INTERIOR LEAD-SAFE WEATHERIZATION



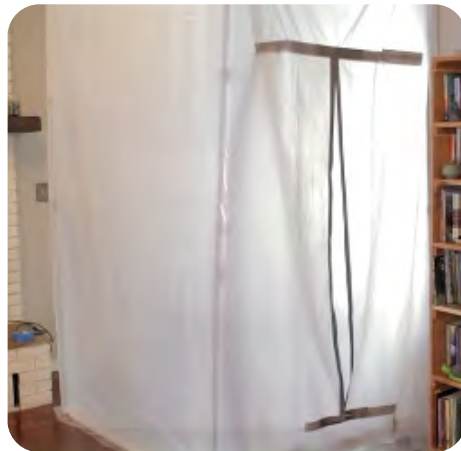
1. Move furniture out of work area and, if it cannot be removed, securely cover horizontal with plastic sheeting



2. Use disposable physical barriers to mark out and contain work area dust and debris



3. Six feet in any direction from the work area, cover surfaces with plastic sheeting, taped in place, including HVAC access points



4. Block off access doorways and install zippers to contain debris in work area

NOTES

Half and Full-face respirators, required for Lead Renovation work, must be fit-tested on all workers at least once a year. The respirator must form a tight seal at the face and neck. Workers who have a beard cannot wear a half- or full-face respirator, since they will not form a tight seal and contaminants can bypass the respirator. Bearded workers need to wear a PAPR, or powered air-purifying respirator.

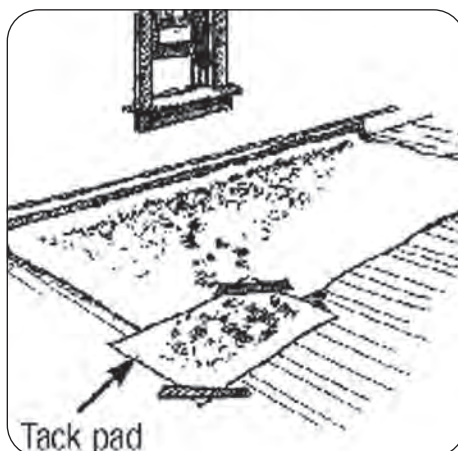
INTERIOR LEAD-SAFE WEATHERIZATION



5. Post signs outside work area to prevent anyone from entering work area unintentionally



7. Wear appropriate PPE, including Tyvek suit, gloves and P-100 HEPA Disposable or Fit-Tested Respirator



6. Use tack pads at access points to containment area to minimize dust and debris being tracked outside area



8. Utilize hand tools and/or shrouded tools that minimize dispersion of dust and debris

NeWAP NOTES

- Deferral is required when the extent and condition of the lead-based paint in the house would potentially create further Health & Safety hazards, the sub-grantee will inform the client of the of the issues associated with a deferral in the Weatherization Deferral Notice (Form WX4) completed by the Weatherization Representative and signed by the client or building owner.
- Only those costs directly associated with the testing and lead safe practices for surfaces directly disturbed during weatherization activities are allowable.
- Documentation in the client file must include Certified Renovator certification: any training provided on-site; description of specific actions taken; lead testing and assessment documentation; and, photos of site containment set up. Include the location of photos referenced is not in the file.
- Follow pre-renovation education provisions for RRP.
- When deferral is necessary, provide information in writing describing conditions that must be met in order for weatherization to commence.
- Provide a Weatherization Deferral Notice (Form WX4) completed by the Weatherization Representative and signed by the client or building owner.

INTERIOR LEAD-SAFE WEATHERIZATION



9. Wipe down surfaces and vacuum work area, taking special care and attention of cracks and crevices where dust and debris might collect

10. Carefully roll up and dispose of any plastic sheeting or other disposable materials in the work area



11. Doff PPE outside, avoiding contact with contaminated surfaces of suit, gloves, etc., and dispose immediately

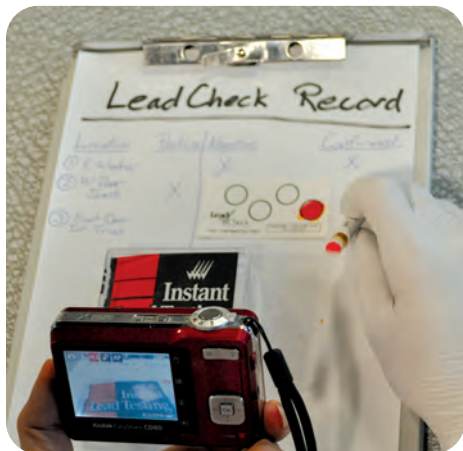
NeWAP NOTES

- Installers must follow EPA's Lead; Renovation, Repair and Painting Program (RPP) when working in pre-1978 housing unless testing confirms the work area to be lead free.
- Testing to determine the presence of lead in paint that will be disturbed by WAP measure installation is allowed with EPA-approved testing methods.
- Testing methods must be economically feasible and justified.
- Job site set up and cleaning verification by a Certified Renovator is required.
- Grantees must verify that crews are using lead safe work practices during monitoring.

Installation Standard 2.2

EXTERIOR LEAD-SAFE WEATHERIZATION

Aligns with [Lead RRP](#)



BEFORE

✗ Homes built before 1978 have the potential for lead paint and require special considerations during retrofitting

AFTER

✓ Detailed attention needs to be paid to every aspect of work with lead-based paint, from start to finish

TOOLS

- HEPA Vacuum
- Hand Tools or Shrouded Power Tools
- Half or Full-face Respirator (Fit-Tested)

MATERIALS

- 6-Mil Plastic Sheeting
- Catchment Poly Bags
- Signage
- Tack Pads
- Painters Tape
- Trash Bags
- Scaffolding
- Disposable Tyvek Suits
- Booties
- Nitrile Gloves
- P-100 Filters

PPE



* situation dependent ** weather dependent

EXTERIOR LEAD-SAFE WEATHERIZATION



1. Create containment area with plastic sheeting 10 feet in any direction from work area



2. Post signs at least 20 feet from work area to prevent anyone from entering work area unintentionally



3. Seal off all exterior access points to home within containment area, including windows, doors, mail slots and vents



4. Where houses are located close together, vertical containment will be necessary

NOTES

Half and Full-face respirators, required for Lead Renovation work, must be fit-tested on all workers at least once a year. The respirator must form a tight seal at the face and neck. Workers who have a beard cannot wear a half- or full-face respirator, since they will not form a tight seal and contaminants can bypass the respirator. Bearded workers need to wear a PAPR, or powered air-purifying respirator.

EXTERIOR LEAD-SAFE WEATHERIZATION



5. Tape plastic up onto work surface and utilize systems to catch debris while limiting damage to exterior plantings



6. Don proper PPE, including tyvek suit with hood, gloves, booties and half- or full-face respirator (see notes). Be aware of potential for thermal stress when working in full PPE



7. Use hand tools or shrouded power tools to limit dispersal of contaminated dust and debris



8. Clean work area and carefully fold and dispose of plastic sheeting



9. Doff PPE outside, avoiding contact with contaminated surfaces of suit, gloves, etc., and dispose immediately

NOTES

Installation Standard 3.1

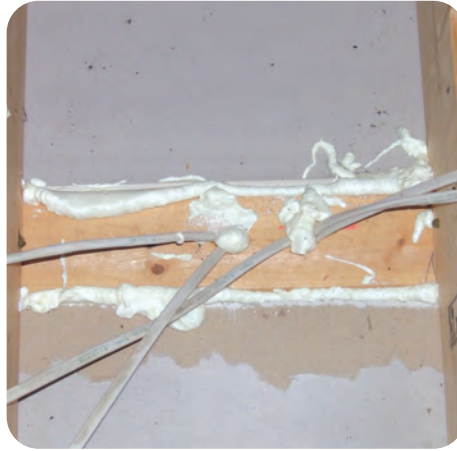
AIR SEAL TOP PLATES IN ATTIC

SWS 3.0101.1, 3.0102.11



BEFORE

✗ Air can move around unsealed top plates in attic, making new insulation less effective



AFTER

✓ Seal perimeter at all gaps and extend sealant up onto adjacent materials

TOOLS

- Caulk Gun
- Spray Foam Dispensing Gun

MATERIALS

- Caulk
- 1-part Polyurethane Spray Foam
- Mastic

PPE



* weather dependent

AIR SEAL TOP PLATES IN ATTIC



Apply caulk to areas with gap 1/4 inch or smaller



Apply sprayfoam or mastic to gaps 1/4 inch to 2 inches wide

NOTES

Installation Standard 3.2

AIR SEAL AN ATTIC SOFFIT OR LARGE OPENING

SWS 3.0101.1 3.0102.9



OPTION A SEAL SOFFIT INTO CONDITIONED SPACE

Soffits, coffered ceilings and other design details can create lower sections in the ceiling line and often are not sealed or insulated properly

OPTION B SEAL SOFFIT OUT OF CONDITIONED SPACE

From the attic side, it is best to determine if it's better to leave the soffit connected to the *conditioned* space (inside the house) or seal it off as part of the *unconditioned* space

TOOLS

- Caulk Gun
- Utility Knife
- Measuring Tape
- Drill
- Spray Foam Nozzle

MATERIALS

- Spray Foam
- Lumber for Support
- Expanded Polystyrene (EPS)
- Extruded Polystyrene (XPS)
- Gypsum Board
- Plywood
- Caulk
- Mechanical Fasteners

PPE



* situation dependent ** if cutting lumber

AIR SEAL AN ATTIC SOFFIT OR LARGE OPENING

OPTION A - SEAL SOFFIT INTO CONDITIONED SPACE



A-1. For openings larger than 24 inches, support braces will be necessary



A-2. Attach bracing across joists securely, spacing no more than 24 inches apart



A-3. Apply sealant along top plates, bracing, and framing members adjacent to opening more than 24 inches apart



A-4. Place Infill material over opening and secure in place with mechanical fasteners

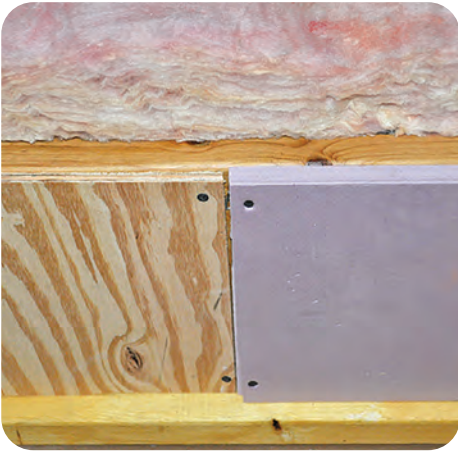


A-5. When support bracing has been used, screw infill material to bracing as well

NOTES

AIR SEAL AN ATTIC SOFFIT OR LARGE OPENING

OPTION B - SEAL SOFFIT OUT OF CONDITIONED SPACE



B-1. Seal off framed openings with rigid material, such as gypsum board, XPS, EPS, or OSB



B-2. Seal around infill materials

NOTES

Installation Standard 3.3

AIR SEAL AN ATTIC CHASE OR SMALL OPENING

SWS 3.0101.1



BEFORE

✗ Open chases for electrical and plumbing allow air movement from subspace and/or conditioned space



AFTER

✓ When properly sealed, air movement will cease through these spaces

TOOLS

- Measuring Tape
- Drill
- Utility Knife
- Caulk Gun
- Spray Foam Gun

MATERIALS

- Extruded Polystyrene (XPS)
- Expanded Polystyrene (EPS)
- Gypsum Board
- Plywood
- Spray Foam
- Mechanical Fasteners

PPE



* weather dependent

AIR SEAL AN ATTIC CHASE OR SMALL OPENING



1. Measure the opening of the chase in a location that will maintain the pressure plane



2. Cut material to fit for each space where it is needed, paying attention to locations of wires and pipes



3. Rigid material to cover the span can be XPS, EPS, gypsum board or plywood, as appropriate for the location



4. Seal rigid material into place securely and air seal with caulk, spray foam or mastic



5. Extend sealing to adjacent materials to ensure a complete air seal

NOTES

AIR SEAL BALLOON FRAMING FROM ATTIC

SWS [3.0101.1](#), [3.0102.4](#)



BEFORE

✗ Balloon framing leaves cavities open from the *basement* to the attic, allowing for large amounts of air movement



AFTER

✓ By sealing at the top of the cavity, air flow is stopped and the cavity below is another step closer to being ready to insulate

TOOLS

- Measuring Tape
- Drill
- Utility Knife
- Saw
- Sprayfoam Gun
- Caulk Gun

MATERIALS

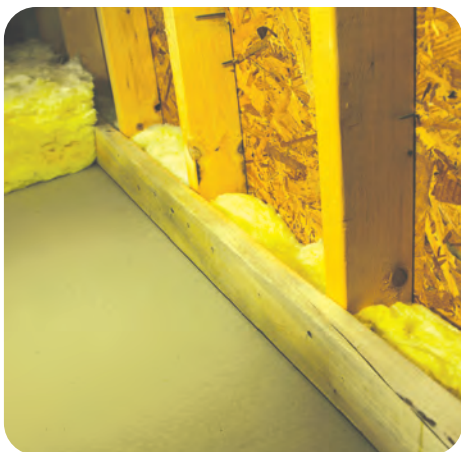
- Extruded Polystyrene (XPS)
- Gypsum Board
- Plywood
- Plastic-wrapped/ Bagged Fiberglass Batts
- 1-part Sprayfoam
- Caulk
- Mastic
- Mechanical Fasteners

PPE



* weather dependent

AIR SEAL BALLOON FRAMING FROM ATTIC



1. Block the opening of balloon framed sidewalls in alignment with the pressure boundary



2. Blocking material options include lumber, gypsum board, XPS, or bagged fiberglass batts



3. Blocking material needs to be appropriate for potential weight load



4. And securely fastened rigid material to withstand pressure of dense-packing beneath



5. Seal any remaining gaps with caulk or 1-part spray foam, extending sealing to adjacent materials

NOTES

SEAL INSULATION-CONTACT RATED CAN LIGHTS

SWS 3.0101.1



BEFORE

✗ Insulation-Contact rated Can lights are commonly installed in the ceiling between the upper story and the attic, meaning gaps around them allow for significant air leakage



AFTER

✓ By sealing around an IC-rated can light, a continuous thermal boundary is maintained

TOOLS

• Caulk Gun

MATERIALS

• Caulk

NOTES

PPE



* weather dependent

Installation Standard 3.6

SEAL ELECTRICAL AND OTHER PENETRATIONS IN ATTIC

SWS 3.0101.1, 6.0201.1, 6.0201.2



1. Electrical, plumbing and HVAC penetrations are often oversized

2. For smaller gaps, caulk is enough to seal the hole

TOOLS

- Caulk Gun
- Spray Foam Gun
- Utility Knife

MATERIALS

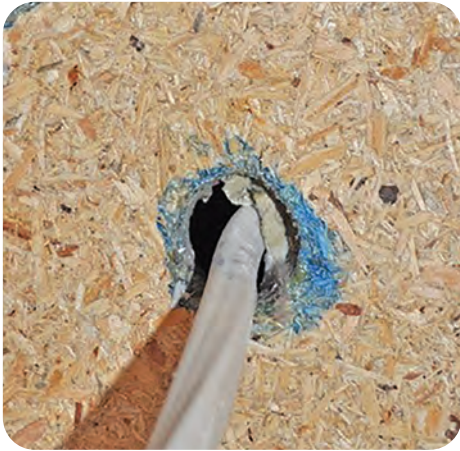
- Caulk
- Spray Foam
- Backer Rod

PPE



* weather dependent

SEAL ELECTRICAL AND OTHER PENETRATIONS IN ATTIC



3. Holes larger than 1/4 inch may require support for the sealant



4. Inserting backer rod provides infill to support the sealant



5. Seal to cover entire opening, including all backer rod

NOTES

For gaps larger than 3 inches, see 3.2 Air Seal an Attic Chase or Small Opening

NeWAP NOTES

- Openings wider than 1/4 inch must be packed with backing and/or infill material specifically designed as packing material prior to caulking.

Installation Standard 3.7

AIR SEAL A FLOORED ATTIC

SWS 3.0101.1



BEFORE

✗ Check floor joist cavities for blocking material and penetrations



AFTER

✓ Air seal cracks and penetrations in floored attic spaces

NOTES

Spray foam will not be used in spaces that will be exposed to habitable living spaces.

TOOLS

- Saw
- Drill
- Measuring Tape
- Utility Knife
- Caulk Gun
- Spray Foam Gun

MATERIALS

- Caulk
- Extruded Polystyrene (XPS)
- Lumber
- Gypsum Board
- 1-part Spray Foam
- Mechanical Fasteners
- Backer Rod

PPE



* situation dependent ** if cutting lumber

AIR SEAL A FLOORED ATTIC



1. With property owner permission, remove flooring material to access cavities



2. Remove only as much flooring as necessary to gain access to every cavity and any large air sealing areas



3. Place blocking material, as needed, and air seal to hold insulation in place



4. In rare cases it may be easier to access to locate blocks from below floored attic spaces



5. Air seal gaps and seams in joist cavities as accessible



6. Check for and air seal electrical, plumbing, and HVAC penetrations properly

Installation Standard 3.8

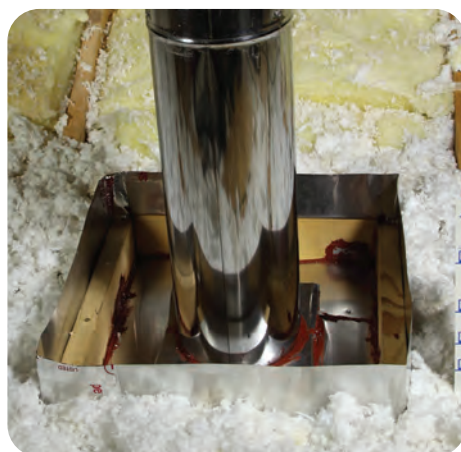
SEAL AROUND CHIMNEYS AND FLUES

SWS 3.0102.2



BEFORE

✗ Even high-temperature sites need air sealing



AFTER

✓ Maintain 3-inch clearance from flue for all combustible materials

TOOLS

- Caulk Gun
- Metal Snips or Nibbler
- Drill
- Tape Measure

MATERIALS

- 26-Gauge Sheet Metal
- Mechanical Fasteners
- Lumber

PPE



* situation dependent ** if cutting lumber

SEAL AROUND CHIMNEYS AND FLUES



1. Select high-temperature caulk sealant that will adjust to temperature differences between materials

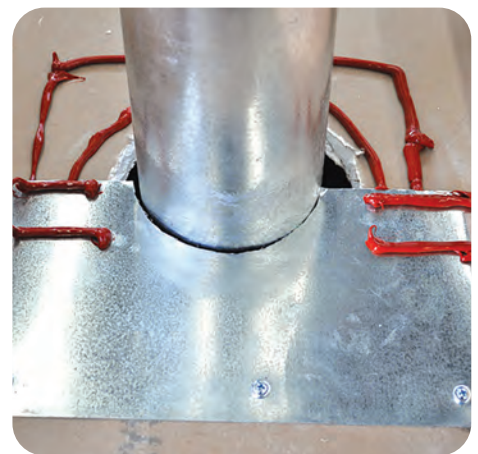


2. Apply unbroken ring of caulk directly to clean decking around entire perimeter of flue or chimney



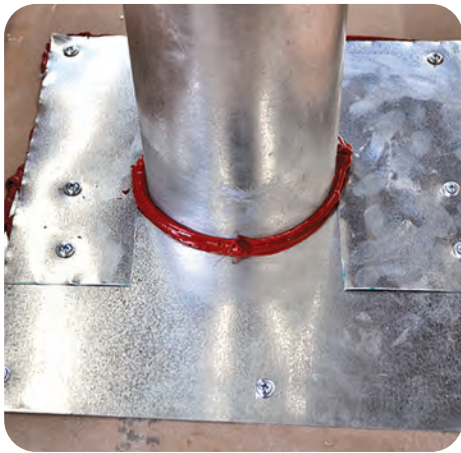
3. Apply unbroken ring of caulk directly to clean decking to match perimeter of sheet metal backing

NOTES

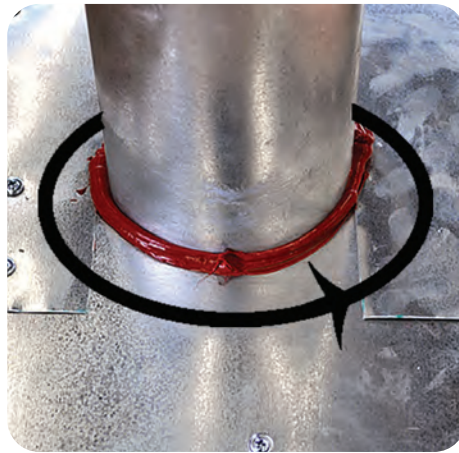


4. Install first layer of metal sheeting and apply additional caulk to complete new perimeter for second layer of sheeting

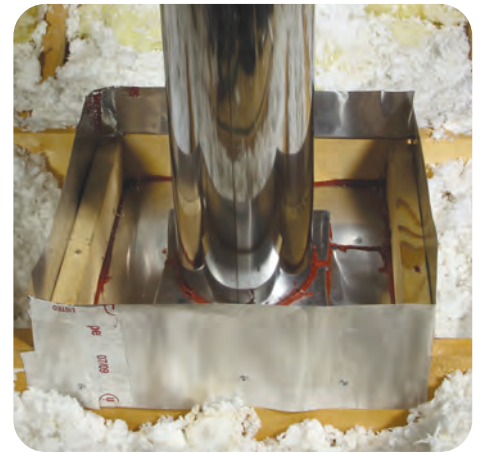
SEAL AROUND CHIMNEYS AND FLUES



5. Set second layer of sheeting to complete ring around flue or chimney. Fasten sheeting mechanically



6. Run bead of high-temperature caulk around flue at backing to seal remaining gaps < 1/4 inch



7. Create a durable, fixed dam, at least 2 inches higher than final insulation level, keeping all combustible materials at least 3 inches away from flue or chimney

NeWAP NOTES

- If sheet metal is used as a barrier around heat producing devices or chimneys, it must be fastened securely to the ceiling joist so the barrier won't collapse.

Installation Standard 3.9

SEAL AROUND NON-INSULATION CONTACT-RATED (NON-IC) CAN LIGHTS

SWS 3.0102.1



BEFORE

✗ Non-Insulation Contact-rated can lights create a fire hazard in well-insulated attics



AFTER

✓ When boxed with appropriate clearances and fire-rated materials, fire risk is mitigated

TOOLS

- Measuring Tape
- Utility Knife
- Caulk Gun

MATERIALS

- 5/8 Inch Gypsum Board
- High-Temperature Caulk
- 100% Silicone Sealant

PPE

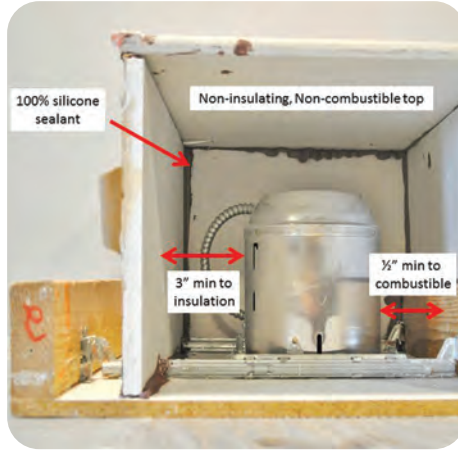


* situation dependent

SEAL AROUND NON-INSULATION CONTACT-RATED (NON-IC) CAN LIGHTS



1. Clear any debris from around non-IC-rated can light



2. Enclosure has 3 inches of clearance from lamp to insulation on all sides, at least 1/2 inch from any combustible material, such as wood



3. Premade boxes can make installation easier when installation site is clear of framing members

NOTES

Non "Insulation Contact" Can Lights are designed to vent heat from the lamp into the cavity around them. They are safe to use in non-insulated cavities, such as the ceiling/floors between different stories in a home. IC-rated Can Lights have a secondary housing to keep the heat of the lamp from contacting the insulation. They are also recommended for use with lower wattage lamps.

SEAL AROUND NON-INSULATION CONTACT-RATED (NON-IC) CAN LIGHTS



4. Seal box on all sides and edges to make continuous barrier from attic, using high temp caulk where appropriate



5. Top of box must be R-1 or less and left free of insulation. Flag enclosure for added visibility

NOTES

With the help of a licensed electrician, there is also the option of replacing old can lights with air-tight units or LED retrofit inserts. Check program requirements.

Installation Standard 4.1

PREPARE ATTIC FLOOR FOR INSULATION

SWS [4.0103.1](#), [4.0103.2](#), [4.0103.3](#), [4.0103.4](#), [4.0103.5](#), [4.0103.6](#), and [4.0103.8](#)



BEFORE YOU BEGIN



✓ Check for live knob & tube wiring and dam off when possible, or replace with modern wiring



✓ Cover junction boxes and attach flag for visibility

TOOLS

- Non-Contact Tester
- Utility Knife
- Drill
- Hole Saw
- Caulk Gun
- Staple Gun
- Metal Snips
- Nibbler

PPE



* if cutting lumber or sheet metal ** situation dependent *** if cutting lumber

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

PREPARE ATTIC FLOOR FOR INSULATION



1. Remove stored materials



2. Run exhaust fan ducts to outside, insulate to R-8



3. Ensure air sealing, if any, is completed



4. Install baffles, if needed. Ensure 2 inches of gap for airflow

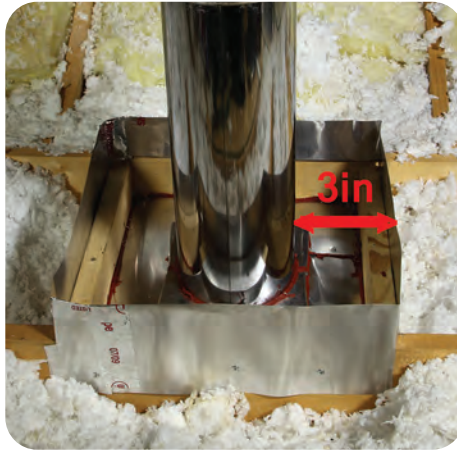
MATERIALS

- Plywood
- Drywall
- XPS
- Junction Box Covers
- Flags
- Vent Caps
- Rigid Duct
- Mechanical Fasteners
- Foil Tape
- R-8 Duct Insulation
- Soffit Baffles
- Depth Rulers
- 26-Gauge Steel Sheeting
- High-Temperature Caulk

PREPARE ATTIC FLOOR FOR INSULATION



5. Depth rulers installed, 1 per 300 square feet



6. All dams are built, as needed

NOTES

Knob-and-tube can be replaced by a duly qualified professional.

DAM, SEAL & INSULATE AN ATTIC HATCH



SWS 3.0103.1



BEFORE

✗ Uninsulated attic access points allow *conditioned* air to escape the home in all seasons



AFTER

✓ Safely and durably sealing and insulating attic access doors prevent air movement and reduces heating and cooling loads

TOOLS

- Measuring Tape
- Saw
- Drill
- T-Square
- Utility Knife
- Caulk Gun

MATERIALS

- Lumber
- Mechanical Fasteners
- Extruded Polystyrene (XPS) or Other Rigid Foam Insulation Board
- Foam Tape
- Adhesive
- Latch (optional)

PPE



* if cutting lumber ** situation dependent

DAM, SEAL & INSULATE AN ATTIC HATCH



1. Rigid, durable attic hatch blocking/dam is installed in a permanent way



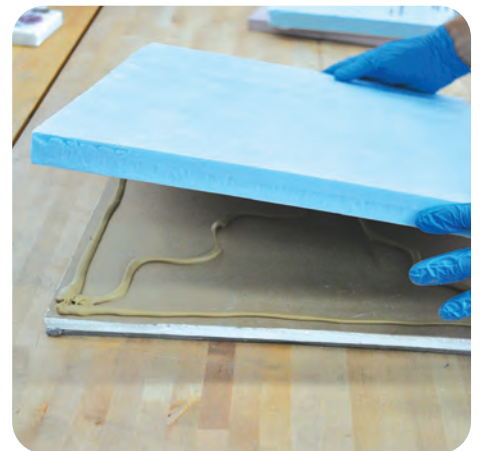
2. Dam is at least 2 inches taller than the final attic insulation depth



3. Cut gypsum board to hatch size for "friction fit" and air seal bottom of hatch with unbroken ring of foam tape

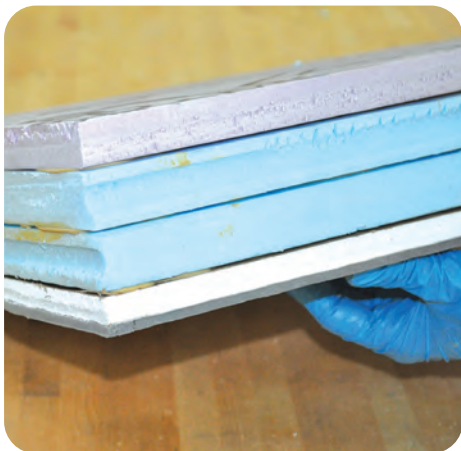
NeWAP NOTES

- All accessible attics over 100 square feet must have an access.
- New attic accesses must be located in an area agreeable to the client, be conducive to adding insulation and installed as per state and local codes.
- A new attic hatch cover must be installed on new accesses and on existing accesses, if necessary.
- Attic accesses should have a minimum of 13" x 20" and must be framed and boxed with 1" common lumber or 3/4" plywood, at a height to accommodate the added insulation and the access.



4. Cut and stack rigid foam insulation, gluing with appropriate adhesive, to build up R-value

DAM, SEAL & INSULATE AN ATTIC HATCH



5. Hatch is insulated to proper R-value (the maximum R-value structurally allowable, up to the final insulation level of surrounding attic)



6. Trim is air-sealed with appropriate material



7. For vertical accesses, run weatherstripping or foam tape to air seal at these doorways too. Hold vertical accesses closed with latch if necessary

NeWAP NOTES

- Existing attic hatches that do not provide adequate access must be reframed to provide an acceptable opening and be boxed with 1" thick common lumber or 3/4" plywood at a height to accommodate the insulation and access.
- Attic access hatch cover must be constructed of 3/4" plywood or particle board.
- The attic access must be finished to match the ceiling or *knee wall* where it is installed as closely as possible.
- *Knee wall* attic access covers or doors must be constructed of 3/4" plywood and attached with a minimum of 2 hinges and 2 latching mechanisms.
- Foam or felt tape access weather-strips are not eligible for reimbursement under the NeWAP.

DAM, SEAL & INSULATE A PULL-DOWN ATTIC STAIRWAY

SWS 3.0103.1



BEFORE

✗ Pull-down stairs can be a weak point in thermal/pressure boundaries, as well as creating a place where insulation can fall down into the home



AFTER

✓ Attic pull-down stairs are safely and durably sealed and insulated to prevent air movement

MATERIALS

- Extruded Polystyrene (XPS)
- Expanded Polystyrene (EPS)
- Polyiso
- Plywood
- 1-Part Spray Foam
- Spray Adhesive
- Caulk Adhesive
- Foil Tape
- Mechanical Fasteners
- Foam Tape
- Weatherstripping
- Latches

TOOLS

- Measuring Tape
- Utility Knife
- Saw
- Caulk Gun
- Spray Foam Gun
- Drill

NeWAP NOTES

- Walk up attic access lids that exceed 12 pounds in weight must be provided with a counter-balanced weight system to provide ease of access.
- Pull-down ladder hatch must be shielded/dammed with 1" common lumber or 3/4" plywood with a hinged 3/4" plywood lid and insulated to the R-value of the adjoining insulated assembly.

PPE



* if cutting lumber ** situation dependent

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

DAM, SEAL & INSULATE A PULL-DOWN ATTIC STAIRWAY



1. Build cover above and around pull-down stair, taller than final insulation height



2. Insulate top and sides of dam cover, to appropriate R-value



3. Air seal all edges of trim



4. Air seal with foam tape or weatherstripping



5. Install latches to ensure hatch remains closed and air sealed if it does not remain closed with a 'friction fit'

NOTES

Installation Standard 4.4

INSULATE AN UNFLOORED ATTIC

SWS 4.0103.2, 4.0103.4, 4.0103.6



BEFORE

Ensure that attic prep work has been completed before starting installation (See 4.1 Prep Attic Floor for Insulation)



AFTER

FINAL CHECKLIST

- ✓ Appropriate insulation material used
- ✓ Correct depth, as specified in work order
- ✓ Insulation level is even

NeWAP NOTES

- Installed insulation should extend over the top of all exterior plates and be full R-value.
- Sealing and repair materials must match the existing surfaces as closely as possible.

TOOLS

- Measuring Tape
- Insulation Machine
- Staple Gun

MATERIALS

- Loose fill fiberglass or cellulose (as per work order)
- Staples

PPE



* situation dependent

INSULATE AN UNFLOORED ATTIC

Description / Comment	
Attic Insulation - Blown Fiberglass - R-38	
Attic Insulation - Blown Fiberglass - R-38	

R13 to R60

Nature Blend™ Loose Fill Formula

Coverage Chart for Thermal Acoustical Application

R Value @ 75°F	Nominal Thickness (inches)	Minimum Settled Thickness (inches)	No. Inches (20% spare for air space)		7" x 4", 10" O.C.		
			Bags Per 1000 Sq. Ft.	Min. Weight Per Sq. Ft.	Bags Per 1000 Sq. Ft.	Min. Weight Per Sq. Ft.	
13	4.4	4.0	17.4	57.5	0.38	15.8	63.5
19	6.1	5.5	27.9	35.8	0.61	25.3	39.6
22	6.8	6.2	33.2	30.1	0.73	30.5	32.8
25	7.8	7.0	38.6	25.9	0.86	35.8	28.0
30	9.2	8.3	47.6	21.0	1.05	44.6	22.4
38	11.4	10.3	62.0	16.1	1.36	58.9	17.0
49	14.6	13.1	82.0	12.2	1.80	78.7	12.7
60	17.7	15.9	101.9	9.8	2.24	98.6	10.1



1. Verify against work order that correct insulation material is being installed
2. Verify insulation depth/density against manufacturer's density chart
3. While installing, regularly check depth of insulation for even coverage and to meet required depth



4. Ensure that insulation does not get into dammed-off areas, such as around chimneys and flues and inside soffit baffles
5. When complete, post insulation certificate by attic entrance of each accessible attic.

NeWAP NOTES

- Cellulose material will be installed to a minimum density of 3.5 pounds per cubic foot.
- Loose fiberglass material will be specifically approved for air flow resistance to a minimum density per the manufacturer's recommendations
- Ceilings must be inspected to ensure that the weight of the added insulation will be supported.
- Leaks in the roof and penetrations in the ceiling must be repaired prior to insulating the attic.

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

INSULATE UNDER A FLOORED ATTIC

SWS 4.0103.6



BEFORE

✗ Attics with flooring often hide uninsulated cavities



AFTER

✓ An insulated attic floor provides a continuous, contiguous, safe, and compliant thermal boundary that prevents air movement

TOOLS

- Measuring Tape
- Utility Knife
- Insulation Machine
- Drill
- Hole Saw
- Prybar
- Caulk Gun

MATERIALS

- Loose Fiberglass or Cellulose Insulation
- Extruded Polystyrene (XPS)
- Caulk
- Mechanical Fasteners
- Gypsum Board
- Plugs

PPE



* situation dependent

INSULATE UNDER A FLOORED ATTIC



1. Ensure that floor cavities are blocked securely at both ends



2. If boards can be loosened, pry up as few boards as possible to access all cavities. If flooring is in solid sheets, access holes may need to be drilled



3. Fill entire cavity with insulation to prescribed density

NeWAP NOTES

- Cellulose material will be installed to a minimum density of 3.5 pounds per cubic foot.
- Loose fiberglass material will be specifically approved for air flow resistance to a minimum density per the manufacturer's recommendations.
- Enclosed ceilings must be insulated the full cavity depth, installed using the *tube-fill method* to a minimum of 3.5 pounds per cubic foot.
- Cellulose insulation should be installed over existing batt insulation.
- All insulation installed must extend over the top of all exterior plates and be the full R-value.



4. Occasionally a homeowner may not want the attic floor to be disturbed. The cavities can also be accessed from below through the ceiling, particularly in garage spaces

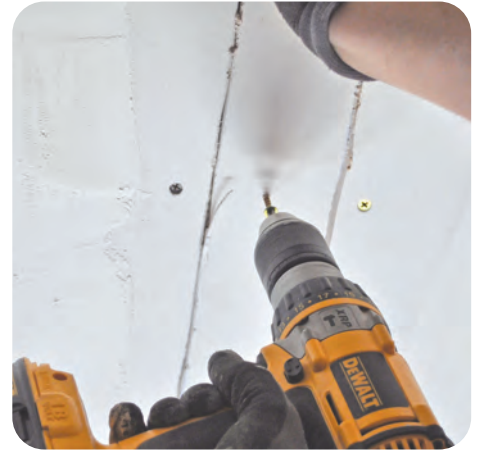
INSULATE UNDER A FLOORED ATTIC



5. Blocking still needs to be put into place



6. Blow insulation to completely fill cavities to prescribed density



7. Fill and reseal access holes to prevent air movement

NOTES

Installation Standard 4.6

INSULATE AN ATTIC STAIRWAY

SWS [4.0104.1](#), [4.0104.2](#), [4.0104.3](#), [4.0104.4](#), [4.0104.5](#),
[4.0104.6](#), [4.0201.2](#), [4.0201.3](#), [4.0202.1](#)



BEFORE

✗ Attic stairways can offer a unique set of insulation challenges. Clearly define where the thermal and pressure boundary are going to be located before starting insulation



AFTER

✓ Insulation provides a continuous, contiguous, safe, and compliant thermal boundary that prevents air movement between the attic and the remainder of the home

TOOLS

- Measuring Tape
- Drill
- Utility Knife
- Hole Saw
- Insulation Machine
- Spray Foam Gun

MATERIALS

- Kraft-Faced Fiberglass Batts
- Loose Cellulose or Fiberglass Insulation
- Netting
- Furring Strips
- Staples
- Mechanical Fasteners
- Extruded Polystyrene (XPS)
- 2-Part Spray Foam
- 1-Part Spray Foam
- Plywood
- Gypsum Board
- House Wrap

PPE



* situation dependent

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

INSULATE AN ATTIC STAIRWAY



1. If walls are accessible from the attic side, choose between batt or blown-in insulation



2. Block off open cavities along the line of the thermal/pressure boundary



3. Air seal around blocking material



4. Cut batts to size for each individual cavity, ensuring no gaps remain, locating kraft-paper toward *conditioned* space



5. For batt insulation, cover installed batts with backing. For blown-in, attach netting to framing members, cut holes in netting and blow in insulation to 3.5 pounds per cubic inch

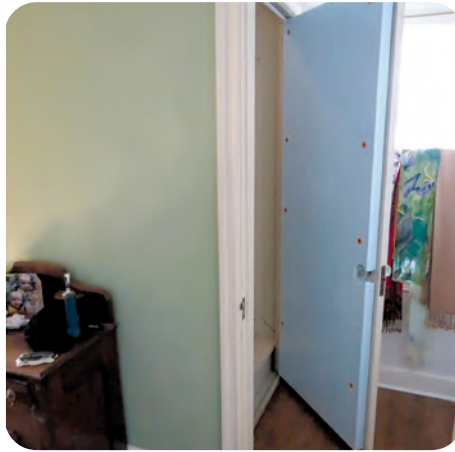


6. If walls are enclosed from attic side, drill holes in stairways walls

INSULATE AN ATTIC STAIRWAY



7. Dense pack stairway walls



8. Weatherstrip and insulate door



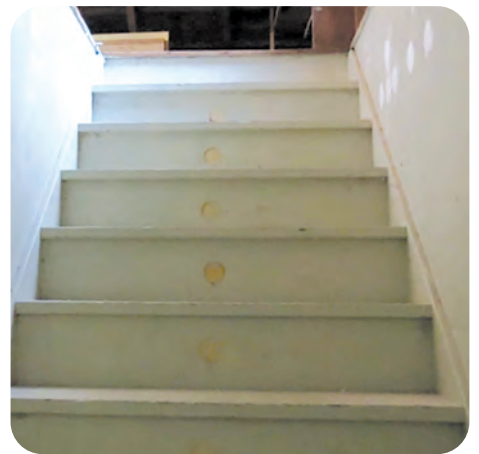
9. Insulate under stairway using insulation indicated by work order



10. Seal off insulation from *conditioned* space in home



11. If backside of stairs is sealed, blow insulation into cavity behind stairs



12. Plug access holes from blown insulation

NOTES

Installation Standard 4.23

PREPARE A MANUFACTURED HOME CEILING FOR INSULATION

SWS 4.0103.6, 4.0103.9, 4.0103.10, 4.0103.11, 4.0103.12



BEFORE YOU BEGIN

Make any repairs and preparation as noted from assessment, as well as fixing any new issues that could cause the ceiling to be compromised with the additional weight of insulation



AFTER

FINAL CHECKLIST

- ✓ Vents all terminate to outside and are properly sealed
- ✓ Flues are dammed properly
- ✓ Ceiling is in good condition to hold weight

TOOLS

- Measuring Tape
- Utility Knife
- Zip Tie Tensioner

MATERIALS

- R-8 minimum Flex Duct insulation
- Duct Insulation with Vapor Retarder
- Water Heater Blanket with Vapor Retarder
- Zip Ties
- Twine
- Spray Adhesive
- Mastic
- UL 181 Fiberglass Mesh Tape

PPE



*if working with mold **weather dependent ***if cutting lumber

PREPARE A MANUFACTURED HOME CEILING FOR INSULATION



1. Ensure plumbing and exhaust vents terminate outside



2. Dam around high temperature flues (note: flue in image is in need of work)



3. Replace non-IC rated can lights with IC-rated cans



4. Repair roof leaks or other damage, as possible, or defer job if necessary

NOTES

Check with your state program to find out deferral thresholds and procedures

Installation Standard 4.24

MH INSULATION: GABLE END BLOW METHOD

SWS 4.0103.9



BEFORE

- ✗ Manufactured housing often does not meet regional standards for insulation



AFTER

- ✓ Fill entire cavity and reseal gable ends

TOOLS

- Drill
- Utility Knife
- Hole Saw or Saws-All
- Caulk Gun

MATERIALS

- Fiberglass or Cellulose Loose Insulation
- Mechanical Fasteners
- Caulk/Sealant

NOTES

PPE



* if cutting lumber

MH INSULATION: GABLE END BLOW METHOD



1. Verify integrity of ceiling to hold weight of insulation



2. Ground blower hose to reduce chance of electrical build-up



3. Remove or fold up gable end to access attic



4. Insert blower hose as far as possible and then retract slowly to fill cavity entirely, on each side of marriage wall



5. Fill cavity and leave appropriate documentation



6. Reseal gable end or install gable vent at peak that has no more than 1/2 inch mesh screen. Repeat all steps from other end, if needed.

Insulation Standard 4.25

MH INSULATION: EDGE BLOW METHOD

SWS 4.0103.10



BEFORE

✗ *Manufactured housing often does not meet regional standards for insulation*



AFTER

✓ Verify reinstallation and proper sealing of edge of roof to ensure no water or pest intrusion

TOOLS

- Drill
- Utility Knife
- Insulation Machine

MATERIALS

- Fiberglass or Cellulose Loose Insulation
- Blocking Material
- Butyl Tape

NOTES

PPE



* if cutting lumber ** situation dependent *** if cutting lumber

MH INSULATION: EDGE BLOW METHOD



1. Verify integrity of ceiling to hold weight of insulation



2. Prepare stable work area to access roof edge



3. Unfasten and remove J channel from edge of roof



4. Clean old butyl tape or putty from J channel and store J channel somewhere safe until it can be reinstalled



5. Remove staples holding down edge of roof



6. Insert blocks to hold roof edge up approximately 6 inches

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

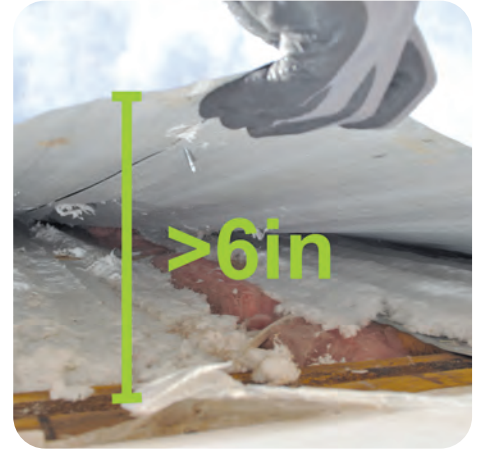
MH INSULATION: EDGE BLOW METHOD



7. Ground the fill hose to reduce chance of electrical build-up



8. Insert blower hose as far as possible into cavity and retract slowly while filling space between trusses



9. Work down the edge of the roof until entire cavity is full



10. Remove blocks and reattach edge of roofing over exterior sidewall paneling



11. Replace butyl tape on J channel



12. Reattach J channel, lapping over edge of roof. Repeat entire process for other side, if necessary

Installation Standard 4.26

MH INSULATION: RIDGE BLOW METHOD

SWS [4.0103.11](#)



BEFORE

✗ *Manufactured housing commonly is underinsulated, particularly older models*



AFTER

✓ After accessing from ridge, ridge cap can be installed or a series of vent caps

TOOLS

- Drill
- Saw
- Insulation Machine
- Caulk Gun
- Metal Sheers

MATERIALS

- Loose Fiberglass Insulation
- Sealant
- 26-Gauge Metal Sheeting
- Vent Caps
- Mechanical Fasteners
- Elastomeric Coating

PPE



MH INSULATION: RIDGE BLOW METHOD



1. Remove ridge cap or cut access holes at ridge, leaving one side attached to put back in place



2. Insert blower hose



3. Fill all accessible areas



4. If not installing ridge or cap vents, replace flaps, patch over with metal, and seal with elastomeric

NOTES

Installation Standard 4.27

MH INSULATION: INTERIOR BLOW METHOD

SWS 4.0103.12



1. Drill holes in ceiling to fill each ceiling joist cavity



2. Blow insulation into ceiling cavity to appropriate R-value for region

TOOLS

- Hole Saw
- Vacuum
- Insulation Machine
- Caulk Gun

MATERIALS

- Cellulose or Fiberglass Loose Insulation
- Plugs
- Sealant

PPE



MH INSULATION: INTERIOR BLOW METHOD



3. Continue throughout house to ensure even coverage and no gaps



4. Seal all holes securely

NOTES

Insulation Standard 4.28

MH INSULATION: TOP FILL BLOW METHOD

SWS 4.0103.11



BEFORE

✘ Attics in older *manufactured housing* are often underinsulated or poorly insulated



AFTER

FINAL CHECKLIST

- ✓ Provide a continuous and safe thermal barrier
- ✓ Protect integrity of roof

TOOLS

- Saw
- Insulation Machine
- Caulk Gun
- Paint Brush
- Drill

MATERIALS

- Cellulose or Fiberglass Loose Insulation
- All-Weather Adhesive
- Sheet Metal
- Mechanical Fasteners
- Elastomeric Paint

PPE



MH INSULATION:TOP FILL BLOW METHOD



1. Drill or cut uniform access holes in the roof adequately spaced to access the entire roof cavity



2. Blow insulation into attic cavity to capacity



3. Run a continuous bead of flexible and durable all-weather adhesive around the access hole



4. Install a durable metal patch of equal or greater gauge than the roof material that overlaps the opening at least 2 inches on all sides, and fastening in place every 2 inches along perimeter



5. Apply elastomeric paint over patch that laps at least 6 inches on all sides to create a continuous seal

NOTES

Installation Standard 3.10

AIR SEAL ABOVE THE KNEEWALL

SWS [3.0101.1](#), [3.0102.11](#)



BEFORE

✗ Knee walls are part of the thermal and pressure boundary



AFTER

✓ Air sealing from above continues the pressure boundary while supporting future insulation

NeWAP NOTES

- Materials used must form an airtight seal.

TOOLS

- Measuring Tape
- Utility Knife
- Saw
- Drill
- Caulk Gun
- Spray Foam Gun

MATERIALS

- Extruded Polystyrene (XPS)
- Plywood
- Gypsum Board
- Lumber
- Mechanical Fasteners
- Caulk
- Spray Foam
- Mastic

PPE



* if cutting lumber ** situation dependent

AIR SEAL ABOVE THE KNEEWALL



1. After clearing away debris, measure gap above *knee wall* in line with pressure boundary



2. Cut blocking material (XPS, wood, gypsum board) to fit gap



3. Securely fit infill or blocking material in place



4. Ensure blocking material is located in line with preferred pressure boundary



5. Secure in place with mechanical fasteners or adhesive as necessary to prevent movement when insulation is installed



6. Seal continuously around blocking material to preserve pressure boundary

Installation Standard 3.11

AIR SEAL BENEATH THE KNEEWALL SWS 3.0101.1



BEFORE

✗ Knee walls are part of the thermal and pressure boundary



AFTER

✓ Air sealing from below allows areas of the attic floor to be treated separately according to whether they fall in or out of the pressure boundary

TOOLS

- Measuring Tape
- Utility Knife
- Saw
- Drill
- Caulk Gun
- Spray Foam Gun

MATERIALS

- Extruded Polystyrene (XPS)
- Plywood
- Gypsum Board
- Lumber
- Mechanical Fasteners
- Caulk
- Spray Foam
- Mastic



* if cutting lumber ** situation dependent

AIR SEAL BENEATH THE KNEEWALL



1. After clearing away debris, measure gap below *knee wall* in line with pressure boundary



2. Cut blocking material (XPS, wood, gypsum board) to fit gap



3. Securely fit infill or blocking material in place



4. Ensure blocking material is located in line with preferred pressure boundary



5. Seal continuously around blocking material to preserve pressure boundary

NeWAP NOTES

- If batt insulation is used to seal the base of *knee walls*, the batt must be sealed in an enclosed *vapor barrier*.
- Materials must form an airtight seal.
- New and existing *knee wall* insulation must be held in place with staples, twine, wire, hex netting or wire expanders and must be covered with an *air infiltration barrier*.

Installation Standard 4.7

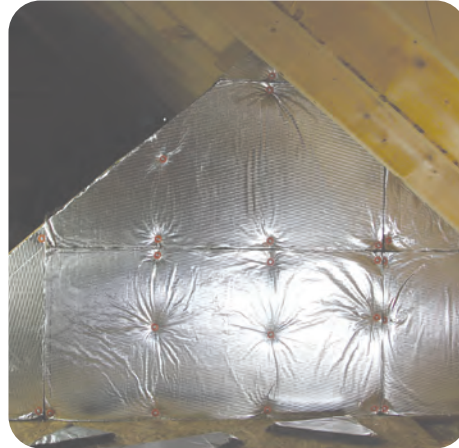
INSULATE AN ATTIC KNEEWALL WITH BATTS

SWS [4.0104.2](#), [4.0104.3](#)



BEFORE

✗ Air sealed knee walls are ready for insulation



AFTER

✓ Once insulated, this *knee wall* provides a continuous, contiguous, safe, and compliant thermal boundary that prevents air movement

TOOLS

- Measuring Tape
- Utility Knife
- Staple Gun

MATERIALS

- Fiberglass Batts
- Staples
- Nylon Strap
- Mechanical Fasteners
- House Wrap
- Radiant Barrier

PPE



* situation dependent

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

INSULATE AN ATTIC KNEE WALL WITH BATTS



1. Measure cavities



2. Cut batts for exact fit



3. Install batts with minimal compression



4. Install backing material

NeWAP NOTES

- New and existing knee wall insulation must be held in place with staples, twine, wire, hex netting or wire expanders and must be covered with an *air infiltration barrier*.
- Materials used must form an airtight seal.
- If faced batt insulation is installed in an open wall cavity, the *vapor barrier* must be installed to the warm side and fit snugly between the stud and wall.
- Materials used in areas of high moisture or areas exposed to the weather must be of suitable grade.

Installation Standard 4.8

INSULATE AN ATTIC KNEE WALL WITH 2-PART SPRAY FOAM

SWS 4.0104.5, 4.0104.6



BEFORE

✗ Air seal before applying spray foam to prevent foam from leaking into conditioned space



AFTER

✓ Spray walls as evenly as possible

TOOLS

- Spray Foam Gun
- Fit-Tested Respirator or PAPR
- Measuring Tape
- Utility Knife
- Drill

MATERIALS

- 2-Part Spray Foam
- Low-Perm Paint
- Polyisocyanurate
- Expanded Polystyrene (EPS)
- Gypsum Board
- Mechanical Fasteners
- Joint Tape
- Joint Compound

PPE

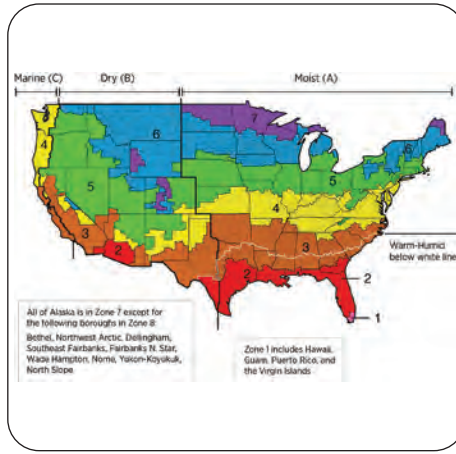


* situation dependent

INSULATE AN ATTIC KNEE WALL WITH 2-PART SPRAY FOAM



Ensure proper PPE when installing 2-Part Spray Foam



For climate zones 5-8, install foam to a thickness of at least a class II *vapor retarder* or install a class II *vapor retarder*, such as fiber-faced polyiso, unfaced EPS or low-perm paint



If space is used for utility access, storage, or permanently habitable, separate foam from the subspace with a suitable thermal barrier covering, such as 1/2-inch gypsum board

NeWAP NOTES

- Material used must form an airtight seal.

Installation Standard 4.9

INSULATE AN ATTIC KNEEWALL WITH BLOWN INSULATION

SWS 4.0104.1



BEFORE

✗ Air sealed knee walls are ready for insulation



AFTER

✓ Once insulated, this knee wall provides a continuous, contiguous, safe, and compliant thermal boundary that prevents air movement

TOOLS

- Measuring Tape
- Utility Knife
- Drill
- Staple Gun
- Hole Saw
- Insulation Machine

MATERIALS

- Extruded Polystyrene (XPS)
- Gypsum Board
- House Wrap
- Radiant Barrier
- Mechanical Fasteners
- Furring Strips
- Loose Fiberglass Insulation

PPE



* situation dependent

Tools and materials listed are only recommendations and may not include everything needed to complete the job.
"After" photo credit: Home Insulation of Syracuse

INSULATE AN ATTIC KNEEWALL WITH BLOWN INSULATION



1. Securely install backing material over entire knee wall



2. Cut holes in backing material to allow access to all cavities



3. Blow insulation into cavities to meet *dense-pack* standards



4. Fill all cavities



5. Replace access hole plugs in backing material, if possible



6. Seal access holes permanently and completely

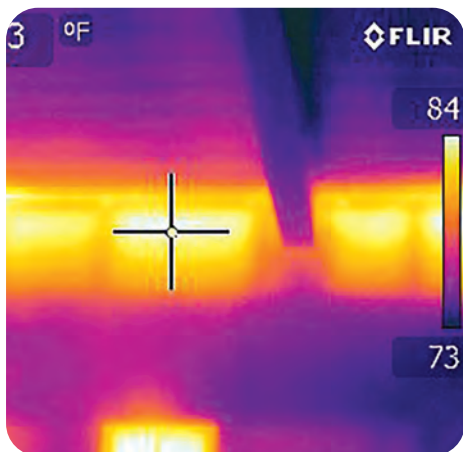
NOTES



Installation Standard 4.10

DENSE-PACK A SIDEWALL VIA EXTERIOR BLOW

SWS [4.0202.1](#)



BEFORE

✗ Walls that are missing insulation or underinsulated are an opportunity for energy savings



AFTER

✓ When properly insulated, walls will allow minimal heat and air transfer

TOOLS

- Measuring Tape
- Utility Knife
- Pry-Bar
- Siding Remover
- Hole Saw
- Drill
- Insulation Machine

MATERIALS

- Plastic Sheeting
- Painters Tape
- Loose Cellulose or Fiberglass Insulation
- Plugs
- Caulk
- Spray Foam
- Mechanical Fasteners

PPE



DENSE-PACK A SIDEWALL VIA EXTERIOR BLOW



1. Protect work area from debris and dirt



2. Ensure balloon-framed walls are blocked at top and bottom



3. Ensure wall integrity is complete (no holes)



4. Remove siding as needed



5. Drill holes as required based on building frame design and exterior materials



6. Fill cavities completely and to proper density

DENSE-PACK A SIDEWALL VIA EXTERIOR BLOW



7. If possible, ensure all cavities are filled before completing job



8. Patch holes



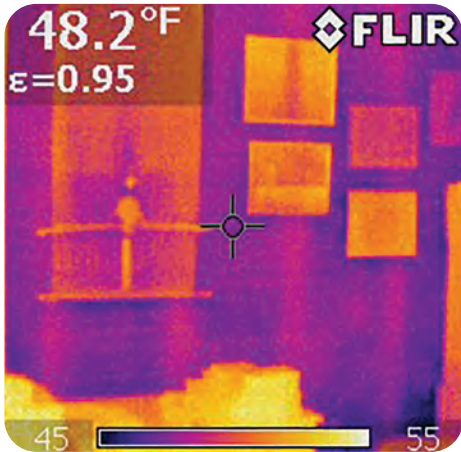
9. Replace and/or repair siding

NeWAP NOTES

- Cellulose insulation used in enclosed wall cavities will be installed at 3.5 pounds per cubic foot or greater density.
- All holes and penetrations will be plugged and/or sealed.
- The number of insulation bags installed will be confirmed and will match the number required on the coverage chart
- Siding must be removed or drilled and all enclosed wall cavities must be filled. wall cavities that are less than 3 than 3 feet in height or where it is not possible to tube fill may be insulated through a minimum 1 inch entry hole.
- Interior and exterior walls must be repaired prior to insulating.
- Wall repairs must be durable and permanent and match the existing area as closely as possible.
- Removed siding must be reinstalled using the original fastening system whenever possible.
- The seam tabs on slate siding must be reinstalled.
- Entry holes must be sealed with plastic or wood plugs, or covered with felt paper prior to reinstalling the siding if the siding was removed.
- Entry holes in stucco or masonry siding must be sealed with mortar or a material manufactured for that purpose.
- Sealing materials must completely seal the opening and be textured and painted to match the existing surface.
- Whenever plastic or wood plugs are used on the exterior of the siding, the plugs must be painted to match the surrounding surface.
-

Installation Standard 4.11 DENSE-PACK A SIDEWALL VIA INTERIOR BLOW

SWS 4.0202.1



BEFORE

✗ Older houses often are lacking in insulation



AFTER

✓ Inconspicuous capped, patched, or covered holes are the ideal

TOOLS

- Measuring Tape
- Utility Knife
- Hole Saw
- Drill
- Insulation Machine
- Infrared Camera

MATERIALS

- Plastic Sheeting
- Loose Cellulose or Fiberglass Insulation
- Gypsum Board
- Joint Compound
- Caulk
- Mechanical Fasteners
- Chair Rail
- Plugs
- Painters Tape

PPE



95

DENSE-PACK A SIDEWALL VIA INTERIOR BLOW



1. Protect work area from debris and dust



2. Ensure balloon-framed walls are blocked at top and bottom



3. Ensure wall integrity is complete (no holes)

Ne WAP NOTES

- Cellulose material will be installed to a minimum density of 3.5 pounds per cubic foot.
- Loose fiberglass material will be specifically approved for air flow resistance to minimum density per manufacturers recommendations.
- Open wall cavities must be covered and insulated with batt, blown or spray applied insulation.
- Interior holes will be plugged and taped or sealed with an appropriate material and made ready for paint.
- Materials used in areas of high moisture or areas exposed to the weather must be of suitable grade.
- If the covering of an open wall cavity is drywall, the drywall must be taped and receive one coat of joint compound.
- If the covering of an open wall cavity is plywood, chipboard or hard-board the joints must be caulked.

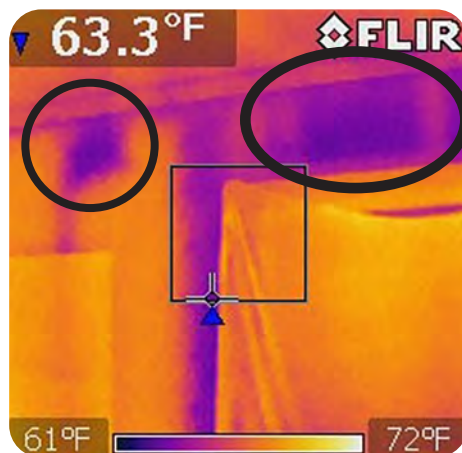


4. Drill holes as required based on building design

DENSE-PACK A SIDEWALL VIA INTERIOR BLOW



5. Fill cavities completely and to proper density



6. If possible, ensure all cavities are filled before completing job (note: dark areas were missed)



7. Patch holes. Use chair rail if preferred.

NeWAP NOTES

- If paneling is installed, the paneling must be 3/18 inch thick and the joints must be caulked.

BATT INSULATION INSTALLATIONS NOTES:

- If faced batt insulation is installed in an open wall cavity, the *vapor barrier* must be installed to the warm in winter side of the wall and fit snugly between the studs and wall.
- Fiberglass batt insulation installed in a *living area* must be covered with paneling, plywood, chipboard, hardboard or drywall, with the exception of sill box insulation. the the covering is drywall, the drywall must be taped and receive on coat of joint compound.

DENSE-PACK TESTING REQUIREMENTS



NeWAP NOTES

Core Sampling will be completed on a minimum of 5% of all frame homes billed each month in which insulation is installed in an enclosed cavity.

- Testing must be completed by the sub-grantee, with verification testing completed by state QCI monitors, for proper weight density and taking a minimum of 3 core samples.
 - The core samples must:
 1. be taken in random locations
 2. 1 core sample must be taken within 3 feet of the top of the wall, and
 3. the results must be recorded on the inspection form and retained in the client file.
 - The remaining 95% of homes will have the dense packed enclosed wall insulation evaluated using either infrared scans (when a 25 degree interior-exterior temperature difference is achieved) or with a wire probe.
 - The results must be recorded on the inspection form and retained in the client file.

Installation Standard 4.21

INSULATE MANUFACTURED HOME SIDEWALLS WITH BATTS

SWS 4.0202.3



BEFORE

✗ *Manufactured housing* sidewalls present a unique challenge when it comes to insulation



AFTER

✓ Properly installed insulation will have no gaps and compressed as little as possible

TOOLS

- Drill
- Measuring Tape
- Utility Knife
- Batt Stuffer

MATERIALS

- Wrapped Fiberglass Batts
- Mechanical Fasteners

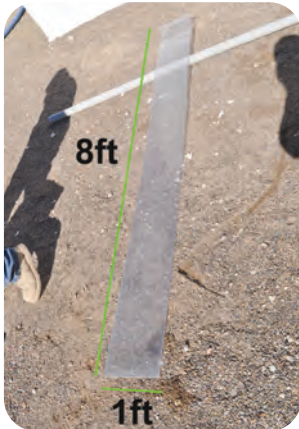
PPE



* situation dependent

INSULATE MANUFACTURED HOME SIDEWALLS WITH BATTS

BEFORE YOU BEGIN



Prepare insulation stuffer, if necessary



1. Remove siding as needed, starting from bottom and taking note of any obstacles that may compress insulation



2. Measure cavity size



3. Plastic-wrapped fiberglass batts provide both insulation value and *vapor retarder* for unsealed cavities



4. Cut batt to length for cavity

INSULATE MANUFACTURED HOME SIDEWALLS WITH BATTS



5. Fold batt over end of insulation stuffer



6. Insert batt into cavity, sliding under top belt rail to top of cavity, and ease stuffer back out to allow batt to fill in space



7. Gently tug batt into place and tuck remaining batt under lower belt rail and fit down to bottom of cavity with minimal compression



8. Reinstall siding



9. Reattach mechanical fasteners

NOTES

Installation Standard 4.22

INSULATE MANUFACTURED HOME SIDEWALLS WITH BLOWN INSULATION

SWS [4.0202.4](#), [4.0202.5](#)



BEFORE

✗ Older *manufactured housing* is often lacking insulation since it did not have to be built to a particular jurisdiction's codes



AFTER

✓ When properly insulated, siding will not bulge or be dented from installation

TOOLS

- Drill
- Insulation Machine

MATERIALS

- Loose Fiberglass Insulation
- Mechanical Fasteners

PPE



* situation dependent

INSULATE MANUFACTURED HOME SIDEWALLS WITH BLOWN INSULATION



1. Ensure the integrity of the wall to be insulated, both from exterior and interior



2. Remove siding as needed, from the bottom



3. Fill cavity with blown insulation, ensuring to get past belt rails and electrical



4. Reinstall siding



5. Be prepared to adapt insulation strategy dependent upon exterior materials

NOTES

Installation Standard 3.12

INSTALL WEATHERSTRIPPING ON AN EXTERIOR DOOR

SWS [3.0202.1](#)



BEFORE

✗ Daylight visible around an exterior door indicates air *infiltration*



AFTER

FINAL CHECKLIST

- ✓ Door closes and opens easily
- ✓ Weatherstrip makes a good seal with the door
- ✓ Weatherstrip does not get flattened in a way that will lead to damage when used

TOOLS

- Tape Measure
- Snips
- Drill with Appropriate Bits

MATERIALS

- Weatherstripping
- Caulk
- Mechanical Fasteners

PPE



INSTALL WEATHERSTRIPPING ON AN EXTERIOR DOOR



1. Measure doorway for weatherstripping



2. Measure door top or bottom as well for weatherstripping and potential door bottom or sweep



3. Notch upper ends of side weatherstripping to allow for top piece



4. Fit weatherstripping snugly into rabbet, if one exists, and against other pieces



5. Fasten weatherstripping securely when no rabbet exists

NOTES

Installation Standard 3.13

INSTALL A DOOR SWEEP OR DOOR BOTTOM ON AN EXTERIOR DOOR

SWS 3.0202.1



BEFORE

✗ Air and water can come in under doors when there is no door bottom or sweep



AFTER

FINAL CHECKLIST

- ✓ Ensure a good seal to prevent air *infiltration*
- ✓ Ensure unimpeded door operation

NeWAP

- Weather-strips, thresholds, door bottoms and sweeps must have a vinyl or silicone insert.
- Weather-strips and sweeps must have the last fastener or screw no more than 2 1/2 inches from the end.
- Foam or felt tape door weather-strips are not eligible for reimbursement under the NeWAP.

PPE



TOOLS

- Measuring Tape
- Metal Snips
- Saw
- Drill
- Caulk Gun

NOTES

Door bottoms commonly are installed on new doors, those that have wooden thresholds, or to replace older existing door bottoms.

For houses with a rubber threshold, door sweeps are more common.

INSTALL A DOOR SWEEP OR DOOR BOTTOM ON AN EXTERIOR DOOR

STEPS 1-3: FOR DOOR SWEEP AND DOOR BOTTOM



1. Measure width of door and ensure that door sweep is appropriate length



2. Adjust threshold to ensure that it is seated tightly



3. Apply caulk to threshold at floor on interior, and exterior if possible, to minimize water intrusion

STEPS 4-6: FOR DOOR SWEEP



4. Install door sweep on interior face of door, centering on door face



5. Attach door sweep using mechanical fasteners



6. Evenly place mechanical fasteners along entire length of door sweep

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

INSTALL A DOOR SWEEP OR DOOR BOTTOM ON AN EXTERIOR DOOR

STEPS 4-8: FOR DOOR BOTTOM



4. With threshold adjusted, measure door opening height



5. Remove door from opening if height of door needs to be shortened to make room for door bottom



6. Trim door, if possible, to ensure good fit of door bottom



7. Trim sweep to match width of door



8. Ensure that door bottom sits tight against the door and reinstall door

NOTES

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

Installation Standard 3.14

AIR SEAL SILL PLATE AND RIM JOIST

SWS 3.0104.1



BEFORE

✗ Air movement around sill plates and near rim joists needs to be addressed before insulating



AFTER

✓ Once air sealed, the cavity is ready for insulation

TOOLS

- Spray Foam Applicator
- Spray Foam Gun
- Caulk Gun

NOTES

MATERIALS

- 2-Part Spray Foam
- 1-Part Spray Foam
- Backer Rod
- Machine Mesh
- Steel Wool
- Caulk

PPE



AIR SEAL SILL PLATE AND RIM JOIST



1. For exterior holes larger than 1/4 inch, steel wool or other pest blocking material before sealing



2. Cut backing material to fill space



3. Seal over to hold backing material in place and air seal



4. Seal penetrations on subfloor as well, looking out not only for current electrical and plumbing, but also vacated holes



5. Push sealant into seams where framing members meet



6. Create a continuous seal on all seams

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

Installation Standard 4.12

INSULATE RIM JOIST

SWS [4.0401.1](#), [4.0401.2](#), [4.0401.3](#)



BEFORE

X Basement and crawlspace rim joists must be addressed when part of the thermal boundary



AFTER

✓ Foam products require a thermal barrier or coating, such as 1/2-inch gypsum board, to separate them from permanently habitable spaces

TOOLS

- Measuring Tape
- Utility Knife
- Spray Foam Applicator
- Spray Foam Gun
- Drill
- Caulk Gun

MATERIALS

- Polyisocyanurate Foam Board
- Plastic-Wrapped Fiberglass Batts
- Extruded Polystyrene (XPS)
- 2-Part Spray Foam
- 1-Part Spray Foam
- Gypsum Board
- Mechanical Fasteners
- Caulk

PPE



* if using two-part

INSULATE RIM JOIST



1. Measure each individual cavity to be insulated and take note of obstacles for insulation



2. Cut insulation, either rigid foam board or wrapped batts, for each individual cavity



3. Ensure space is filled with no gaps or misalignment, and insulation tight to rim joist

NOTES

As long as foam is not over 3.25 inches thick and space is not permanently habitable, insulation does not need to be covered by thermal barrier.



4. Ensure insulation is secured in place and will not move over time

INSULATE RIM JOIST



5. If foam insulation is over 3.25 inches thick or space is permanently habitable, insulation needs to be covered by a thermal barrier, such as gypsum board



6. When using wrapped or faced batts, ensure facing is to the *conditioned* side of the cavity and that batt is uncompressed



7. Seal edges of the wrap or facing to surrounding surface to ensure a continuous barrier



8. 2-part sprayfoam can also be used as rim joist insulation

NOTES



Installation Standard 4.13

INSULATE BASEMENT WALLS IN CONDITIONED SPACE

SWS 4.0402.4, 4.0402.5



BEFORE

✗ An uninsulated wall in a "conditioned" space allows the loss of *conditioned* air



AFTER

✓ A sealed continuous air barrier finishes off an insulated *basement* wall, providing air sealing and thermal comfort

TOOLS

- Caulk Gun
- Spray Foam Gun
- Metal Snips
- Measuring Tape
- Utility Knife
- Drill
- Staple Gun
- Taping Knife
- Mudding Trowel

MATERIALS

- | | | |
|--------------|--------------------------------|------------------------|
| • Backer Rod | • Fiberglass Kraft-Faced Batts | • Luan |
| • Metal Lath | • Extruded Polystyrene (XPS) | • Mechanical Fasteners |
| • Spray Foam | • Staples | • Joint Compound |
| • Caulk | • Gypsum Board | • Joint Tape |

PPE



95

INSULATE BASEMENT WALLS IN CONDITIONED SPACE



1. Check wall for penetrations and seal as needed



2. Check wall for water intrusion that needs to be mitigated first. All bulk sources of moisture should be directed away from the foundation walls



3. If insulation has *vapor retarder* on only one side, install it facing the *conditioned space*



4. Install insulation to prescribed R-value in full contact with the entire perimeter of foundation wall from ceiling to floor



5. Install a sealed air barrier on the *conditioned* side of the insulation. When using foam, gypsum board must be at least 1/2 inch to meet building codes for a thermal barrier

NOTES

Installation Standard 4.14

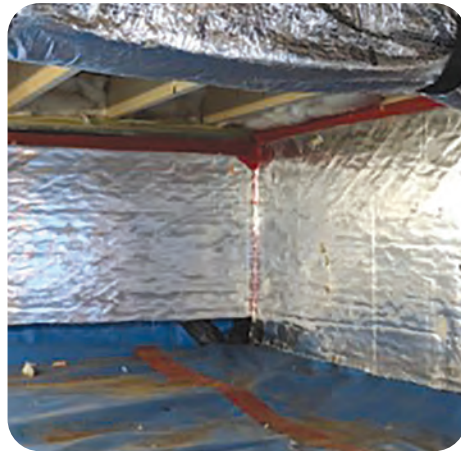
INSULATE CONDITIONED CRAWLSPACE WALL

SWS 4.0402.2, 4.0402.3



BEFORE

✗ Unvented crawlspaces are sometimes considered to be part of the *conditioned* space, so the walls need insulation



AFTER

FINAL CHECKLIST

- ✓ Insulation is or has class II vapor retarder
- ✓ Vapor retarder faces conditioned space
- ✓ Insulation laps underneath ground vapor retarder at foundation wall

TOOLS

- Measuring Tape
- Utility Knife
- Drill
- Spray Foam Gun
- Half- or Full-Face Respirator

MATERIALS

- Polyisocyanurate Foam Board
- Nylon Fasteners
- 2-Part Spray Foam

PPE

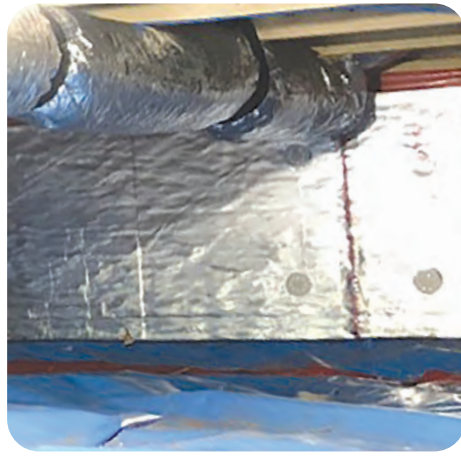


* if using two-part

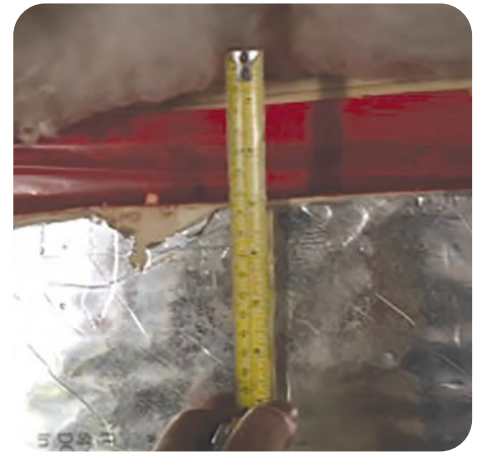
INSULATE CONDITIONED CRAWLSPACE WALL



1. Use a fire-rated material



2. Attach insulation in a durable manner



3. Leave a 3-inch termite inspection gap between the bottom of the sill plate at the top of the insulation, if needed

NOTES

Notes section with horizontal lines for writing.



Installation Standard 3.15

AIR SEAL SMALL PENETRATIONS IN A SUBFLOOR

SWS 3.0101.1, 3.0104.1



Many types of caulks and sealants will easily span and seal a 1/4-inch gap



One-part spray foams can also span up to 3 inches to create an air seal

TOOLS

- Caulk Gun
- Spray Foam Gun
- Utility Knife

NeWAP NOTES

- Caulking must be paintable and must be clear or a color complementary to the surface to which it is applied.
- Caulking installed around heat-producing sources must be specifically manufactured for installation around heat sources.
 - Expanding and non-expanding foam sealant may be used as an air sealing material.
- *Spray-applied insulation* may be used as an air sealing material.
- Mortar or mortar patch used to air seal must be a color complementary to the surface to which it is applied.
- *Sealing & repair materials to match the applied surface as close as possible.*

MATERIALS

- Caulk Sealant
- One-Part Spray Foam
- Backer Rod

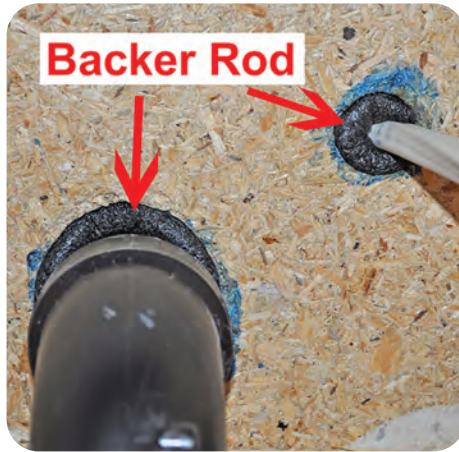
PPE



AIR SEAL SMALL PENETRATIONS IN A SUBFLOOR



1. For small penetrations, caulk or sealant is often enough to seal the gap



2. Use a backer rod or other infill material when sealing a gap larger than 1/4 inch with caulk



3. Seal over the backer rod to establish the air seal



4. Spray foam can also be used in areas with slightly larger penetrations

NeWAP NOTES

- Openings wider than than 1/4 inch must be packed with backing and/or infill material specifically designed as packing material prior to caulking.

Installation Standard 3.16

AIR SEAL LARGE PENETRATIONS IN A SUBFLOOR

SWS 3.0101.1, 3.0104.1



BEFORE

✗ Larger penetrations in the subfloor, especially plumbing chases, need to be air sealed



AFTER

✓ Depending on the size of the gap, one-part spray foam or a combination of infill material and foam or caulk can be used

NeWAP NOTES

- Openings wider than 1/4 inch must be packed with backing and/or infill material specifically designed as packing material prior to caulking.

TOOLS

- Measuring Tape
- Utility Knife
- Drill
- Spray Foam Gun
- Caulk Gun

MATERIALS

- One-Part Spray Foam
- Two-Part Spray Foam
- Caulk
- Extruded Polystyrene (XPS)
- Mechanical Fasteners

PPE



AIR SEAL LARGE PENETRATIONS IN A SUBFLOOR



1. One-part spray foam expands to fill large holes, but needs support for holes over 5 inches



2. For larger holes, rigid infill material is needed



3. Cut rigid infill with attention to locations of pipes and electrical



4. Secure rigid infill in place and seal smaller gaps around infill with appropriate materials



5. Use appropriate materials for high-temperature locations, such as around flues and chimneys

NeWAP NOTES

- Openings wider than than 1/4 inch must be packed with backing and/or infill material specifically designed as packing material prior to caulking.

Installation Standard 3.17

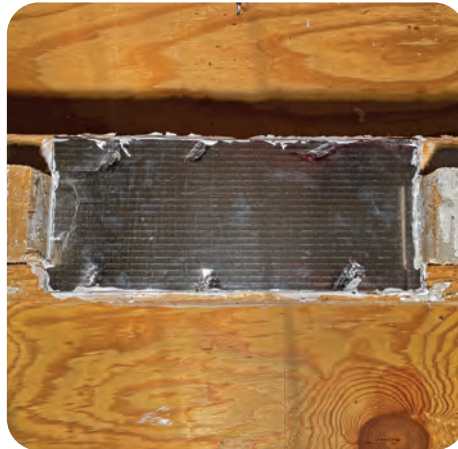
AIR SEAL BALLOON FRAMING AT SUBFLOOR

SWS [3.0101.1](#), [3.0102.4](#)



BEFORE

X Balloon-framed walls have an open cavity that runs from the *basement* to the *attic*, allowing for large amounts of air flow via *stack effect*



AFTER

✓ Securely sealing off these cavities prevents air movement, as well as providing a barrier to hold in insulation and providing fire blocking

TOOLS

- Measuring Tape
- Utility Knife
- Saw
- Drill
- Spray Foam Gun
- Caulk Gun
- Chip Brush

MATERIALS

- Extruded Polystyrene (XPS)
- Expanded Polystyrene (EPS)
- Gypsum Board
- Lumber
- Mechanical Fasteners
- 1-Part Spray Foam
- 2-Part Spray Foam
- Caulk
- Mastic

PPE



AIR SEAL BALLOON FRAMING AT SUBFLOOR



1. Measure opening



2. Cut blocking material to fit



3. Seal all edges with caulk, foam or mastic

NOTES

Spray foam will not be used in spaces that will be exposed to habitable living space.

Installation Standard 4.15

INSULATE A SUBFLOOR WITH BATTS ABOVE UNCONDITIONED SPACE

SWS [4.0301.1](#), [4.0301.6](#), [4.0302.1](#)



BEFORE

✗ Uninsulated, unconditioned spaces drive down the energy efficiency of HVAC systems



AFTER

FINAL CHECKLIST

- ✓ Vapor retarder faces warm side of floor
- ✓ Consistent cover across subfloor

TOOLS

- Measuring Tape
- Utility Knife
- Drill

MATERIALS

- Kraft-Faced Fiberglass Batts
- Strapping
- Netting
- Rigid Barrier Such as Extruded Polystyrene (XPS)
- Mechanical Fasteners

PPE



INSULATE A SUBFLOOR WITH BATTS ABOVE UNCONDITIONED SPACE



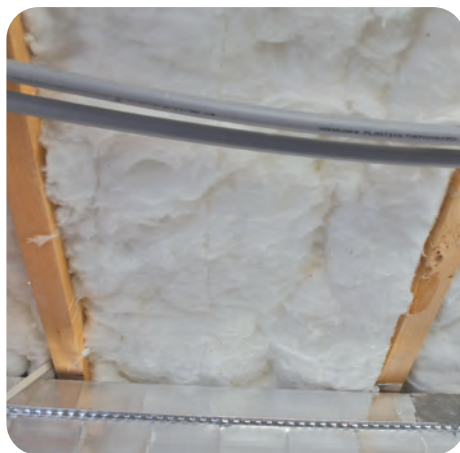
1. Ensure air sealing is complete



2. Insulation R-value matches work order



3. Batt vapor retarder faces warm side of floor



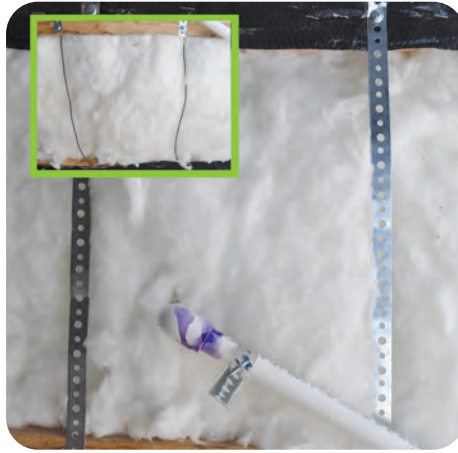
4. Batts installed with no gaps

NOTES

INSULATE A SUBFLOOR WITH BATTS ABOVE UNCONDITIONED SPACE



5. Batts are in good contact with subfloor



6. Batts held in place with physical fasteners, with minimal compression



7. In areas where exposure to outside elements or vermin may be a concern, such as cantilevered or *exposed floors*, a rigid barrier is an extra layer of protection

NeWAP NOTES

- *Exposed floors*, except over garages, must be insulated with batt or blown insulation and covered with exterior grade plywood or tar impregnated fiberboard and the seams must be caulked.
- *Exposed floors* over garages must be insulated with batt or blown insulation. Fire code drywall must be installed on open floor cavities over garages. The drywall must be taped and receive one coat of joint compound or the joints and seams must be caulked to form an airtight seal.



Installation Standard 4.16

INSULATE A SUBFLOOR WITH BLOWN INSULATION ABOVE UNCONDITIONED SPACE

SWS 4.0301.2, 4.0301.3, 4.0301.4, 4.0302.2, 4.0302.3

BEFORE YOU BEGIN



Uninsulated, *unconditioned* spaces drive down the energy efficiency of HVAC systems

Description /Comment

Floor Insulation - Loose-fill + Rigid Barrier - R-19

Floor Insulation - Loose-fill + Rigid Barrier - R-19

Floor Insulation - Loose-fill + Rigid Barrier - R-19

- ✓ Review work order to verify if *dense-pack* or loose fill is required. Netting a subfloor will mean loose fill, but a rigid barrier can mean either.

TOOLS

- Measuring Tape
- Utility Knife
- Scissors
- Caulk Gun
- Insulation Machine
- Pressure Gauge
- Hole Saw

MATERIALS

- Netting
- Rigid Barrier Such as Extruded Polystyrene (XPS)
- Staples
- Mechanical Fasteners
- Caulk
- Cellulose or Fiberglass Loose Insulation

PPE



INSULATE A SUBFLOOR WITH BLOWN INSULATION ABOVE UNCONDITIONED SPACE



1. Verify all air sealing and prep work is complete



2. Attach rigid barrier to cover entire cavity



3. Seal seams between sheets of rigid material to prevent air movement and insulation leakage



4. Cut an access hole into each cavity of the floor, large enough for fill tube



5. Use appropriate fill tube to correspond with work order requirements



6. Fill cavity completely to density required by work order

INSULATE A SUBFLOOR WITH BLOWN INSULATION ABOVE UNCONDITIONED SPACE



7. Plug access hole either with original material cut out or appropriate replacement



8. Seal around plug to keep it secure and air tight



9. For work orders that require netting, secure a smooth layer of netting across the bottom of floor joists

NOTES



10. Keep staples close together

INSULATE A SUBFLOOR WITH BLOWN INSULATION ABOVE UNCONDITIONED SPACE



11. Cover the entire cavity to ensure continuous insulation coverage and prevent insulation from blowing out the ends



12. Cut access hole for fill tube



13. Loose fill netting to required density



14. Ensure insulation coverage is even and continuous throughout floor cavities

NeWAP NOTES

- Cellulose material will be installed to a minimum density of 3.5 pounds per cubic foot
- Loose fiberglass material will be specifically approved for air flow resistance to a minimum density per the manufacturer's recommendations.

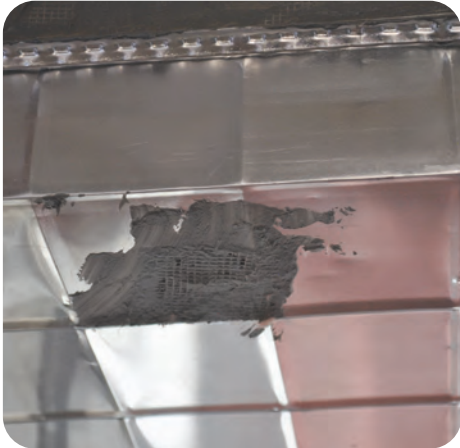
Installation Standard 4.29

INSULATE A MANUFACTURED HOME BELLY

SWS 4.0302.9, 4.0302.1, (3.0102.5, 3.0102.6, 3.0102.7)



BEFORE YOU BEGIN



CHECKLIST

- ✓ Air and duct sealing complete
- ✓ Electrical/plumbing issues fixed
- ✓ Belly board repaired/replaced

TOOLS

- Measuring Tape
- Utility Knife
- Drill
- Insulation Machine
- Pressure Gauge
- Saw

MATERIALS

- Belly Wrap
- Belly Board
- Caulk
- Mechanical Fasteners
- Mastic
- Spray Foam
- Extruded Polystyrene (XPS)

PPE



INSULATE A MANUFACTURED HOME BELLY



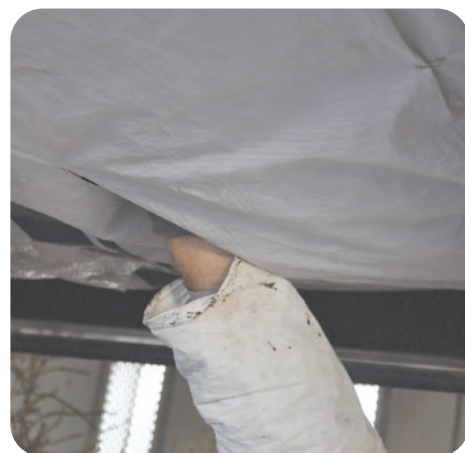
1. Remove old insulation and make repairs as needed



2. Attach new belly wrap



3. Seal seams of belly wrap



4. Cut access holes to ensure entire cavity will receive continuous and consistent insulation

NOTES

INSULATE A MANUFACTURED HOME BELLY



5. Fill entire belly cavity to prescribed R-value



6. Apply waterproof, permanent adhesive to patch for belly wrap, with patch sized at least 3 inches larger than hole in barrier



7. Stitch staple patch to ensure permanent adhesion

NOTES



Installation Standard 3.18

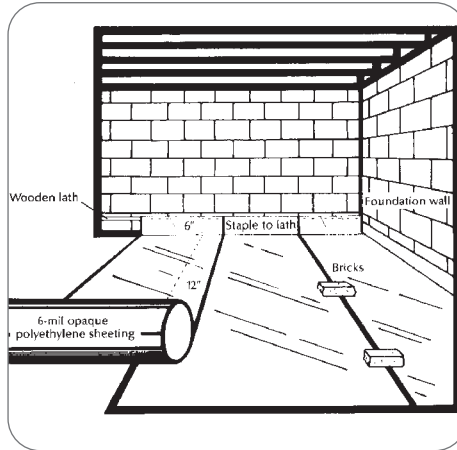
INSTALL A CRAWLSPACE VAPOR RETARDER

SWS 2.0202.1, 2.0202.2, 2.0202.3, (3.0104.1)



BEFORE

- ✗ Moisture and resultant mold issues in crawlspaces can cause extensive damage to floor assemblies and foundations



AFTER

- ✓ A well-installed vapor retarder helps to minimize ground moisture vapor and soil gas, such as radon

TOOLS

- Utility Knife
- Measuring Tape
- Caulk Gun

MATERIALS

- 6 Mil Plastic Sheeting
- Durable Adhesive Tape
- Furring Strips
- Mechanical Fasteners
- Ballast
- Sealant

PPE



95

INSTALL A CRAWLSPACE VAPOR RETARDER



1. Clear out storage and debris



2. Select appropriate materials



3. Spread out plastic as flat as possible

NOTES



4. Extend plastic a minimum of 6 inches up walls, piers and columns

INSTALL A CRAWLSPACE VAPOR RETARDER



5. Use a minimum 12" reverse shingle overlap and tape seams



6. Plastic needs to be fastened in durable way: e.g. tape, sealant, screws



7. Use ballast to hold down vapor retarder

NOTES

Installation Standard 3.19

REPAIR AN EXISTING CRAWLSPACE VAPOR RETARDER

SWS 2.0202.1, 2.0202.2, 2.0202.3, (3.0104.1)



BEFORE

✗ Improperly installed and damaged *vapor retarders* do not prevent moisture and resultant mold issues in crawlspace



AFTER

✓ A well-installed *vapor retarder* helps to minimize ground moisture vapor and soil gas, such as radon

TOOLS

- Utility Knife
- Measuring Tape
- Caulk Gun

MATERIALS

- 6-Mil Plastic Sheeting
- Durable Adhesive Tape
- Furring Strips
- Mechanical Fasteners
- Ballast
- Sealant

PPE



95

REPAIR AN EXISTING CRAWLSPACE VAPOR RETARDER



1. When repairing along the ground, ensure seams overlap uphill in a reverse shingle pattern



2. Overlap seams by at least 12 inches



3. Spread out plastic as flat as possible



4. Plastic needs to be fastened in durable way: e.g. tape, sealant



5. Ensure plastic extends a minimum of 6 inches up walls, piers and columns and is securely attached

NOTES

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

Installation Standard 6.1

VENT A CLOTHES DRYER

SWS 6.0202.1, (6.0101.1, 6.0101.2)



BEFORE

✗ Dryer vents with long bumpy runs create a fire hazard



AFTER

✓ When properly vented, dryers run more efficiently, are safer, and last longer

TOOLS

- Metal Snips or Grinder
- Flathead Screwdriver
- Utility Knife

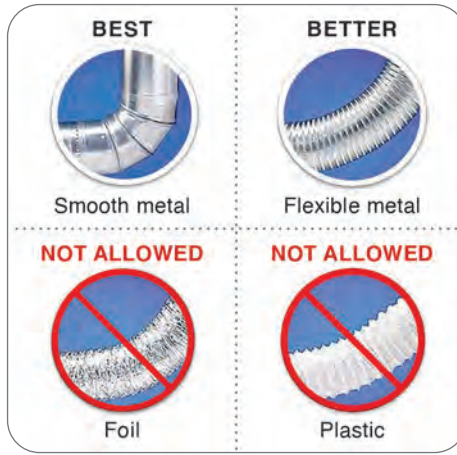
MATERIALS

- 28-Gauge Rigid or Semi-Rigid Metal Ducting
- Worm-Drive Clamps
- Backdraft Damper
- Duct Insulation
- Foil Tape

PPE



VENT A CLOTHES DRYER



1. Keep duct run as short as possible to prevent backup of lint

2. Duct material is metal rigid or semi-rigid

3. Correct fasteners are used (no screws penetrating into duct)

NOTES



4. Duct terminates to outside, at a downward slope when possible

VENT A CLOTHES DRYER



5. Termination has *backdraft damper* and no cage



6. Duct in uninsulated space is insulated



7. If duct run must exceed 35 feet, install booster fan

NeWAP NOTES

- Existing unvented clothes dryers must be vented to the exterior of the home.
- Dryer vent pipe must not be installed with sheet metal screws, rivets or other intrusive fasteners that will collect lint. Acceptable fasteners include clamps, straps and duct mastic with mesh tape.
- Dryer vent pipe must be metal.
- Dryer vent ductwork must be smooth surfaced and whenever possible and must not exceed 14 feet in length.
- No more than two 90 degree elbows may be used in the vent system.
- Relocation of dryers may need to be considered to meet this vent pipe length limitation.
- Flexible metal vent pipe not exceeding 8 feet in length may be used to vent a dryer. It must not be installed with sheet metal screws, rivets or intrusive fasteners that will collect lint.

Installation Standard 6.2

INSTALL EXHAUST FAN FLEX DUCT (BATH FAN ONLY)

SWS [6.0101.1](#), [6.0101.2](#), [6.0201.1](#)



BEFORE

✗ Exhausting moisture from bath fans into the attic or crawlspace can cause mold and rot in building materials



AFTER

✓ Bath fans must exhaust to the exterior of the home

TOOLS

- Measuring Tape
- Utility Knife
- Zip Tie Tensioner
- Drill

MATERIALS

- Flex Ducting with R-8 Insulation (unless ducting will be buried in insulation)
- Zip Ties
- Support Strapping
- Mechanical Fasteners

PPE



* if going in attic

INSTALL EXHAUST FAN FLEX DUCT (BATH FAN ONLY)



1. Ensure proper connection of duct to bath fan



2. Ensure flex ducting runs smoothly with no kinks or u-turns



3. Create the shortest run possible to an exterior termination and provide adequate support as needed without compressing the duct

NeWAP NOTES

- The NeWAP limits new metal flexible ducts to four (4) feet or less.
- Bathroom and Kitchen exhaust fans must be vented to the exterior.
- Horizontal runs and elbows should be avoided.
- If the exhaust vent is terminated through the soffit, caution must be taken to avoid moisture collecting in the vent pipe.
- Flexible plastic ducting is not allowed.

Installation Standard 6.3

INSTALL A HARD-DUCTED EXHAUST VENT



SWS [6.0101.1](#), [6.0101.2](#), [6.020](#) [6.0201](#)



X Kitchens and bathrooms must be ventilated to control moisture, vapor, and combustion gases

- ### TOOLS
- Measuring Tape
 - Hole Saw
 - Drill
 - Caulk Gun

- ### MATERIALS
- Mastic
 - Brush
 - Foil Tape
 - Duct Insulation
 - 28-Gauge Ducting
 - Vent Termination
 - Caulk

AFTER

KITCHEN CHECKLIST

- ✓ Located within 5 feet of primary cooking surface
- ✓ At least 100 *cfm* but not more than 3 sones
- ✓ Efficacy of 2.8 *cfm*/watt or more

BATHROOM CHECKLIST

- ✓ Located in center of room
- ✓ At least 50 *cfm* but not more than 2 sones
- ✓ Efficacy of 4 *cfm*/watt or more

PPE



* if going in attic **weather dependent if going in attic

INSTALL A HARD-DUCTED EXHAUST VENT



1. Fasten rigid duct using three equally spaced screws



2. Keep duct run as short as possible with few turns, and run to exterior – either via roof or sidewall



3. Seal all joints with mesh and mastic or foil tape

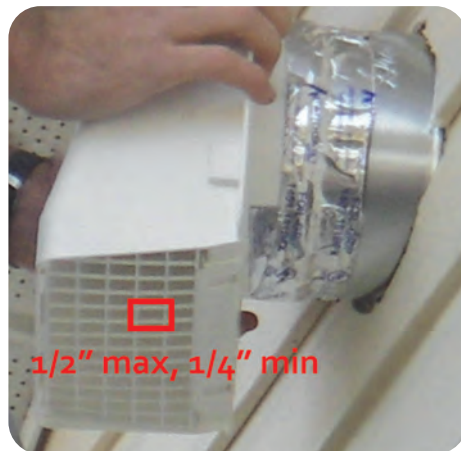
NeWAP NOTES

- Bathroom and Kitchen exhaust fans must be vented to the exterior.
- Exhaust vent piping must be fastened at all connections with sheet metal screws or rivets.
 - Galvanized steel, stainless steel or copper must be used for termination fitting for kitchen range exhaust.



4. Completely seal joints

INSTALL A HARD-DUCTED EXHAUST VENT



5. Locate exterior vent based on duct run and size hole less than 1/2 inch larger than duct

6. Chose appropriate exterior termination to match size of duct while minimizing water intrusion and pest infestation. Seal around exterior termination as needed

7. Ducting that runs through *unconditioned* space will be insulated to R-8

NOTES

Installation Standard 6.4 SEAL DUCTS WITH MASTIC

SWS [5.0106.1](#), [6.0101.2](#), [6.0101.3](#), ([5.0105.1](#), [5.0105.2](#), [5.0105.3](#))



CHECKLIST

- ✓ Ensure ducts are properly connected
- ✓ Ensure ducts are properly supported

TOOLS

- Drill
- Zip Tie Tensioner
- Caulk Gun

MATERIALS

- Mastic
- Fiberglass Mesh Tape
- Chip Brush
- Mechanical Fasteners
- 26-Gauge Metal Sheeting
- Duct or Electrical Tape (for temporary use)
- Flexible Caulking
- Butyl Tape

NOTES

Mastic alone can be used for gaps < 1/8-inch, when gap is located more than 10 inches from air handler and static pressure is less than 1 iwc.

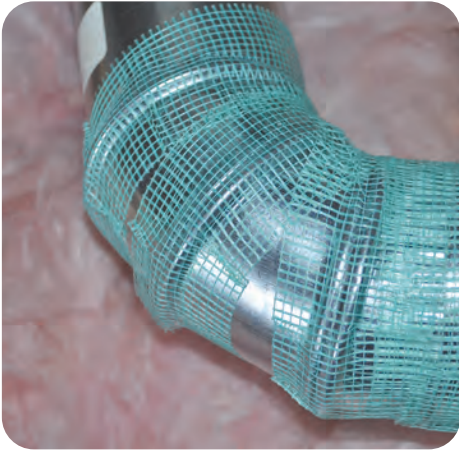
PPE



* location dependent **weather dependent

SEAL DUCTS WITH MASTIC

METHOD A – FOR SMALL GAPS (LESS THAN 1/4 INCH) INCLUDING ALL JOINTS, SEAMS, AND CRACKS IN DUCT SYSTEM



A-1. Apply fiberglass mesh tape over all gaps, seams, joints, etc.



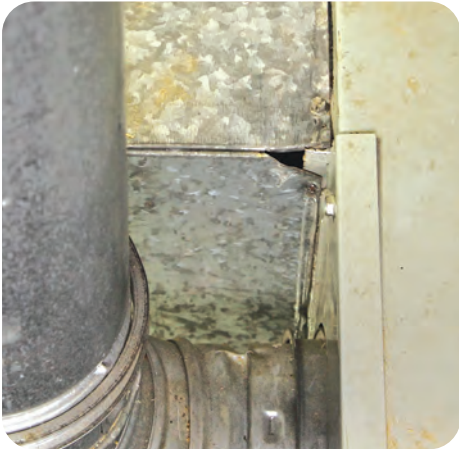
A-2. Apply mastic over all mesh tape and all gaps, seams, joints, etc.

NeWAP NOTES

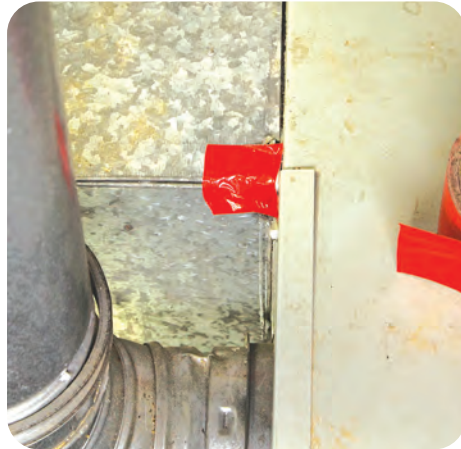
- Tears and joints must be sealed using non-toxic and water-resistant mastic.
- Mesh tape must be used when openings and tears are over 1/16 of an inch.
- Appropriate manufacturer recommended sealing tape may be used only when the installation of mastic is not feasible.

SEAL DUCTS WITH MASTIC

METHOD B - FOR MEDIUM GAPS (1/4-3/4 INCH) SUCH AS MINOR HOLES AND PENETRATIONS IN DUCT SYSTEM



B-1. Small holes and penetrations require one additional step



B-2. Apply temporary tape as a backer to hold mastic



B-3. Apply mastic over the tape



B-4. Push fiberglass mesh into the mastic

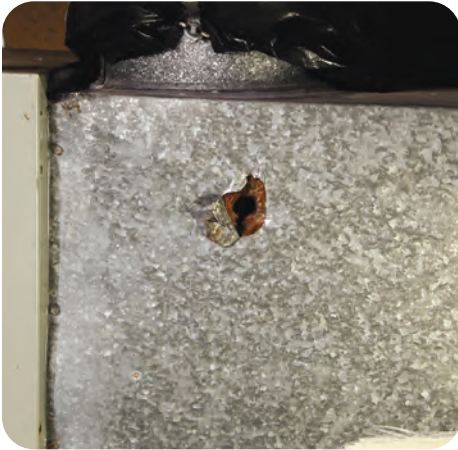


B-5. Apply additional mastic over mesh and tape, extending at least 1 inch past edges of tape in all directions

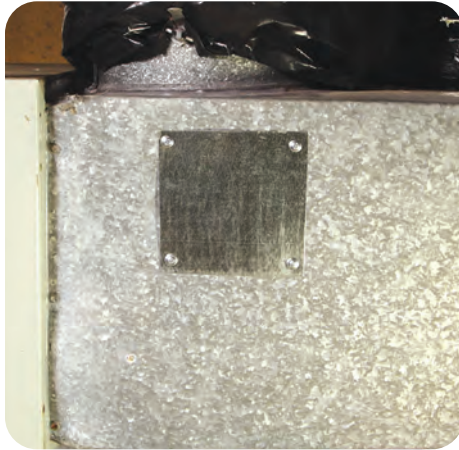
NOTES

SEAL DUCTS WITH MASTIC

METHOD C - FOR LARGER GAPS OR HOLES (OVER 3/4 INCH)



C-1. Larger holes require a different process



C-2. Cut patch that will extend over entire gap or hole and affix with mechanical fasteners



C-3. Apply mastic over edges and fasteners of patch and push fiberglass mesh into it



C-4. Apply additional mastic over mesh, extending at least 1 inch past tape and seam in all directions

NOTES

SEAL DUCTS WITH MASTIC

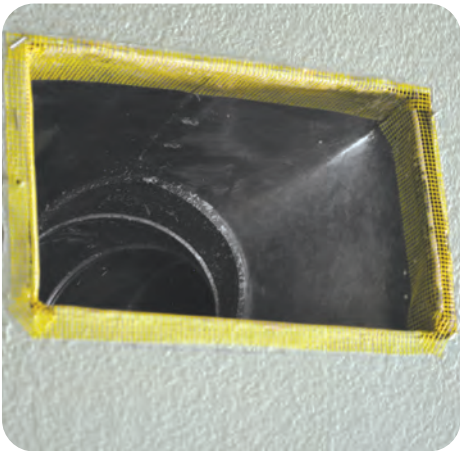
METHOD D - CONNECTIONS BETWEEN DUCT BOOT AND SURFACE



D-1. Often, holes for duct boots are cut too large and leave gaps around the boot as a path for air leakage



D-2. Clean the area around the duct boot to allow for better adhesion of fiberglass mesh tape



D-3. Apply fiberglass mesh tape bridging from duct boot interior to surface, taking care not to extend past what will be covered by register



D-4. Apply mastic over mesh and allow to dry completely before reinstalling register

NOTES

SEAL DUCTS WITH MASTIC

METHOD E - AT THE AIR HANDLER



E-1. Ensure that filter slot cover is removable so that occupant can change filter as needed, but does not allow for bypass air around air filter



E-2. Seal unnecessary holes in air handler cabinet with butyl tape

NOTES

Installation Standard 4.17

INSULATE HARD PIPE DUCTS

SWS 5.0107.1, 5.0105.2, (6.0202.1)



BEFORE YOU BEGIN

VERIFY DUCTS ARE:

- ✓ Connected properly
- ✓ Supported properly
- ✓ Air-sealed properly

AFTER

Well-supported and uniformly-insulated ducts perform at higher efficiency

TOOLS

- Measuring Tape
- Utility Knife

MATERIALS

- Duct Insulation (min R-8) with Exterior Vapor Retarder
- UL-181 Tape
- Twine
- Zip Ties

PPE



* location dependent **weather dependent

INSULATE HARD PIPE DUCTS



1. Layer insulation around duct, fitting between duct and construction members as necessary and able



2. Tape joints to secure insulation in place



3. Insulation will not be compressed



4. Tape around circumference of duct at regular intervals



5. Twine or zip ties can also be used to offer additional support for insulation – but need not to cause compression on the insulation

NeWAP NOTES

- Appropriate manufacturer recommended sealing tape may be used only when the installation of mastic is not feasible.
- The insulation must have a vapor barrier installed to the exterior and the joints be sealed with mastic caulking or butyl tape.
- Ductwork must be insulated with a minimum R-8 secured with cord, wire, plastic or nylon bands.
- Fiberglass duct liner must not be installed.

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

Installation Standard 4.18

INSULATE FLEX DUCTS

SWS 5.0107.1, 5.0105.2



BEFORE YOU BEGIN

VERIFY DUCTS ARE:

- ✓ Connected properly
- ✓ Supported properly
- ✓ Air-sealed properly

AFTER

Ducts in *unconditioned* spaces require a minimum R-8 insulation. If exposed to the exterior, R-12.

TOOLS

- Measuring Tape
- Utility Knife
- Zip Tie Tensioner

MATERIALS

- Duct Insulation (min R-8) with Exterior Vapor Retarder
- UL-181 Tape
- Twine
- Zip Ties

PPE



* location dependent **weather dependent

INSULATE FLEX DUCTS



1. Secure duct liner to hard connections with zip tie and tensioner tool



2. Pull insulation over hard connections as needed



3. Secure *vapor retarder* layer at boots



4. Seal new joints

NOTES

Installation Standard 4.19

INSULATE SUPPLY BOOTS

SWS 5.0107.1, 5.0107.2



✘ Exposed duct boots are a prime location for energy loss

BEFORE YOU BEGIN

Ensure ducts are:

- ✓ Properly connected
- ✓ Properly supported
- ✓ Properly air-sealed

TOOLS

- Measuring Tape
- Utility Knife
- Zip Tie Tensioner

MATERIALS

- R-8 Minimum Flex Duct insulation
- Duct Insulation with Vapor Retarder
- Water Heater Blanket with Vapor Retarder
- Zip Ties
- Twine
- Spray Adhesive
- Mastic
- UL 181 Fiberglass Mesh Tape

PPE



INSULATE SUPPLY BOOTS



1. Insulate all exposed metal of the boot



2. Ensure a complete vapor barrier by sealing all seams with mastic

NOTES

• R-8 minimum for ducts in unconditioned spaces.

• R-12 minimum for ducts exposed to outside elements.

Installation Standard 4.20

INSULATE PLENUM

SWS [5.0107.1](#)



BEFORE

- ✗ Return and supply plenums left uninsulated with contact to *unconditioned* spaces allow for energy loss



AFTER

FINAL CHECKLIST

- ✓ Ducts are connected properly
- ✓ Ducts are supported properly
- ✓ Ducts are air-sealed properly

TOOLS

- Measuring Tape
- Utility Knife

MATERIALS

- R-8 Minimum Duct Insulation
- Spray Adhesive
- Twine
- Mechanical Fasteners
- Extruded Polystyrene
- Gypsum Board
- Mastic
- UL-181 Mesh Tape
- Butyl Tape

PPE



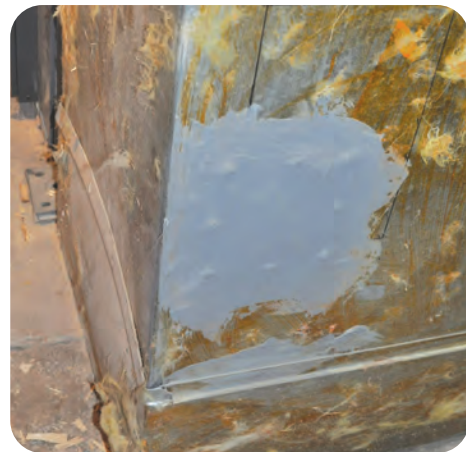
INSULATE PLENUM



1. Cover any unnecessary holes in the air handler cabinet



2. Check return cavities inside *building envelope* to ensure they are sealed off from *unconditioned spaces*



3. Patch holes in ducts and plenum with appropriate materials (see 6.4 Seal Ducts with Mastic)

NOTES

Expanded Polystyrene (EPS) is not appropriate for use in high-temperature areas -- particularly inside framed return platforms.



4. Prepare plenum by removing any residue from old insulation

INSULATE PLENUM



5. Measure insulation to take maximum advantage of large sheets of duct insulation



6. Cut to size for area to be covered. Insulate all exposed metal of the plenum

NOTES



7. To ensure a complete *vapor barrier*, trim insulation from *vapor barrier* to create overlap flap for seams, or tape seams with UL-181 tape



8. Ensure clean surface for adhesion at overlap seam



9. Spray adhesive over area where piece will be installed

INSULATE PLENUM



10. Ensure smooth and unrippled adhesion of insulation to metal of plenum



11. Spray adhesive along *vapor retarder* at seam to seal closed



12. Ensure overlapping flap securely adhered to the lower layer to maintain complete *vapor barrier*, or tape seams with UL-181 tape



13. Support insulation to prevent movement over time, securing in place without puncturing *vapor retarder*

NOTES

Installation Standard 3.20

WINDOW INSTALLATION

SWS 3.0201.9



BEFORE

- ✗ Single pane aluminum-frame windows offer little to no thermal break from outdoors



AFTER

FINAL CHECKLIST

- ✓ Window opens and closes properly
- ✓ All exterior edges are air-sealed
- ✓ Water will flow away from window

NOTES

Check file for age of house and complete any required lead testing before work begins.

TOOLS

- Measuring Tape
- Utility Knife
- Drill
- Spray Foam Gun
- Vacuum

MATERIALS

- Plastic Sheeting
- Shims
- Flashing Tape
- Mechanical Fasteners
- Backer Rod
- Spray Foam

PPE



WINDOW INSTALLATION



1. Measure window to be replaced



2. Remove existing window



3. Clean up sash or jam and repair any issues



4. Replace flashing as needed



5. Dry fit window



6. Level the window using shims and secure with mechanical fasteners

Tools and materials listed are only recommendations and may not include everything needed to complete the job.

WINDOW INSTALLATION



7. Ensure window is operational



8. Caulk all exterior edges



9. Insulate and seal rough opening with backer rod and/or spray foam



10. Replace trim

NOTES

Installation Standard 3.21

DOOR INSTALLATION

SWS 3.0202.2



BEFORE

X In rare cases, doors are too damaged to be retrofitted and must be replaced



AFTER

FINAL CHECKLIST

- ✓ Weatherstrip and door bottom installed
- ✓ Door opens and closes properly
- ✓ All exterior trim is caulked
- ✓ Water will flow away from the door

NOTES

Check file for age of house and complete any required lead testing before work begins.

PPE



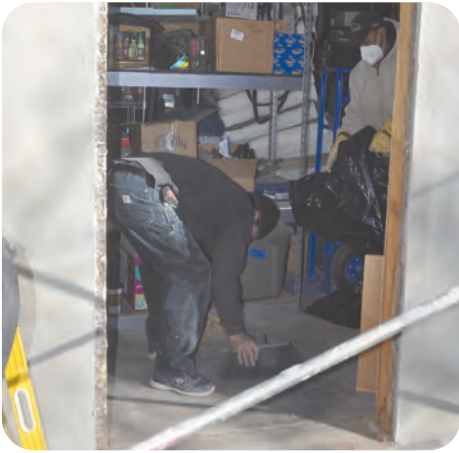
TOOLS

- Measuring Tape
- Utility Knife
- Saw
- Drill
- Level
- Caulk Gun
- Spray Foam Gun
- Jamb Saw

MATERIALS

- Lumber
- Shims
- Mechanical Fasteners
- Adhesive
- Spray Foam
- Caulk
- Insulation
- Weatherstrip
- Door Bottom
- Lock set

DOOR INSTALLATION



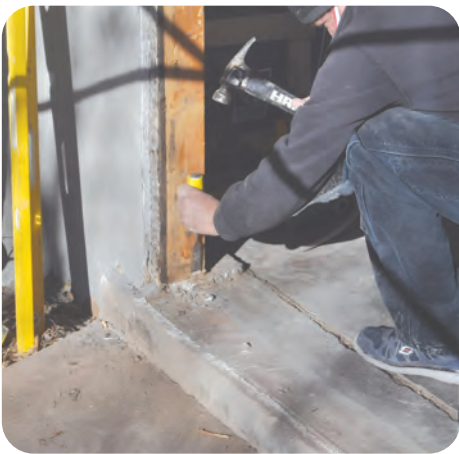
1. Remove old door and clear away debris



2. Measure opening and ensure that the door on location is the proper size



3. Prepare opening by ensuring that jacks are plumb and threshold is level



4. Frame in and adjust opening as necessary to accommodate new door



5. Attach flashing, if necessary, to protect any new materials from water intrusion



6. Using shims, locate door in frame, adjusting for level and plumb, and attach securely

NeWAP NOTES

- All door casings must be caulked.
- Doors must conform to the thickness of the existing jamb and have three (3) hinges.
- If trimming the bottom of the door is required; the door must be trimmed at a 5 degree an

DOOR INSTALLATION



7. Ensure door is fully operational and lock set is aligned



8. Insulate gaps between door jamb and frame



9. Seal rough opening, to prevent both air and water intrusion



10. Replace trim



11. Seal along threshold, ensuring water will flow away from door

NeWAP NOTES

- The new door must have an NFRC (National Fenestration Rating Council) tested U-factor of 0.17 or lower.
- Existing locksets may be re-installed on the new door.
- If a new lockset is installed, 2 keys must be provided to client.
- Any safety lock installed on the existing door must be removed and reinstalled on the new door

NeWAP NOTES

- The existing casing may be reinstalled. If new casing is needed, the casing must match the existing as closely as possible.
- Cavities around the door frame must be insulated or sealed with non-expanding foam sealant.

Installation Standard 3.22

WINDOW GLASS REPLACEMENT

SWS 3.0201.1, 3.0201.4



BEFORE

✗ Broken, cracked or missing glass breaks the pressure and thermal boundary



AFTER

✓ Newly installed glass is sealed to prevent air and water *infiltration*

NOTES

Check file for age of house and complete any required lead testing before work begins.

TOOLS

- Heavy Work Gloves
- Glass Cutter
- Scraping Tool

MATERIALS

- Cleaning Solution
- New Window Pane
- Silicone Caulk
- Window Glazing
- Tape

PPE



WINDOW GLASS REPLACEMENT



1. Remove all broken glass



2. Clean all debris, caulk, etc., from sash



3. Measure rough opening for pane, size pane 1/8-3/16 inches less than RO

NOTES



4. Run interior bead of caulk

WINDOW GLASS REPLACEMENT



5. Install new glass, using tempered where code requires, that meets or exceeds previous glazing



6. Hold new pane with tape or stops



7. Caulk all edges

NOTES

Installation Standard 7.1 INSULATE AN ELECTRIC DOMESTIC WATER HEATER

SWS 7.0301.2



TOOLS

- Utility Knife

BEFORE YOU BEGIN

Check data plate on water heater to find existing insulation level (if any) and verify additional insulation is not prohibited

AFTER

- ✓ A properly insulated water heater safely reduces standby losses

MATERIALS

- Water Heater Insulation Blanket
- Foil Tape
- Tie Strap
- Wire
- Twine

PPE



95

INSULATE AN ELECTRIC DOMESTIC WATER HEATER



1. Insulate tank with minimum R-10 or better



2. Ensure a continuous *vapor barrier* with no gaps



3. Do not obstruct temperature and pressure relief valve (T&P)



4. Tape all seams and edges airtight



5. Cut flaps at access plates, tape them shut and then label from the exterior



6. Secure seams with tie strap, wire or twine and minimal compression

NOTES

- Electric water heaters must have the top insulated and the thermostat control access panels accessible or marked and labeled.
- Insulation must not cover the pressure relief valve end of the drip leg, high limit switch, plumbing pipes, or drain valve on electric water heaters.

Installation Standard 7.2

INSULATE A GAS DOMESTIC WATER HEATER

SWS 7.0301.2



TOOLS

- Utility knife

BEFORE YOU BEGIN

Check data plate on water heater to find existing insulation level (if any) and verify additional insulation is not prohibited

AFTER

- ✓ A properly insulated water heater safely reduces standby losses

MATERIALS

- Water Heater Insulation Blanket
- Foil Tape
- Tie Strap
- Wire
- Twine

PPE



95

INSULATE A GAS DOMESTIC WATER HEATER



1. Insulate tank with minimum R-10 or better



2. Ensure a continuous *vapor barrier* with no gaps



3. Cut insulation to allow 6-inch space to draft diverter and flue pipe

NeWAP NOTES

- Insulation must not cover the pressure relief valve, end of drip leg, draft hood, burner air inlet, pilot light access door, thermostat control, drain valve or the top of the water heater on natural gas or propane water heaters.



4. Do not obstruct burner access plate or combustion air intake

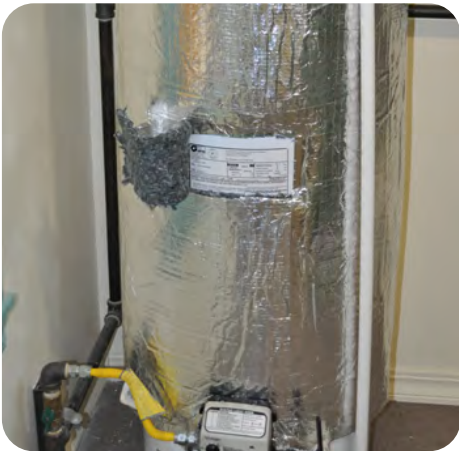
INSULATE A GAS DOMESTIC WATER HEATER



5. Do not obstruct temperature and pressure relief valve (T&P)



6. Tape all seams and edges airtight



7. Cut flaps at access plates, tape them shut and then label from the exterior



8. Secure seams with tie strap, wire or twine and minimal compression

NOTES



Installation Standard 7.3 INSULATE DOMESTIC HOT WATER (DHW) PIPES

SWS 7.0301.1



Insulate pipes to a minimum R-3 at least 6 feet from DHW on both hot and cold lines

Insulation should be continuous with no gaps

TOOLS

- Utility Knife
- Measuring Tape

NeWAP NOTES

- Water lines that have asbestos pipe wrap must not be insulated or sealed in the area containing asbestos.
- Water lines must be a minimum of 6 feet of the hot and 6 feet of the cold in all directions from the water heater using properly sized preformed pipe wrap or insulation specifically designed as pipe wrap.
- Each section of preformed pipe wrap must be fastened with a minimum of 3 wire, cord, plastic or nylon bands.
- Joints and elbows must be insulated.
- Duct tape must not be used as a means of fastening the pipe wrap.
-

MATERIALS

- Pipe Insulation
- Tape or Tie Straps

PPE

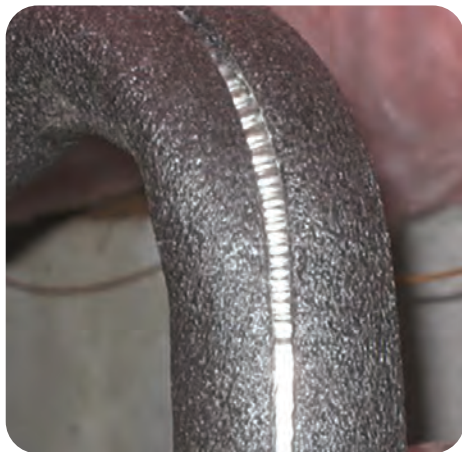


95

INSULATE DOMESTIC HOT WATER (DHW) PIPES



Keep insulation back at least 6 inches from draft diverter and single wall pipe



Do not rely on manufactured adhesive seam seal to hold closed



Secure seams with tape



When path is partially obstructed or curved, shape insulation to the location to eliminate gaps

NOTES

Installation Standard 7.4

INSTALL A LOW-FLOW SHOWERHEAD

SWS [7.0201.1](#)



BEFORE

✗ Higher flow showerheads waste water and cause water heaters to run more than necessary



AFTER

✓ Low-flow showerheads must be 2.5 gallon per minute (gpm) or less flow rate, to reduce heating load and encourage lower water use.

TOOLS

- Adjustable Wrench
- Pipe Wrench
- Channel Locks
- Buffer Material
- Rag
- Toothbrush/Wire brush

MATERIALS

- Thread Tape
- New Showerhead

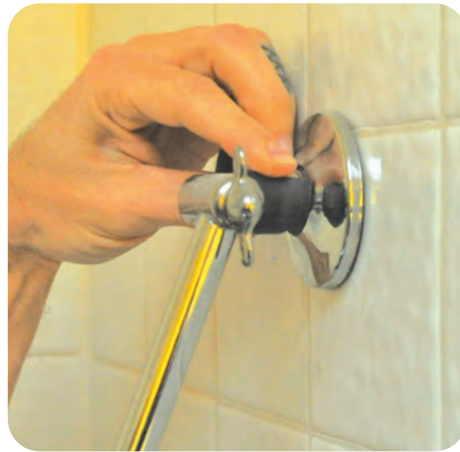
PPE



INSTALL A LOW-FLOW SHOWERHEAD



1. Carefully remove old showerhead with adjustable wrench, taking care not to loosen shower arm



2. If old showerhead does not have flat sides at connection, wrap with buffer material, such as a piece of rubber



3. Then use pipe wrench or channel locks to loosen connection at shower arm



4. Clean threads of shower arm well to remove old residue



5. Wrap new thread tape around threads



6. Install new showerhead according to occupant needs, such as hand-held, shutoff or swivel

INSTALL A LOW-FLOW SHOWERHEAD



7. Ensure that connections will not leak while preventing damage by using buffer material



8. Use thread tape at all connections



9. Verify proper water flow and that there are no leaks

NOTES

Installation Standard 7.5

INSTALL A LOW-FLOW FAUCET AERATOR

SWS 7.0201.1



BEFORE

✗ Faucets without aerators produce excess flow and old aerators can impinge flow or cause leakage



AFTER

✓ Low-flow faucet aerators limit flow to 2.2 gpm or less and reduce heating load by encouraging lower water use

TOOLS

- Adjustable Wrench/
Aerator Wrenches
- Soft Rag

MATERIALS

- Thread Tape
- WaterSense Aerator

PPE



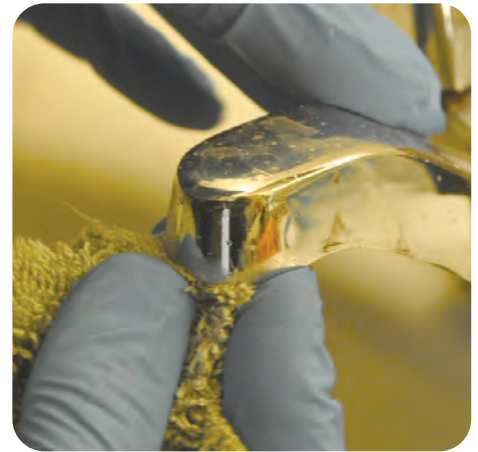
INSTALL A LOW-FLOW FAUCET AERATOR



1. Using adjustable wrench or aerator wrench, gently remove old aerator, taking care not to damage faucet



2. Once loose, continue removal by hand



3. Clean threads of the faucet with a soft rag to remove any debris



4. Verify size and type of aerator will work with faucet



5. Wrap thread tape around new aerator if male, or faucet threads if it takes a female aerator



6. Carefully install new aerator, ensuring any necessary rubber washers are in place and taking care not to cross-thread

INSTALL A LOW-FLOW FAUCET AERATOR



7. Do not overtighten aerator
8. Run water through new aerator to verify it is not cross-threaded and no water is leaking around sides
9. Remove old aerator from property and permanently dispose of it

NOTES

For kitchen sinks, 1.0-1.5 gpm save water without affecting performance. For lavatory sinks, as low as 0.5 gpm is adequate.

Installation Standard 6.5 INSTALL ROOF VENT

SWS 6.0101.2, 6.0201.1, 6.0201.2, 4.0188.2



BEFORE

- ✗ Kitchens, bathrooms, and attics all have requirements for ventilation to the exterior, as well as dryer and combustion exhaust venting



AFTER

- ✓ A properly installed vent preserves the integrity of the roof

TOOLS

- Measuring Tape
- Drill
- Hole Saw
- Caulk Gun
- Utility Knife
- Mastic Brush

MATERIALS

- Vent with Collar
- Caulk
- Mechanical Fasteners
- Joint Tape
- Mastic

PPE



* if going in attic **location dependent ***weather dependent ****if using power tools

INSTALL ROOF VENT



1. Determine the appropriate vent dependent on its use – attic ventilation, kitchen hood, bath fan, dryer exhaust (these should ideally be lower), or combustion exhaust



2. Locate ideal hole location from attic side of roof deck and drill center hole



3. Mark out size and location of hole on roof deck, verifying size of termination collar



NeWAP NOTES

- Attic vents must be installed prior to insulating.
- Venting must not be installed on metal roofs.
- Attics with metal roofs that cannot be vented must not be insulated.
- Attics with no *vapor retarder* must have a minimum of 1 square foot of net free vent area for every 150 square feet of attic area.
- Attics with a *vapor retarder* must have a minimum of 1 square foot of net free vent area for every 300 square feet of attic area.
- In attics with over 300 square feet of attic area, vents must be located to provide the most adequate venting opportunity.

INSTALL ROOF VENT



4. From roof side, cut hole slightly larger than termination collar. If shingle roof, cut just below one layer of shingles in order to preserve overlap



5. Run sealant around perimeter of vent and tuck under any surrounding uphill shingles. Seal uphill shingles over vent



6. Collar should extend down through roof into attic



7. Slide vent ducting to collar, sized to match the duct diameter, and attach with mechanical fasteners



8. Seal duct joints with mesh and mastic to complete vent installation. Insulate as required

INSTALL ROOF VENT

NeWAP NOTES

- Soffit vents should be installed with the fins facing towards the house with rust proof, pan-headed screws.
- Gable vents should be set in caulking and nailed or screwed in place using rust proof fasteners.
- The vents must be trimmed.
- Gable vents installed in siding without sheathing behind it must have the vent framed.
- Roof, turbine and ridge vents must be sealed roofing tar and attached with roofing nails.
- Roof vents must be centered within 2 feet of the ridge or peak of the roof.
- Shingles must overlap the top half of the roof vent flange. The bottom half of the vent's flange must be exposed on top of the shingles.
- Roof, turbine and ridge vents are considered to be high or exhaust vents, while soffit and gable vents are considered to be low or intake vents.
- Roof vents should not be installed over framing members. If vents must be installed over framing members, care must be taken to insure that the rafters are not cut. The roof vent opening is to be framed.

Installation Standard 6.6

LOCATE AN EXTERIOR TERMINATION



✓ SWS 6.0101.2

Locate all exhaust terminations to the outside – not attics



- ✓ At least 3 feet from the property line



- ✓ At least 3 feet from all operable openings



- ✓ At least 10 feet from a mechanical intake



- ✓ If near soffit, no open soffit venting for at least 6 feet on each side

NOTES

See these Job Aids for PPE for appropriate termination installations

6.1 Vent a Clothes Dryer

6.2 Install Exhaust Fan Flex Duct (Bath Fan Only)

6.3 Install a Hard-Ducted Exhaust Vent

6.5 Install Roof Vent

Index of Standard Work Specifications Referenced:

**Note: Inclusion on this list does not imply that every Specification within the cited Detail is addressed in the Field Guide/Appendices. Job Aids in parentheses () presume referenced SWS has been followed.

2020 SWS	Detail Title	Installation Standard
<u>2.0101.1</u>	Hardwired (interconnected) Smoke Alarms	<u>A-2</u>
<u>2.0101.2</u>	Battery-Operated Smoke Alarms	<u>A-2</u>
<u>2.0102.1</u>	CO Detection and Warning Equipment	<u>A-2</u>
<u>2.0202.1</u>	Un-Vented Subspaces – Ground Cover	<u>3.18, 3.19</u>
<u>2.0202.2</u>	Vented Subspaces – Ground Cover	<u>3.18, 3.19</u>
<u>2.0202.3</u>	Pier and Skirting Foundations – Ground Cover	<u>3.18, 3.19</u>
<u>3.0101.1</u>	Air Sealing Holes	<u>3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.10, 3.11, 3.15, 3.16, 3.17</u>
<u>3.0102.1</u>	Sealing Non-Insulation Contact Recessed Light	<u>3.9</u>
<u>3.0102.2</u>	Sealing High-Temperature Devices	<u>3.8</u>
<u>3.0102.4</u>	Sealing Firewalls	<u>3.4, 3.17</u>
<u>3.0102.5</u>	MH Belly Repair – Soft Bottom Patching	<u>(4.29)</u>
<u>3.0102.6</u>	MH Belly Repair – Soft Bottom Replacement	<u>(4.29)</u>
<u>3.0102.7</u>	MH Belly Repair – Rigid Bottom Patching	<u>(4.29)</u>
<u>3.0102.9</u>	Sealing Dropped Soffits/Bulkheads	<u>3.2</u>
<u>3.0102.11</u>	Sealing Roof/Wall Connections	<u>3.1, 3.10</u>
<u>3.0103.1</u>	Access Doors and Hatches	<u>4.2, 4.3</u>
<u>3.0104.1</u>	Closed Crawlspace Air Sealing	<u>3.14, 3.15, 3.16, (3.18, 3.18)</u>
<u>3.0201.1</u>	Window Air Sealing	<u>3.20</u>
<u>3.0201.4</u>	Glass Replacement	<u>3.22</u>
<u>3.0201.9</u>	Window Replacement	<u>3.20</u>
<u>3.0202.1</u>	Door Air Sealing	<u>3.12, 3.13</u>
<u>3.0202.2</u>	Door Replacement	<u>3.21</u>
<u>4.0103.1</u>	Accessible Attic – Batt Installation	<u>4.1</u>
<u>4.0103.2</u>	Accessible Attic – Loose Fill Installation	<u>4.1, 4.4</u>
<u>4.0103.3</u>	Accessible Attic – Batt Insulation over Existing Insulation	<u>4.1</u>
<u>4.0103.4</u>	Accessible Attic – Loose Fill over Existing Insulation	<u>4.1, 4.4</u>
<u>4.0103.5</u>	Accessible Attic – SPF on Attic Floor	<u>4.1</u>
<u>4.0103.6</u>	Accessible Attic – Dense Pack Insulation	<u>4.1, 4.4, 4.23</u>
<u>4.0103.8</u>	Loose Fill to Capacity	<u>4.1</u>
<u>4.0103.9</u>	MH – Blown Insulation via Gable End Access	<u>4.23, 4.24</u>
<u>4.0103.10</u>	MH – Blown Insulation via Roof Side Lift Access	<u>4.23, 4.25</u>
<u>4.0103.11</u>	MH – Blown Insulation via Roof Top Access	<u>4.23, 4.26, 4.28</u>
<u>4.0103.12</u>	MH – Blown Insulation via Interior Access through the Ceiling	<u>4.23, 4.27</u>
<u>4.0104.1</u>	Knee Wall – Dense Packing	<u>4.6, 4.9</u>
<u>4.0104.2</u>	Knee Wall – Batt Insulation	<u>4.6, 4.3</u>
<u>4.0104.3</u>	Knee Wall – Existing Batt Insulation Repair	<u>4.6, 4.3</u>

2020 SWS	Detail Title	Job Aids
<u>4.0104.4</u>	Knee Wall – Rigid Insulation	4.6
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2020 SWS	Detail Title	Job Aids
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<u>NFPA 720</u>	Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment	<u>A-2</u>

Useful Acronyms in this Guide:

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers,
<https://www.ashrae.org>

EPS: Expanded Polystyrene – lightweight insulation board composed of foam beads, will absorb water

gpm: Gallons per Minute, measurement of water flow at a fixture

LED: Light-Emitting Diode, increasingly cost-effective and efficient lighting technology

IESNA: Illuminating Engineering Society of North America, <https://www.ies.org>

NECA: National Electrical Contractors Association, <https://necaonline.com>

NEMA: National Electrical Manufacturers Association, <https://www.nema.org/Standards>

NFPA: National Fire Protection Association, <https://www.nfpa.org>

OSB: Oriented Strand Board, wood by-product pressed into sheets, similar to particle board but with larger pieces compressed together with adhesives

SPF: Spray Polyurethane Foam, also known as 2-part spray foam, is a liquid insulation material that combines an iso and a resin and requires very particular personal protective equipment

SWS: Standard Work Specification, <https://sws.nrel.gov>

UL: Underwriters Laboratories, <https://ul.org>

XPS: Extruded Polystyrene – lightweight insulation board characterized by smooth uniform foam appearance, often in pastel colors indicating manufacturer

A-2 Safety Measures

Smoke Alarm Installation

Aligns with [2.0101.1](#), [2.0101.2](#), NFPA 72

Smoke alarms, either battery-operated or hardwired (interconnected), will be listed and labeled in accordance with UL 217

Battery-operated smoke alarms will have sealed, non-replaceable 10-year batteries

Smoke alarms, either battery-operated or hardwired (interconnected), will be installed in the locations required by Authority Having Jurisdiction

NFPA 72 states that smoke alarms will be installed:

- Inside each bedroom
- Outside each sleeping area
- On every level of the home, including the *basement*
 - If a level does not have a bedroom, install in the living room or near the stairway to the upper level, or both locations
 - In the *basement*, install on the ceiling at the bottom of the stairs leading to the next level
- On walls at a height not more than 12 inches away from the ceiling (to the top of the alarm) or on the ceiling
- At least 10 feet from any cooking appliance
- Away from windows, doors, or ducts where drafts might interfere with their operation
- For pitched ceilings, install alarm within 3 feet of the peak, but not in the apex (within four inches of the peak)

Install smoke alarms in accordance with the manufacturer's instructions

Provide occupants the manufacturer's written instructions

- Installation of battery operated or plug-in 110 Volt Carbon Monoxide Detectors/Smoke Detectors, is required on initial inspection of the home.

Carbon Monoxide (CO) Detection and Warning Equipment

Aligns with [2.0102.1](#), NFPA 720

Select CO alarms that are listed and labeled in accordance with UL 2034, or approved by the authority having jurisdiction, have a minimum of 10-year manufacturer's warranty and contain internal, non-replaceable batteries

Install CO alarms in the locations required by the Authority Having Jurisdiction

NFPA 720 states that carbon monoxide alarms will be installed:

- In each sleeping area, within 10 feet of each bedroom door
- On every level of the home, including the *basement*
- More than 15 feet from heating or cooking appliances
- NOT in or near very humid areas, such as bathrooms

In addition, the International Association of Fire Chiefs recommends installing a CO detector near or over any attached garage.

Install CO alarms in accordance with the manufacturer's instructions, taking note of instructions for placement and height, as this can vary significantly by manufacturer

Provide occupants the manufacturer's written instructions

A-3 Baseload Lighting Measures

FOR ALL BASELOAD LIGHTING MEASURES:

Provide occupants/owners with user's manual, warranty information, installation instructions, and installer contact information

Permanently remove uninstalled equipment from job site and recycle or dispose of removed equipment and refrigerant in accordance with local and federal law (e.g., EPA Section 608 of Clean Air Act of 1990)

Permanently decommission old equipment

Lighting Replacement

Aligns with [7.0103.1](#)

Discuss the lighting schedule with the client. At a minimum, replace any incandescent lamps that are on for one or more hours each day.

Educate client about incandescent lamp use, including using these lamps as little as possible.

Select replacement lighting that is appropriate for the intended application (e.g., enclosed, dimmable, potential for breakage, indoor vs. outdoor).

LEDs rated 2700-3000 K have similar color to incandescent bulbs.

Provide lighting level quality required for the intended application (e.g., task lighting, hazards lighting, nightlights) and approximate the lumen rating of incandescent lamp being replaced (see chart at right), except in circumstances where Lighting Reduction may be put into place (see [Article below](#)).

LED/Incandescent Lamp Equivalency Chart		
LED	Incandescent	Lumens
6 – 9 W	40 W	450 lm
8 – 12 W	60 W	800 lm
9 – 13 W	75 W	1100 lm
16 – 20 W	100 W	1600 lm
25 – 28 W	150 W	2600 lm

All replacement lamps are the highest level of efficiency within a technology (e.g., LED bulbs) and are ENERGY STAR® qualified, equivalent or better, and UL approved.

New fixtures or lamps facilitate upgrade to future lighting technologies

New lamps are rated no more than the rated wattage of fixture.

Install lighting in accordance with manufacturer specifications and applicable code (i.e., [NFPA 70](#), [NFPA 101](#), [NECA/IESNA 500](#))

If applicable, clean lens and reflector before installing new bulb

Install all electrical wiring according to applicable code (i.e., [NFPA 70](#))

Lighting Reduction

Aligns with [7.0103.2](#), [7.0103.7](#)

Replace or maneuver window coverings (e.g., blinds, shades, movable insulation) to maximize useful daylight where appropriate

Follow IESNA protocols for appropriate light levels for certain tasks when designing delamping procedure

Ensure final lighting levels are in accordance with ASHRAE 90.1 or 90.2

Ensure final egress lighting levels are in accordance with NFPA 70 and 101

Ensure that delamping does not impact required egress lighting, as required by ANSI/NFPA 101

De-energize circuit and lock out power before work begins

Remove bulbs or fixtures per plan ensuring that no open connections will remain after work is finished

Terminate all unused electrical connections in appropriate covered junction box per NFPA 70

Seal any penetrations created by removal as per ANSI/NFPA/ICC Fire Code

If removed bulbs or fixtures meet retrofit standards and are operational, store them in a dry location for reuse

- The costs associated with window coverings are not eligible expenditures under the Nebraska Weatherization Assistance Program

Fixture Replacement

Aligns with [7.0103.3](#), [7.0103.4](#), [7.0103.5](#), [7.0103.6](#)

FOR ALL FIXTURE INSTALLATIONS:

De-energize circuit and lock-out power before work begins

Locate and install new fixtures in accordance with appropriate code (e.g., NFPA 101, NFPA 70, NECA/IESNA 500)

Ballast Replacement

Select pulse start, high-efficiency, electronic ballasts that meet the appropriate nationally recognized product standards (ANSI C82.1, ANSI C82.2, UL 924, UL 1029, NEMA) and have a ballast factor of 0.85 or greater

Select ballasts that match the input and output voltage of the existing fixture, that fit within the existing enclosure, and will support the necessary wattage of the bulbs

Install ballasts in accordance with manufacturer specifications

Clean the lens and reflector once installation is complete

Exit Sign Replacement

Select exit signs from the NEMA Premium Exit Sign List and that meet all applicable codes (UL 924, NFPA 70, and/or IBC and IFC, as appropriate)

Signs that include battery-backups that can maintain the total load for a minimum period of 1-1/2 hours and indicate system failure with visual and audible alarm

Signs that are able to be attached to the existing outlet box

Signs that are rated for a maximum of 5 watts per illuminated side

Signs with at least a 1-year warranty

Emergency Lighting Replacement

Select emergency light fixtures that are UL approved for location installed (i.e., indoor, outdoor, wet location)

Emergency light fixture has battery-backup that can maintain the total load for a minimum period of 1-1/2 hours, in accordance with section 700.12 of NFPA 70

Security Lighting

Select security light fixtures that are UL approved for location installed (i.e., indoor, outdoor, wet location)

Security light fixtures provide the required lighting conditions with the lowest possible energy-use, are vandal-proof, are dark-sky approved and are ENERGY STAR® qualified, equivalent or better

Aim light fixtures to minimize light emitted above the horizontal, beyond the perimeter of the property, and not directly into any window of a residence

Clean the lens and reflector once installation is complete

Install both photo and motion sensors and configure to only activate when sun is down and to switch off within 5 minutes if no motion is detected

- Generally, the costs associated with the replacement of light fixtures and controls are not eligible expenditures in the Nebraska Weatherization Assistance Program. In some instances, with prior Nebraska Department of Environment and Energy approval, these costs may be reimbursable.

Lighting Controls

Aligns with [7.0104.1](#), [7.0104.2](#), [7.0104.3](#), [7.0104.4](#), [7.0104.5](#)

FOR ALL CONTROL INSTALLATIONS:

Select controls that are compatible with the existing wiring and lighting fixture, and are UL approved and listed for the installed location

Install control in accordance with NFPA 70 and manufacturer specifications, in a secure location, and in location appropriate enclosure (e.g., weatherproof) or protected from physical damage

Occupancy Sensors

Do not install occupancy sensors in areas accessed for electrical and mechanical maintenance

Set controls to match the intended use of the space (i.e., time off setting not too short or too long)

Stand-Alone Timers

Select timer that has at least 10 hours of battery backup time, has at least two programmable schedules, and has an appropriate manual override

Do not install timers for egress lighting required by NFPA 101

Set timer to turn off exterior fixtures when there is sufficient daylight (civil twilight) or when lighting is no longer needed at night per ASHRAE 90.1 or 90.2

Set timer to turn off interior fixtures when light is no longer needed in the space

Motion Control Sensors

Select sensor that is location- and climate-appropriate (e.g., outdoor weatherproof fixture)

Locate sensor where it will minimize false starts

Set controls of motion sensor based on anticipated occupant usage or security needs

Set control to turn off lighting if no motion is detected for a maximum of 15 minutes

Outdoor Photo Sensors

Select sensor that is UL approved and listed for the installed location (e.g., UL 60730-1) and is location- and climate-appropriate (e.g., outdoor weatherproof fixture)

Select fixture that allows for replacement of photo sensor independently

Position sensor to properly sense natural light, but shielded from artificial light sources (e.g., other outdoor lighting)

Bi-Level Controls

Select control that has an appropriate manual override

Affix permanent labels near the switch location to indicate light level and fixture control

Quality Control Form

(List Comments on Page 11)

Agency <input type="checkbox"/> BVCAP <input type="checkbox"/> CAPLSC <input type="checkbox"/> CAPMN <input type="checkbox"/> HFHO <input type="checkbox"/> CNCAP <input type="checkbox"/> NENCAP <input type="checkbox"/> NWCAP <input type="checkbox"/> SENCA	Inspector Name: _____	Job Number: _____
Client Name: _____	Address: _____	Phone: _____
NEO QCI: _____	Subgrantee QCI: _____	Primary Fuel Type: <input type="checkbox"/> Nat. Gas <input type="checkbox"/> Fuel Oil <input type="checkbox"/> Propane <input type="checkbox"/> Electric <input type="checkbox"/> Other: _____

FILE REVIEW

1. Lead Safe Weatherization Documentation

1. Lead Hazard Pre-Renovation Form
 Yes
 No, why _____
 N/A, 1978 or later or verified as lead free

2. Certified Renovator Documentation
 Yes Certified Renovator: _____ Certified Firm: _____
 No, why _____
 N/A, 1978 or later or verified as lead free

3. Crew/Contractor Information Included
 Photo Documentation Included: Yes No Additional Documentation: _____

2. Mold and Moisture Documentation

1. Mold Assessment and Release Form
 Yes
 No, why _____

2. Observed Issues/Concerns: _____

3. Health and Safety Testing/Documentation

1. Heating System Inspection:
 Initial Inspection Completed By: _____
 2nd Inspection Completed By: _____
 Sizing Calcs. Completed for Replacement Unit(s): Yes No, Why _____

2. Pre-Weatherization – Completed by: _____
 Primary Heat: CAZ Draft CO Combustion Efficiency No, or not able to determine if testing was completed
 Other appliances tested:
 Water Heater: CAZ Draft CO Notes: _____
 Stovetop/Range: CAZ Draft CO Notes: _____
 Other: CAZ Draft CO Notes: _____

3. Post Weatherization – Completed by: _____
 Primary Heat: CAZ Draft CO Combustion Efficiency No, or not able to determine if testing was completed
 Other appliances tested:
 Water Heater: CAZ Draft CO Notes: _____
 Stovetop/Range: CAZ Draft CO Notes: _____
 Other: CAZ Draft CO Notes: _____

4. Air Infiltration Testing

1. Pre-Weatherization: _____ CFM⁵⁰ Completed by: _____

1. Pre-Infiltration: _____ CFM⁵⁰ Completed by: _____

2. Post-Infiltration: _____ CFM⁵⁰ Completed by: _____

2. Post-Weatherization: _____ CFM⁵⁰ Completed by: _____

5. Energy Audit Documentation

1. All Identified Measures Completed: Yes No, Why _____

2. Data Entry Measures Reviewed: Yes No, Why _____

Measures Recommended: _____

Comments: _____

6. State Historic Preservation Documentation

1. SHPO Approval Included:

- Yes
- No, why _____
- N/A, home is less than 45 years old

ON-SITE WORK ASSESSMENT

7. Attics

1. Attic Air Sealing Performed N/A On Work Order: Y or N On BCJO: Y or N

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed but cannot verify (no access to attic, closed cavity, etc.).
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, item does not appear to have been performed but can not verify (no access to attic, closed cavity, etc.).
- No, item was on work order but not installed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

2. Attic Insulation Installed N/A On Work Order: Y or N On BCJO: Y or N
 Pre Wx R= _____ Post Wx R= _____

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed but cannot verify (no access to attic, closed cavity, etc.).
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 - Improper material choice
 - Not to proper depth
 - General installation concerns. Explain: _____
- No, item does not appear to have been performed but can not verify (no access to attic, closed cavity, etc.).
- No, item was on work order but not installed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

3. Insulation Certificate Completed and Posted N/A On Work Order: Y or N On BCJO: Y or N

- Yes, certificate includes appropriate information and is visible from the access.
- Yes, certificate includes appropriate information, but in location other than attic.
- Yes, certificate is installed but not complete or does not include all appropriate information.
- No, certificate is not completed and posted.

4. Heat Source Shielding and/or Damming N/A On Work Order: Y or N On BCJO: Y or N

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed but cannot verify (no access to attic, closed cavity, etc.).
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, item was on work order but not installed and NO justification in the file.
- No, item was not on work order, even though standards require it.
- N/A, no heat sources or vents go through the attic.

5. Attic Venting N/A On Work Order: Y or N On BCJO: Y or N

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed but cannot verify (no access to attic, closed cavity, etc.).
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, item was on work order but not installed and NO justification in the file.
- No, item was not on work order, even though standards require it.

7. Attics (continued)

6. Attic Access Insulated, Air Sealed and Secured N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
- Improper material choice
- Not to proper depth
- Minimum access size (13" x 20") confirmed
- General installation concerns.
Explain _____
- No, item was not on work order, even though standards require it.
- No, item was on work order but not installed and NO justification in the file.

7. Energy Related Attic Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N
- Yes
- No
Explain: _____
- N/A, no repairs were performed.

8. H&S Related Attic Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N
- Yes
- No
Explain: _____
- N/A, no repairs were performed.

9. Density Sample Taken:
- Yes, Density and R-Value Confirmed:
- No, Why _____

10. Attic Work Comments: _____

8. Sidewall/Kneewall/Building Envelope

1. Sidewall Insulation Installed N/A On Work Order: Y or N On BCJO: Y or N
- Pre Wx R= _____ Post Wx R= _____
- Yes, work appears to have been performed to specified standards, verified through density testing and available tools (IR).
- Yes, work appears to have been performed to specified standards based on bag/density comparison, but cannot verify.
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order but not installed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

2. Plugs, Patching & Painting Completed N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, work was not appropriate or did not meet specified standards.

3. General Air Sealing of Building Envelope N/A On Work Order: Y or N On BCJO: Y or N
- Site visit indicates that it should have been on work order.
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, work was not appropriate or did not meet specified standards.

8. Sidewall/Kneewall/Building Envelope (continued)

4. Kneewall Access Insulated, Air Sealed and Secured N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to specified standards.
 Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Improper material choice
 Not to proper depth
 Minimum access size (13" x 20") confirmed
 General installation concerns
 Explain: _____
 No, item was not on work order, even though standards require it.
 No, item was on work order but not installed and NO justification in the file.
5. Kneewall Insulation Certificate Completed and Posted N/A On Work Order: Y or N On BCJO: Y or N
 Yes, certificate includes appropriate information and is visible from the access.
 Yes, certificate includes appropriate information, but in location other than kneewall attic.
 Yes, certificate is installed but does not include appropriate information.
 No, certificate is not completed and posted.
6. Vapor Barrier on Kneewall Facing Warm Side
 Yes
 No
 N/A
7. Energy Related Sidewall/Kneewall/Building Envelope Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N
 Yes
 No
 N/A, no repairs were performed.
8. Health & Safety Related Sidewall/Kneewall/Building Envelope Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N
 Yes
 No
 Explain: _____
 N/A, no repairs were performed.
9. Density Sample Taken:
 Yes, Density and R-Value Confirmed:
 No, Why _____
10. Thermal Imaging Completed:
 Yes
 No, Why _____
11. Sidewall/Kneewall/Building Envelope Comments: _____

9. Subspaces, Basements and Crawlspace

1. Subspace Air Sealing Performed N/A On Work Order: Y or N On BCJO: Y or N
 Partial Perimeter Ceiling Complete
 Site visit indicates that it should have been on work order.
 Yes, work appears to have been performed to specified standards.
 Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.

9. Subspaces, Basements and Crawlspace (continued)

2. Foundation/Perimeter Insulation Installed N/A On Work Order: Y or N On BCJO: Y or N
 Pre Wx R= _____ Post Wx R= _____

- Yes, work appears to have been performed to specified standards.
 Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Materials
 Incomplete
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.

3. Under-Floor Insulation Installed N/A On Work Order: Y or N On BCJO: Y or N
 Pre Wx R= _____ Post Wx R= _____

- Yes, work appears to have been performed to specified standards.
 Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Materials
 Incomplete
 Explain: _____
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.

4. Basement Wall Insulation Installed N/A On Work Order: Y or N On BCJO: Y or N
 Pre Wx R= _____ Post Wx R= _____

- Yes, work appears to have been performed to specified standards.
 Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Materials
 Incomplete
 Explain: _____
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.

5. Vapor Barrier Installed, Coverage & Secure N/A On Work Order: Y or N On BCJO: Y or N

- Already existed.
 Inaccessible space.
 Yes, work appears to have been performed to specified standards.
 Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.

6. Energy Related Subspace Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N

- Yes
 No
 Explain: _____
 N/A, no repairs were performed.

9. Subspaces, Basements and Crawlspaces (continued)

7. Health & Safety Related Subspace Repairs Documented (i.e. dryer venting, moisture, etc.)

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes

No

Explain: _____

N/A, no repairs were performed.

Subspace Work Comments: _____

10. Heating, Ventilation and Air Conditioning

1. Heating System Replacement

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes, work appears to have been performed to manufacturers' standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.

Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards/guidelines.

Explain: _____

N/A, not replaced.

No, item was on work order, not installed but justification in file.

No, item was on work order but not installed and NO justification in the file.

No, site visit indicates that it should have been on work order.

Unit Replacement Justification:

SIR>1.0

Health & Safety

Unsure, No Documentation

2. Air Conditioner Replacement

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes, work appears to have been performed to manufacturers' standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.

Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards/guidelines.

Explain: _____

N/A, not replaced.

No, item was on work order, not installed but justification in file.

No, item was on work order but not installed and NO justification in the file.

No, site visit indicates that it should have been on work order.

3. Heat Pump Installation/Replacement

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes, work appears to have been performed to manufacturers' standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.

Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards/guidelines.

Explain: _____

N/A, not replaced.

No, item was on work order, not installed but justification in file.

No, item was on work order but not installed and NO justification in the file.

No, site visit indicates that it should have been on work order.

4. Heating System Tune & Clean

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes, work appears to have been performed to specified standards.

Yes, work appears to have been performed to standards but does not reflect good workmanship.

Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards.

Explain: _____

No, item was on work order, not completed but justification in file.

No, item was on work order but not completed and NO justification in the file.

No, site visit indicates that it should have been on work order.

10. Heating, Ventilation and Air Conditioning (continued)

5. Cooling System Tune & Clean N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order, not completed but justification in file.
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

6. Duct Sealing N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order, not completed but justification in file.
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

7. Distribution System Modifications (balancing ductwork, belly return conversions, etc.) N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order, not completed but justification in file.
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

8. Setback Thermostat N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order, not completed but justification in file.
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

9. Heating, Ventilation and Air Conditioning Work Comments: _____

11. Windows and Doors

1. Window Replacement N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to standards and state guidelines.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
- Installation
- Window Selection NFRC Rating: _____
- Location
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.
- N/A, no windows replaced.
Justification for Replacement:
- SIR>1.0 Beyond Repair Unsure, No Documentation

11. Windows and Doors (continued)

2. Storm Window Replacement N/A On Work Order: Y or N On BCJO: Y or N

Yes, work appears to have been performed to standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.
 Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards.

Installation

Material Selection

Location

No, item was on work order but not completed and NO justification in the file.

No, site visit indicates that it should have been on work order.

N/A, no storm windows replaced.

3. Door Replacement N/A On Work Order: Y or N On BCJO: Y or N

Yes, work appears to have been performed to standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.
 Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards.

Installation

Window Selection NFRC Rating: _____

Location

No, item was on work order but not completed and NO justification in the file.

No, site visit indicates that it should have been on work order.

N/A, no doors replaced.

Justification for Replacement:

SIR>1.0 Beyond Repair Unsure, No Documentation

4. Window Air Sealing N/A On Work Order: Y or N On BCJO: Y or N

Site visit indicates that it should have been on work order.

Yes, work appears to have been performed to standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.
 Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards.

Installation

Material Selection

Explain: _____

No, item was on work order but not completed and NO justification in the file.

N/A, no window air sealing required.

5. Door Air Sealing N/A On Work Order: Y or N On BCJO: Y or N

Site visit indicates that it should have been on work order.

Yes, work appears to have been performed to standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.
 Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards.

Installation

Material Selection

Explain: _____

No, item was on work order but not completed and NO justification in the file.

N/A, no door air sealing required.

6. Energy Related Window and Door Work Documented N/A On Work Order: Y or N On BCJO: Y or N

Yes

No

Explain: _____

N/A, no repairs were performed.

7. Window and Door Work Comments: _____

12. Baseloads and Other

1. Water Heater Replacement N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to manufacturers' standards and state guidelines.
 Yes, work appears to have been performed to standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards/guidelines.
 Explain: _____
 N/A, not replaced.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 Site visit indicates that it should have been on work order.
 Unit Replacement Justification:
 SIR>1.0 Health & Safety Unsure, No Documentation
2. Pipe Insulation N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, work appears to have been performed to standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Inappropriately secured
 To close heat source
 Incomplete
 Material Selection
 Explain: _____
 N/A, not required.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
3. Low-Flow Showerheads N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 N/A, not required.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
4. Refrigerator Replacement N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, but improper unit selection.
 N/A, not required.
 No, item was on work order, some/all not installed but justification in file.
 No, item was on work order but some/not all installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
5. High Efficiency Lighting N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, but improper bulb selection.
 N/A, not required.
 No, item was on work order, some/all not installed but justification in file.
 No, item was on work order but some/not all installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
6. Carbon Monoxide Detector(s) N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, but location is questionable.
 N/A, not required.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
7. Smoke/Fire Detector(s) N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, but location is questionable.
 N/A, not required.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.

12. Baseloads and Other (continued)

8. ASHRAE Ventilation Fan N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines and appropriate calculations in the file.
 Yes, but location is questionable.
 Explain: _____
 N/A, not required and appropriate calculations in the file.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.

9. Other Health & Safety Related Work Installed/Documented N/A On Work Order: Y or N On BCJO: Y or N
 Yes (list)
 No
 Explain: _____
 N/A, no repairs were performed.

10. Other Baseload Energy Related Work Installed/Documented N/A On Work Order: Y or N On BCJO: Y or N
 Yes (list)
 No
 Explain: _____
 N/A, no repairs were performed.

11. Baseload and Other Work Comments: _____

13. Incidental Repairs

1. All incidental repair work is justified in the client file with an explanation of the need and the specific energy conservation measure(s) impacted.
 Yes (list)
 No
 Explain: _____
 N/A, no repairs were performed.
2. All incidental repair work is completed within the \$500.00 limit.
 Yes (list)
 No
 Explain: _____
 N/A, no repairs were performed.
3. Does this unit need additional attention from the crew, contractor, or agency?
 Yes. Checking yes requires additional explanation: _____
 No

SIGNATURE

 Quality Control Inspector Name (print) _____

Sign Here  Signature _____

_____ Date

Client Education Confirmation of Receipt

Agency BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA


Client Name: _____ Job Number: _____
Address: _____ City: _____ Phone Number: _____

CLIENT CONFIRMATION OF RECEIPT

I have received the following information as part of my participation in the Nebraska Weatherization Assistance Program.

- Lead-Safe Education** — A copy of the pamphlet, *Renovate Right: Important Lead Hazard Information for Families, Child Care Providers and Schools*, informing me of the potential risk of the lead hazard exposure from weatherization/renovation activity to be performed in my dwelling unit.
- Energy Consumption Education** — Information regarding changes I can make in order to reduce the energy consumption of my household.
- Mold and Moisture Education** — A copy of the pamphlet, *A Brief Guide to Mold and Moisture and Your Home*, informing me of how to clean up residential mold problems and how to prevent mold growth.
- Asbestos Education** — Information regarding what asbestos is, the dangers and ways to avoid asbestos exposure.
- EPA's A Citizen's Guide to Radon** — Information regarding what radon is, and the health effects radon exposure can have on people.

CLIENT SIGNATURE

Sign Here  Signature _____ Date _____

SELF-CERTIFICATION OPTION (FOR TENANT-OCCUPIED DWELLINGS ONLY)


I hereby certify that I attempted to deliver the following educational information to the dwelling client listed above:

- Lead-Safe** **Energy Consumption** **Mold and Moisture** **Asbestos** **Radon**

If the information was delivered but a client signature was not obtainable, you may check the appropriate box below:

- Refusal to Sign** — I certify that I have made a good faith effort to deliver the information to the client of the dwelling unit listed above at the date and time indicated and that the client refused to sign the Education Confirmation of Receipt form. I furthermore certify that I have left copies of the information listed above at the dwelling unit with the client.

AGENCY EMPLOYEE SIGNATURE

Sign Here  Agency Employee Signature _____

 Printed Name of Agency Employee _____ Date _____

This material was prepared with the support of the U.S. Department of Energy (DOE), Low Income Weatherization Assistance Program Grant. However, any opinions findings conclusions or recommendations expressed herein are those of the author and do not necessarily reflect the views of DOE.

Quality Control Form

(List Comments on Page 11)

Agency <input type="checkbox"/> BVCAP <input type="checkbox"/> CAPLSC <input type="checkbox"/> CAPMN <input type="checkbox"/> HFHO <input type="checkbox"/> CNCAP <input type="checkbox"/> NENCAP <input type="checkbox"/> NWCAP <input type="checkbox"/> SENCA	Inspector Name: _____	Job Number: _____
Client Name: _____	Address: _____	Phone: _____
NEO QCI: _____	Subgrantee QCI: _____	Primary Fuel Type: <input type="checkbox"/> Nat. Gas <input type="checkbox"/> Fuel Oil <input type="checkbox"/> Propane <input type="checkbox"/> Electric <input type="checkbox"/> Other: _____

FILE REVIEW

1. Lead Safe Weatherization Documentation

1. Lead Hazard Pre-Renovation Form
 Yes
 No, why _____
 N/A, 1978 or later or verified as lead free

2. Certified Renovator Documentation
 Yes Certified Renovator: _____ Certified Firm: _____
 No, why _____
 N/A, 1978 or later or verified as lead free

3. Crew/Contractor Information Included
 Photo Documentation Included: Yes No Additional Documentation: _____

2. Mold and Moisture Documentation

1. Mold Assessment and Release Form
 Yes
 No, why _____

2. Observed Issues/Concerns: _____

3. Health and Safety Testing/Documentation

1. Heating System Inspection:
 Initial Inspection Completed By: _____
 2nd Inspection Completed By: _____
 Sizing Calcs. Completed for Replacement Unit(s): Yes No, Why _____

2. Pre-Weatherization – Completed by: _____
 Primary Heat: CAZ Draft CO Combustion Efficiency No, or not able to determine if testing was completed
 Other appliances tested:
 Water Heater: CAZ Draft CO Notes: _____
 Stovetop/Range: CAZ Draft CO Notes: _____
 Other: CAZ Draft CO Notes: _____

3. Post Weatherization – Completed by: _____
 Primary Heat: CAZ Draft CO Combustion Efficiency No, or not able to determine if testing was completed
 Other appliances tested:
 Water Heater: CAZ Draft CO Notes: _____
 Stovetop/Range: CAZ Draft CO Notes: _____
 Other: CAZ Draft CO Notes: _____

4. Air Infiltration Testing

1. Pre-Weatherization: _____ CFM⁵⁰ Completed by: _____

1. Pre-Infiltration: _____ CFM⁵⁰ Completed by: _____

2. Post-Infiltration: _____ CFM⁵⁰ Completed by: _____

2. Post-Weatherization: _____ CFM⁵⁰ Completed by: _____

5. Energy Audit Documentation

1. All Identified Measures Completed: Yes No, Why _____

2. Data Entry Measures Reviewed: Yes No, Why _____

Measures Recommended: _____

Comments: _____

6. State Historic Preservation Documentation

1. SHPO Approval Included:

- Yes
- No, why _____
- N/A, home is less than 45 years old

ON-SITE WORK ASSESSMENT

7. Attics

1. Attic Air Sealing Performed N/A On Work Order: Y or N On BCJO: Y or N

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed but cannot verify (no access to attic, closed cavity, etc.).
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, item does not appear to have been performed but can not verify (no access to attic, closed cavity, etc.).
- No, item was on work order but not installed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

2. Attic Insulation Installed N/A On Work Order: Y or N On BCJO: Y or N
 Pre Wx R= _____ Post Wx R= _____

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed but cannot verify (no access to attic, closed cavity, etc.).
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 - Improper material choice
 - Not to proper depth
 - General installation concerns. Explain: _____
- No, item does not appear to have been performed but can not verify (no access to attic, closed cavity, etc.).
- No, item was on work order but not installed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

3. Insulation Certificate Completed and Posted N/A On Work Order: Y or N On BCJO: Y or N

- Yes, certificate includes appropriate information and is visible from the access.
- Yes, certificate includes appropriate information, but in location other than attic.
- Yes, certificate is installed but not complete or does not include all appropriate information.
- No, certificate is not completed and posted.

4. Heat Source Shielding and/or Damming N/A On Work Order: Y or N On BCJO: Y or N

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed but cannot verify (no access to attic, closed cavity, etc.).
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, item was on work order but not installed and NO justification in the file.
- No, item was not on work order, even though standards require it.
- N/A, no heat sources or vents go through the attic.

5. Attic Venting N/A On Work Order: Y or N On BCJO: Y or N

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed but cannot verify (no access to attic, closed cavity, etc.).
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, item was on work order but not installed and NO justification in the file.
- No, item was not on work order, even though standards require it.

7. Attics (continued)

6. Attic Access Insulated, Air Sealed and Secured N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
- Improper material choice
- Not to proper depth
- Minimum access size (13" x 20") confirmed
- General installation concerns.
 Explain: _____
- No, item was not on work order, even though standards require it.
- No, item was on work order but not installed and NO justification in the file.

7. Energy Related Attic Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N
- Yes
- No
 Explain: _____
- N/A, no repairs were performed.

8. H&S Related Attic Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N
- Yes
- No
 Explain: _____
- N/A, no repairs were performed.

9. Density Sample Taken:
- Yes, Density and R-Value Confirmed:
- No, Why _____

10. Attic Work Comments: _____

8. Sidewall/Kneewall/Building Envelope

1. Sidewall Insulation Installed N/A On Work Order: Y or N On BCJO: Y or N
- Pre Wx R= _____ Post Wx R= _____
- Yes, work appears to have been performed to specified standards, verified through density testing and available tools (IR).
- Yes, work appears to have been performed to specified standards based on bag/density comparison, but cannot verify.
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, item was on work order but not installed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

2. Plugs, Patching & Painting Completed N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, work was not appropriate or did not meet specified standards.

3. General Air Sealing of Building Envelope N/A On Work Order: Y or N On BCJO: Y or N
- Site visit indicates that it should have been on work order.
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
- No, work was not appropriate or did not meet specified standards.

8. Sidewall/Kneewall/Building Envelope (continued)

4. Kneewall Access Insulated, Air Sealed and Secured N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to specified standards.
 Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Improper material choice
 Not to proper depth
 Minimum access size (13" x 20") confirmed
 General installation concerns
 Explain: _____
 No, item was not on work order, even though standards require it.
 No, item was on work order but not installed and NO justification in the file.
5. Kneewall Insulation Certificate Completed and Posted N/A On Work Order: Y or N On BCJO: Y or N
 Yes, certificate includes appropriate information and is visible from the access.
 Yes, certificate includes appropriate information, but in location other than kneewall attic.
 Yes, certificate is installed but does not include appropriate information.
 No, certificate is not completed and posted.
6. Vapor Barrier on Kneewall Facing Warm Side
 Yes
 No
 N/A
7. Energy Related Sidewall/Kneewall/Building Envelope Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N
 Yes
 No
 N/A, no repairs were performed.
8. Health & Safety Related Sidewall/Kneewall/Building Envelope Repairs Documented N/A On Work Order: Y or N On BCJO: Y or N
 Yes
 No
 Explain: _____
 N/A, no repairs were performed.
9. Density Sample Taken:
 Yes, Density and R-Value Confirmed:
 No, Why _____
10. Thermal Imaging Completed:
 Yes
 No, Why _____
11. Sidewall/Kneewall/Building Envelope Comments: _____

9. Subspaces, Basements and Crawlspace

1. Subspace Air Sealing Performed N/A On Work Order: Y or N On BCJO: Y or N
 Partial Perimeter Ceiling Complete
 Site visit indicates that it should have been on work order.
 Yes, work appears to have been performed to specified standards.
 Yes, work appears to have been performed to specified standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Explain: _____
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.

9. Subspaces, Basements and Crawlspaces (continued)

7. Health & Safety Related Subspace Repairs Documented (i.e. dryer venting, moisture, etc.)

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes

No

Explain: _____

N/A, no repairs were performed.

Subspace Work Comments: _____

10. Heating, Ventilation and Air Conditioning

1. Heating System Replacement

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes, work appears to have been performed to manufacturers' standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.

Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards/guidelines.

Explain: _____

N/A, not replaced.

No, item was on work order, not installed but justification in file.

No, item was on work order but not installed and NO justification in the file.

No, site visit indicates that it should have been on work order.

Unit Replacement Justification:

SIR>1.0

Health & Safety

Unsure, No Documentation

2. Air Conditioner Replacement

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes, work appears to have been performed to manufacturers' standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.

Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards/guidelines.

Explain: _____

N/A, not replaced.

No, item was on work order, not installed but justification in file.

No, item was on work order but not installed and NO justification in the file.

No, site visit indicates that it should have been on work order.

3. Heat Pump Installation/Replacement

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes, work appears to have been performed to manufacturers' standards and state guidelines.

Yes, work appears to have been performed to standards but does not reflect good workmanship.

Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards/guidelines.

Explain: _____

N/A, not replaced.

No, item was on work order, not installed but justification in file.

No, item was on work order but not installed and NO justification in the file.

No, site visit indicates that it should have been on work order.

4. Heating System Tune & Clean

N/A

On Work Order: Y or N

On BCJO: Y or N

Yes, work appears to have been performed to specified standards.

Yes, work appears to have been performed to standards but does not reflect good workmanship.

Explain: _____

Yes, some work was performed but NOT ALL work meets specified standards.

Explain: _____

No, item was on work order, not completed but justification in file.

No, item was on work order but not completed and NO justification in the file.

No, site visit indicates that it should have been on work order.

10. Heating, Ventilation and Air Conditioning (continued)

5. Cooling System Tune & Clean N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order, not completed but justification in file.
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

6. Duct Sealing N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order, not completed but justification in file.
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

7. Distribution System Modifications (balancing ductwork, belly return conversions, etc.) N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order, not completed but justification in file.
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

8. Setback Thermostat N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____
- No, item was on work order, not completed but justification in file.
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.

9. Heating, Ventilation and Air Conditioning Work Comments: _____

11. Windows and Doors

1. Window Replacement N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to standards and state guidelines.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
- Installation
- Window Selection NFRC Rating: _____
- Location
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.
- N/A, no windows replaced.
Justification for Replacement:
- SIR>1.0 Beyond Repair Unsure, No Documentation

11. Windows and Doors (continued)

2. Storm Window Replacement N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to standards and state guidelines.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
- Installation
 - Material Selection
 - Location
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.
- N/A, no storm windows replaced.

3. Door Replacement N/A On Work Order: Y or N On BCJO: Y or N
- Yes, work appears to have been performed to standards and state guidelines.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
- Installation
 - Window Selection NFRC Rating: _____
 - Location
- No, item was on work order but not completed and NO justification in the file.
- No, site visit indicates that it should have been on work order.
- N/A, no doors replaced.
- Justification for Replacement:
- SIR>1.0
 - Beyond Repair
 - Unsure, No Documentation

4. Window Air Sealing N/A On Work Order: Y or N On BCJO: Y or N
- Site visit indicates that it should have been on work order.
- Yes, work appears to have been performed to standards and state guidelines.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
- Installation
 - Material Selection
- Explain: _____
- No, item was on work order but not completed and NO justification in the file.
- N/A, no window air sealing required.

5. Door Air Sealing N/A On Work Order: Y or N On BCJO: Y or N
- Site visit indicates that it should have been on work order.
- Yes, work appears to have been performed to standards and state guidelines.
- Yes, work appears to have been performed to standards but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
- Installation
 - Material Selection
- Explain: _____
- No, item was on work order but not completed and NO justification in the file.
- N/A, no door air sealing required.

6. Energy Related Window and Door Work Documented N/A On Work Order: Y or N On BCJO: Y or N
- Yes
- No
Explain: _____
- N/A, no repairs were performed.

7. Window and Door Work Comments: _____

12. Baseloads and Other

1. Water Heater Replacement N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to manufacturers' standards and state guidelines.
 Yes, work appears to have been performed to standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards/guidelines.
 Explain: _____
 N/A, not replaced.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 Site visit indicates that it should have been on work order.
 Unit Replacement Justification:
 SIR>1.0 Health & Safety Unsure, No Documentation
2. Pipe Insulation N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, work appears to have been performed to standards but does not reflect good workmanship.
 Explain: _____
 Yes, some work was performed but NOT ALL work meets specified standards.
 Inappropriately secured
 To close heat source
 Incomplete
 Material Selection
 Explain: _____
 N/A, not required.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
3. Low-Flow Showerheads N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 N/A, not required.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
4. Refrigerator Replacement N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, but improper unit selection.
 N/A, not required.
 No, item was on work order, some/all not installed but justification in file.
 No, item was on work order but some/not all installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
5. High Efficiency Lighting N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, but improper bulb selection.
 N/A, not required.
 No, item was on work order, some/all not installed but justification in file.
 No, item was on work order but some/not all installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
6. Carbon Monoxide Detector(s) N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, but location is questionable.
 N/A, not required.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.
7. Smoke/Fire Detector(s) N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines.
 Yes, but location is questionable.
 N/A, not required.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.
 No, site visit indicates that it should have been on work order.

12. Baseloads and Other (continued)

8. ASHRAE Ventilation Fan N/A On Work Order: Y or N On BCJO: Y or N
 Yes, work appears to have been performed to standards and state guidelines and appropriate calculations in the file.
 Yes, but location is questionable.
 Explain: _____
 N/A, not required and appropriate calculations in the file.
 No, item was on work order, not installed but justification in file.
 No, item was on work order but not installed and NO justification in the file.

9. Other Health & Safety Related Work Installed/Documented N/A On Work Order: Y or N On BCJO: Y or N
 Yes (list)
 No
 Explain: _____
 N/A, no repairs were performed.

10. Other Baseload Energy Related Work Installed/Documented N/A On Work Order: Y or N On BCJO: Y or N
 Yes (list)
 No
 Explain: _____
 N/A, no repairs were performed.

11. Baseload and Other Work Comments: _____

13. Incidental Repairs

1. All incidental repair work is justified in the client file with an explanation of the need and the specific energy conservation measure(s) impacted.
 Yes (list)
 No
 Explain: _____
 N/A, no repairs were performed.
2. All incidental repair work is completed within the \$500.00 limit.
 Yes (list)
 No
 Explain: _____
 N/A, no repairs were performed.
3. Does this unit need additional attention from the crew, contractor, or agency?
 Yes. Checking yes requires additional explanation: _____
 No

SIGNATURE

 Quality Control Inspector Name (print) _____

Sign Here  Signature _____

_____ Date

Client Education Confirmation of Receipt

Agency BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA


Client Name: _____ Job Number: _____
Address: _____ City: _____ Phone Number: _____

CLIENT CONFIRMATION OF RECEIPT

I have received the following information as part of my participation in the Nebraska Weatherization Assistance Program.

- Lead-Safe Education** — A copy of the pamphlet, *Renovate Right: Important Lead Hazard Information for Families, Child Care Providers and Schools*, informing me of the potential risk of the lead hazard exposure from weatherization/renovation activity to be performed in my dwelling unit.
- Energy Consumption Education** — Information regarding changes I can make in order to reduce the energy consumption of my household.
- Mold and Moisture Education** — A copy of the pamphlet, *A Brief Guide to Mold and Moisture and Your Home*, informing me of how to clean up residential mold problems and how to prevent mold growth.
- Asbestos Education** — Information regarding what asbestos is, the dangers and ways to avoid asbestos exposure.
- EPA's A Citizen's Guide to Radon** — Information regarding what radon is, and the health effects radon exposure can have on people.

CLIENT SIGNATURE

Sign Here  Signature _____ Date _____

SELF-CERTIFICATION OPTION (FOR TENANT-OCCUPIED DWELLINGS ONLY)


I hereby certify that I attempted to deliver the following educational information to the dwelling client listed above:

- Lead-Safe** **Energy Consumption** **Mold and Moisture** **Asbestos** **Radon**

If the information was delivered but a client signature was not obtainable, you may check the appropriate box below:

- Refusal to Sign** — I certify that I have made a good faith effort to deliver the information to the client of the dwelling unit listed above at the date and time indicated and that the client refused to sign the Education Confirmation of Receipt form. I furthermore certify that I have left copies of the information listed above at the dwelling unit with the client.

AGENCY EMPLOYEE SIGNATURE

Sign Here  Agency Employee Signature _____

 Printed Name of Agency Employee _____ Date _____

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Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA


Client Name: _____ Job Number: _____


Address: _____ City: _____ Phone Number: _____

PAMPHLET RECEIPT

I have received a copy of the lead hazard information pamphlet informing me of the potential risk of the lead hazard exposure from renovation activity to be performed in my dwelling unit. I received this pamphlet before the work began.

CLIENT'S SIGNATURE

Sign Here  Client Signature _____

 Printed Name of Client _____ Date _____

RENOVATOR'S SELF CERTIFICATION OPTION (for tenant-occupied dwellings only)

Instructions to Renovator: If the lead hazard information pamphlet was delivered but a tenant signature was not obtainable, you may check the appropriate box below.

- Declined** — I certify that I have made a good faith effort to deliver the lead hazard information pamphlet to the rental dwelling unit listed below at the date and time indicated and that the occupant declined to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit with the occupant.
- Unavailable for Signature** — I certify that I have made a good faith effort to deliver the lead hazard information pamphlet to the rental dwelling unit listed below and that the occupant was unavailable to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit by sliding it under the door or by (fill in how pamphlet was left). _____

Unit Address: _____

RENOVATOR'S SIGNATURE

Sign Here  Renovator's Signature _____

 Printed Name of Renovator _____ Attempted Delivery Date _____

Note Regarding Mailing Option — As an alternative to delivery in person, you may mail the lead hazard information pamphlet to the owner and/or tenant. Pamphlet must be mailed at least seven days before renovation. Mailing must be documented by a certificate of mailing from the post office.

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Agency BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

ISSUES PREVENTING WEATHERIZATION

The following issues prevent the installation of Weatherization conservation measure(s) at this time:

Malfunctioning combustion appliance(s) present that we are unable to correct:
 Furnace/Heater Water Heater Range/Oven Clothes Dryer Other _____

Extensive repair of structure or mechanical system is required that is cost-prohibitive:
 Structure Plumbing Electrical Heating Other _____

Sanitation problems are present which could endanger the Weatherization crew:
 Sewage Other _____

Severe moisture problems are present:
 Structure Crawlspace Attic Other _____

Harmful pesticide residue or Hazardous pest/insect infestation is present:
 Dwelling Yard Crawlspace Attic Other _____

Excessive peeling paint on pre-1978 home:
 Interior work area Exterior work area Other _____

Other problems:
Detailed description of problems: _____

CLIENT ACKNOWLEDGEMENT

I/we have read (or had explained) the contents of this form and understand that: (1) the health and safety problems indicated above prevent the completion of Weatherization work at this time; (2) program limitations prevent the Weatherization Program from correcting the problem(s) and (3) if the problems/issues listed above are corrected within **60 days** from the date of this notification Weatherization work will resume on the property.

Sign Here Owner, Tenant Signature _____ Date _____

Landlord, Agent Signature _____ Date _____

To report that the problems/issues have been corrected please contact:
Agency: _____ Phone: _____

Weatherization Representative: _____ Date: _____

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Mold Assessment and Release Form

Agency BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

MOLD HEALTH AND SAFETY ASSESSMENT

Mold can be a problem in any dwelling, especially in those where an excessive amount of moisture and humidity are present. Dwellings containing several people, pets, plants or fish aquariums tend to have higher moisture and humidity issues where conditions may exist for mold to grow.

The Weatherization Program's Health & Safety assessment of your home includes a visual check for mold. This is not a mold inspection, the person making the assessment is not a mold inspector, the testing of specific molds is beyond the scope of the program and the Weatherization program is not liable for mold that was found during the inspection.

During the assessment the inspector indicated mold growing in the following areas of your home:

DWELLING AREAS	MOLD IS:	
Living/Bedroom	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Bathroom Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Laundry Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Combustion Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Crawl Space Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Attic Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Basement Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Other Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present

Specific Area Description: _____

Moldy or musty odors are also an indicator of hidden mold growth:

Moldy or musty odors are: Present Not present

SIGNATURES

Agency Employee's Signature

Sign Here _____ Agency Employee's Signature _____ Date _____

The client must sign one of the following disclaimers:

Mold/Moisture Disclaimer: By signing below I acknowledge that I have received information concerning moisture and mold conditions in my home prior to any Weatherization work being completed and I will take steps to reduce excessive moisture. I agree to hold the Weatherization program harmless for any future moisture or mold problems that are not associated with the Weatherization work.

Sign Here _____ Client Signature _____ Date _____

Deferral Disclaimer: By signing below I acknowledge that I have been notified there is existing mold in the home prior to any Weatherization work being completed. I have further been advised that remediating mold is outside of the scope of the Weatherization program and that the work must be deferred until the mold and/or moisture problem is remedied.

Sign Here _____ Client Signature _____ Date _____

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Radon Informed Consent/Consent To Perform Work

Agency

BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

NATIONAL RADON STUDY INFORMATION

I understand that the Health & Safety of the home/building, the occupants and the Weatherization providers is a priority of the Nebraska Weatherization Assistance Program. In 2011 the U.S. Department of Energy's Oakridge National Laboratory conducted a national field study of indoor air quality parameters in homes treated under the Weatherization Assistance Program (WAP). The study involved testing and monitoring 514 single-family homes (including manufactured homes) located in 35 states. The results of the nation-wide testing, deploying 7-day, activated charcoal canisters to measure radon levels, provided the following key findings:

- The average single-family home in the program has a heating-season indoor radon level of 1.9 ± 0.1 pCi/L.
- Pre-weatherization radon levels are correlated with pre-weatherization air tightness or tighter homes tend to have higher radon levels.
- Elevated radon levels are relatively rare in mobile homes and in site-built homes in counties identified by EPA as having low radon potential.
- The data suggests that weatherization results in a small, statistically significant (in absolute terms) increase in indoor radon levels. Nationally, the study data suggest an average increase of 0.4 ± 0.2 pCi/L.
- The impact of weatherization on radon appears to be generally proportional to pre-weatherization levels: homes with low pre-existing radon levels, which constitute the majority of program homes, experience only a slight increase in radon levels on average, while homes with pre-existing elevated radon levels experience a larger than average increase following weatherization.
- On average, the radon impact is largest among site-built homes in EPA high-radon-potential counties, and lowest among mobile homes and homes in low-radon potential counties.
- Changes in measured air-leakage rates due to air-sealing efforts, which are intended to reduce air infiltration and yield energy savings, were found to be statistically correlated with changes in radon levels in study homes.
- The study provides some evidence that the installation of continuous mechanical ventilation reduces radon levels in homes.

More results on the national study can be found at the following website:

http://weatherization.ornl.gov/Retrospectivepdfs/ORNL_TM-2014_170.pdf

PRECAUTIONARY WEATHERIZATION MEASURES THAT CAN/WILL BE IMPLEMENTED

The following radon precautions will be implemented in **all** weatherized homes to reduce the possibility of exacerbating any potential radon issues:

- Whenever site conditions permit, exposed dirt floors within the pressure/thermal boundary will be covered.
- Existing sumps will be air sealed to allow drainage but still reduce radon effects.
- Accessible, visible openings or cracks in below-grade walls and floors that contact the ground will be caulked and sealed.
- Other precautions may include, but are not limited to:
 - sealing any observed floor and/or foundations penetrations,
 - isolating the basement from the conditioned space, and
 - ensuring crawlspace venting is installed.

In **all** weatherized homes equipped with active radon mitigation systems the following additional radon precautions will be implemented

- Verifying that the radon vent fan is operating.
- If a previously installed radon mitigation system is not operating correctly, the client will be advised to consult the system installer or the state radon office.


WEATHERIZATION BENEFITS


Participants in weatherization programs are the recipients of **both** energy related and non-energy related. Some of the non-energy related benefits include 1) water and sewer savings, 2) increased property value and 3) shut-offs and reconnection avoidance. Additionally there are health and safety benefits that can include 1) improved comfort, 2) fewer illnesses, 3) fewer fires and 4) improves protection against the effects of carbon monoxide.

RADON INFORMED CONSENT

I have read (or had explained) the above statements and I consent to permit the Weatherization program provider to enter my property and perform the required Health & Safety assessments.

I have received the EPA's *A Citizen's Guide to Radon* and discussed the radon related risks with the agency representative.

Sign Here  _____ Date _____
Client Signature


 _____
Agency Representative Signature


CONSENT TO PERFORM WORK

This is a program funded by the U.S. Department of Energy and/or the U.S. Department of Health and Human Services to provide assistance to low income homeowners by making their homes more energy efficient. The goal of the program is to help low income people reduce their fuel bills by lowering their energy consumption. It is a onetime only service and the work performed is of a permanent nature. After final inspection, the measures implemented become my personal property and it is my responsibility to maintain and repair installed measures to keep the building systems in working condition.

Weatherization materials may include, but are not limited to, the following items: insulation, caulking, glazing, weatherstripping, thresholds, door sweeps, primary doors and primary windows, pipe wrap, water heater blankets, venting, minor repairs and glass replacement. The decisions concerning material type and quantity shall be the responsibility of the Agency providing the service. The determination for the type of work to be implemented on your home is solely based on the completion of an inspection and an energy audit that assesses how much money can be saved with implementation and work provides a cost-effective savings-to-investment ratio (SIR).

I have read (or had explained) the above statements and I consent to permit the Weatherization program provider enter my property and perform these services on my home.

Sign Here  _____ Date _____
Client Signature

 _____
Agency Representative Signature

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Home Health and Safety Screening Questionnaire

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

CLIENT QUESTIONNAIRE

In performing Weatherization services, we strive to use the safest materials possible. All products used in Weatherization Services must be approved by the U.S. Department of Energy. It is recognized that some products used may have an odor (Volatile Organic Compound or VOC) that some people may find objectionable or to which some people may experience sensitivity. If any family member believes that they may be hypersensitive to, or otherwise objects to the use in your home of any of the common commercial building materials listed below, please indicate with a check mark next to the item:

- NO** household occupant(s) have known hypersensitivities, allergies or objection to the use in my home of the commercial building products listed below, and I hereby agree to hold harmless and release the Weatherization Assistance Program, its agencies and contractors from any liability that may result from the use of these products.
- YES** at least one household occupant is hypersensitive, allergic or objects to certain types of commercial building products.

If you answered **"Yes"** above, please fill out the section below.

PRODUCTS BANNED FROM USE

Please indicate the products that may **NOT** be used in your home. Be aware that there may be some products for which there are no reasonable or acceptable substitutions. Checking off some items on this list may mean that we are unable to perform some energy-saving measures for your home. If there are any questions about the products, please ask for more information about how the product may be used before checking an item as unacceptable:

Check the products NOT to be used:

- | | |
|---|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> latex acrylic or silicone caulk or sealant <input type="checkbox"/> spray-on adhesives <input type="checkbox"/> wall spackle patch <input type="checkbox"/> interior latex paint or primer <input type="checkbox"/> vinyl or plastic products or sheeting <input type="checkbox"/> fiberglass insulation (rigid, blanket, loose) <input type="checkbox"/> fluorescent light bulbs <input type="checkbox"/> any products with volatile organic compounds or odor | <ul style="list-style-type: none"> <input type="checkbox"/> adhesive tape products <input type="checkbox"/> duct sealant <input type="checkbox"/> gas pipe sealant, pvc primer or glue <input type="checkbox"/> exterior paint, primer or roof sealant <input type="checkbox"/> rigid foam insulation or spray foam <input type="checkbox"/> cellulose insulation (loose fill) <input type="checkbox"/> other (please list below) _____ _____ _____ |
|---|--|

The products checked above may not be used in the Weatherization of my home. It is understood that some energy conservation measures may not be completed due to the restrictions requested based upon possible health concerns.

SIGNATURES

Sign Here Client Signature _____ Date _____

Weatherization Representative _____ Date _____

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Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

PAMPHLET RECEIPT

I have received a copy of the lead hazard information pamphlet informing me of the potential risk of the lead hazard exposure from renovation activity to be performed in my dwelling unit. I received this pamphlet before the work began.

CLIENT'S SIGNATURE

Sign Here ▶ Client Signature _____

▶ Printed Name of Client _____ Date _____

RENOVATOR'S SELF CERTIFICATION OPTION (for tenant-occupied dwellings only)

Instructions to Renovator: If the lead hazard information pamphlet was delivered but a tenant signature was not obtainable, you may check the appropriate box below.

- Declined** — I certify that I have made a good faith effort to deliver the lead hazard information pamphlet to the rental dwelling unit listed below at the date and time indicated and that the occupant declined to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit with the occupant.
- Unavailable for Signature** — I certify that I have made a good faith effort to deliver the lead hazard information pamphlet to the rental dwelling unit listed below and that the occupant was unavailable to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit by sliding it under the door or by (fill in how pamphlet was left). _____

Unit Address: _____

RENOVATOR'S SIGNATURE

Sign Here ▶ Renovator's Signature _____

▶ Printed Name of Renovator _____ Attempted Delivery Date _____

Note Regarding Mailing Option — As an alternative to delivery in person, you may mail the lead hazard information pamphlet to the owner and/or tenant. Pamphlet must be mailed at least seven days before renovation. Mailing must be documented by a certificate of mailing from the post office.

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Agency BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

ISSUES PREVENTING WEATHERIZATION

The following issues prevent the installation of Weatherization conservation measure(s) at this time:

Malfunctioning combustion appliance(s) present that we are unable to correct:
 Furnace/Heater Water Heater Range/Oven Clothes Dryer Other _____

Extensive repair of structure or mechanical system is required that is cost-prohibitive:
 Structure Plumbing Electrical Heating Other _____

Sanitation problems are present which could endanger the Weatherization crew:
 Sewage Other _____

Severe moisture problems are present:
 Structure Crawlspace Attic Other _____

Harmful pesticide residue or Hazardous pest/insect infestation is present:
 Dwelling Yard Crawlspace Attic Other _____

Excessive peeling paint on pre-1978 home:
 Interior work area Exterior work area Other _____

Other problems:
Detailed description of problems: _____

CLIENT ACKNOWLEDGEMENT

I/we have read (or had explained) the contents of this form and understand that: (1) the health and safety problems indicated above prevent the completion of Weatherization work at this time; (2) program limitations prevent the Weatherization Program from correcting the problem(s) and (3) if the problems/issues listed above are corrected within **60 days** from the date of this notification Weatherization work will resume on the property.

Sign Here Owner, Tenant Signature _____ Date _____

Landlord, Agent Signature _____ Date _____

To report that the problems/issues have been corrected please contact:
Agency: _____ Phone: _____

Weatherization Representative: _____ Date: _____

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Mold Assessment and Release Form

Agency BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

MOLD HEALTH AND SAFETY ASSESSMENT

Mold can be a problem in any dwelling, especially in those where an excessive amount of moisture and humidity are present. Dwellings containing several people, pets, plants or fish aquariums tend to have higher moisture and humidity issues where conditions may exist for mold to grow.

The Weatherization Program's Health & Safety assessment of your home includes a visual check for mold. This is not a mold inspection, the person making the assessment is not a mold inspector, the testing of specific molds is beyond the scope of the program and the Weatherization program is not liable for mold that was found during the inspection.

During the assessment the inspector indicated mold growing in the following areas of your home:

DWELLING AREAS	MOLD IS:	
Living/Bedroom	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Bathroom Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Laundry Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Combustion Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Crawl Space Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Attic Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Basement Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present
Other Areas	<input type="checkbox"/> visibly present	<input type="checkbox"/> not visibly present

Specific Area Description: _____

Moldy or musty odors are also an indicator of hidden mold growth:

Moldy or musty odors are: Present Not present

SIGNATURES

Agency Employee's Signature

Sign Here _____ Agency Employee's Signature _____ Date _____

The client must sign one of the following disclaimers:

Mold/Moisture Disclaimer: By signing below I acknowledge that I have received information concerning moisture and mold conditions in my home prior to any Weatherization work being completed and I will take steps to reduce excessive moisture. I agree to hold the Weatherization program harmless for any future moisture or mold problems that are not associated with the Weatherization work.

Sign Here _____ Client Signature _____ Date _____

Deferral Disclaimer: By signing below I acknowledge that I have been notified there is existing mold in the home prior to any Weatherization work being completed. I have further been advised that remediating mold is outside of the scope of the Weatherization program and that the work must be deferred until the mold and/or moisture problem is remedied.

Sign Here _____ Client Signature _____ Date _____

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Radon Informed Consent/Consent To Perform Work

Agency

BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENC

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

NATIONAL RADON STUDY INFORMATION

I understand that the Health & Safety of the home/building, the occupants and the Weatherization providers is a priority of the Nebraska Weatherization Assistance Program. In 2011 the U.S. Department of Energy's Oakridge National Laboratory conducted a national field study of indoor air quality parameters in homes treated under the Weatherization Assistance Program (WAP). The study involved testing and monitoring 514 single-family homes (including manufactured homes) located in 35 states. The results of the nation-wide testing, deploying 7-day, activated charcoal canisters to measure radon levels, provided the following key findings:

- The average single-family home in the program has a heating-season indoor radon level of 1.9 ± 0.1 pCi/L.
- Pre-weatherization radon levels are correlated with pre-weatherization air tightness or tighter homes tend to have higher radon levels.
- Elevated radon levels are relatively rare in mobile homes and in site-built homes in counties identified by EPA as having low radon potential.
- The data suggests that weatherization results in a small, statistically significant (in absolute terms) increase in indoor radon levels. Nationally, the study data suggest an average increase of 0.4 ± 0.2 pCi/L.
- The impact of weatherization on radon appears to be generally proportional to pre-weatherization levels: homes with low pre-existing radon levels, which constitute the majority of program homes, experience only a slight increase in radon levels on average, while homes with pre-existing elevated radon levels experience a larger than average increase following weatherization.
- On average, the radon impact is largest among site-built homes in EPA high-radon-potential counties, and lowest among mobile homes and homes in low-radon potential counties.
- Changes in measured air-leakage rates due to air-sealing efforts, which are intended to reduce air infiltration and yield energy savings, were found to be statistically correlated with changes in radon levels in study homes.
- The study provides some evidence that the installation of continuous mechanical ventilation reduces radon levels in homes.

More results on the national study can be found at the following website:

http://weatherization.ornl.gov/Retrospectivepdfs/ORNL_TM-2014_170.pdf

PRECAUTIONARY WEATHERIZATION MEASURES THAT CAN/WILL BE IMPLEMENTED

The following radon precautions will be implemented in **all** weatherized homes to reduce the possibility of exacerbating any potential radon issues:

- Whenever site conditions permit, exposed dirt floors within the pressure/thermal boundary will be covered.
- Existing sumps will be air sealed to allow drainage but still reduce radon effects.
- Accessible, visible openings or cracks in below-grade walls and floors that contact the ground will be caulked and sealed.
- Other precautions may include, but are not limited to:
 - sealing any observed floor and/or foundations penetrations,
 - isolating the basement from the conditioned space, and
 - ensuring crawlspace venting is installed.

In **all** weatherized homes equipped with active radon mitigation systems the following additional radon precautions will be implemented

- Verifying that the radon vent fan is operating.
- If a previously installed radon mitigation system is not operating correctly, the client will be advised to consult the system installer or the state radon office.


WEATHERIZATION BENEFITS


Participants in weatherization programs are the recipients of **both** energy related and non-energy related. Some of the non-energy related benefits include 1) water and sewer savings, 2) increased property value and 3) shut-offs and reconnection avoidance. Additionally there are health and safety benefits that can include 1) improved comfort, 2) fewer illnesses, 3) fewer fires and 4) improves protection against the effects of carbon monoxide.

RADON INFORMED CONSENT

I have read (or had explained) the above statements and I consent to permit the Weatherization program provider to enter my property and perform the required Health & Safety assessments.

I have received the EPA's *A Citizen's Guide to Radon* and discussed the radon related risks with the agency representative.

Sign Here  _____ Date _____
Client Signature


 _____
Agency Representative Signature


CONSENT TO PERFORM WORK

This is a program funded by the U.S. Department of Energy and/or the U.S. Department of Health and Human Services to provide assistance to low income homeowners by making their homes more energy efficient. The goal of the program is to help low income people reduce their fuel bills by lowering their energy consumption. It is a onetime only service and the work performed is of a permanent nature. After final inspection, the measures implemented become my personal property and it is my responsibility to maintain and repair installed measures to keep the building systems in working condition.

Weatherization materials may include, but are not limited to, the following items: insulation, caulking, glazing, weatherstripping, thresholds, door sweeps, primary doors and primary windows, pipe wrap, water heater blankets, venting, minor repairs and glass replacement. The decisions concerning material type and quantity shall be the responsibility of the Agency providing the service. The determination for the type of work to be implemented on your home is solely based on the completion of an inspection and an energy audit that assesses how much money can be saved with implementation and work provides a cost-effective savings-to-investment ratio (SIR).

I have read (or had explained) the above statements and I consent to permit the Weatherization program provider enter my property and perform these services on my home.

Sign Here  _____ Date _____
Client Signature

 _____
Agency Representative Signature

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Home Health and Safety Screening Questionnaire

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

CLIENT QUESTIONNAIRE

In performing Weatherization services, we strive to use the safest materials possible. All products used in Weatherization Services must be approved by the U.S. Department of Energy. It is recognized that some products used may have an odor (Volatile Organic Compound or VOC) that some people may find objectionable or to which some people may experience sensitivity. If any family member believes that they may be hypersensitive to, or otherwise objects to the use in your home of any of the common commercial building materials listed below, please indicate with a check mark next to the item:

- NO** household occupant(s) have known hypersensitivities, allergies or objection to the use in my home of the commercial building products listed below, and I hereby agree to hold harmless and release the Weatherization Assistance Program, its agencies and contractors from any liability that may result from the use of these products.
- YES** at least one household occupant is hypersensitive, allergic or objects to certain types of commercial building products.

If you answered “Yes” above, please fill out the section below.

PRODUCTS BANNED FROM USE

Please indicate the products that may **NOT** be used in your home. Be aware that there may be some products for which there are no reasonable or acceptable substitutions. Checking off some items on this list may mean that we are unable to perform some energy-saving measures for your home. If there are any questions about the products, please ask for more information about how the product may be used before checking an item as unacceptable:

Check the products NOT to be used:

- | | |
|---|---|
| <input type="checkbox"/> latex acrylic or silicone caulk or sealant | <input type="checkbox"/> adhesive tape products |
| <input type="checkbox"/> spray-on adhesives | <input type="checkbox"/> duct sealant |
| <input type="checkbox"/> wall spackle patch | <input type="checkbox"/> gas pipe sealant, pvc primer or glue |
| <input type="checkbox"/> interior latex paint or primer | <input type="checkbox"/> exterior paint, primer or roof sealant |
| <input type="checkbox"/> vinyl or plastic products or sheeting | <input type="checkbox"/> rigid foam insulation or spray foam |
| <input type="checkbox"/> fiberglass insulation (rigid, blanket, loose) | <input type="checkbox"/> cellulose insulation (loose fill) |
| <input type="checkbox"/> fluorescent light bulbs | <input type="checkbox"/> other (please list below) _____ |
| <input type="checkbox"/> any products with volatile organic compounds or odor | _____ |

The products checked above may not be used in the Weatherization of my home. It is understood that some energy conservation measures may not be completed due to the restrictions requested based upon possible health concerns.

SIGNATURES

Sign Here Client Signature _____ Date _____

Weatherization Representative _____ Date _____

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Health and Safety Checklist

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Job Number: _____

Client Name: _____ Phone Number: _____

Address: _____

City: _____ State: _____ Zip Code: _____

PUBLICATIONS AND DOCUMENTS

Please check the boxes below to indicate which materials have been delivered to the client listed above.

- Radon Informed Consent/Consent to Perform Work Form WX6
- Home and Safety Home Screening Questionnaire Form WX7
- Renovate Right (occupants of all buildings built pre-1978)
- Lead Hazard Pre-Renovation Form WX3
- EPA's A Citizen's Guide to Radon
- A Brief Guide to Mold, Moisture and Your Home
- Nebraska Mold Assessment and Release Form WX5
- Consumer Product Safety Asbestos Fact Sheet
- Nebraska Weatherization Program — Even More Dollar and Energy Savings Brochure
- Weatherization Deferral Notice Form WX4
- Client Education Confirmation of Receipt Form WX2
- Combustion Equipment Safety Fact Sheet
- Asbestos Fact Sheet
- ASHRAE 62.2 Fact Sheet

SIGNATURE

I hereby certify that I have left copies of the materials checked above at the dwelling unit with the client. The materials checked above have been given to the above-listed client.

**Sign
Here**

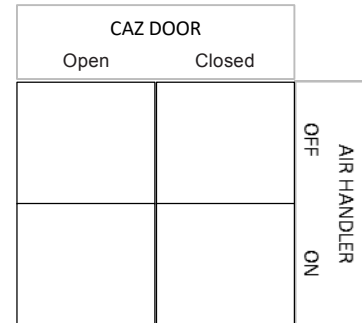
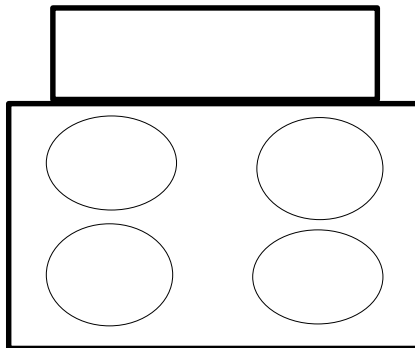
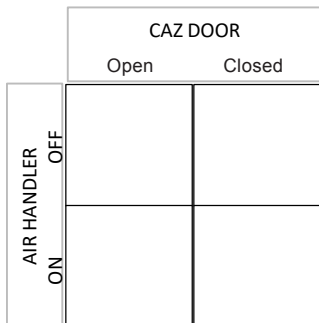
Weatherization Representative

Date

Client Name:		Project Number:
Street Address:	City:	Client Phone:
CAZ Location:	Pre-test Date:	Post-date:

Test Steps		Pre-WX	Post-WX	
1.	Check gas line & fittings from meter to appliances for leaks.			
2.	Inspect venting and deactivate all combustible appliances.			
3.	Record outdoor temperature.	°F	°F	
4.	Close all exterior windows, doors, solid fuel dampers and operable vents in the CAZ. Set all combustion appliances to the pilot setting or turn off the service disconnect.			
5.	Set CAZ baseline with reference to outside on DG 700. Record base pressure WRT outside.	Pa	Pa	
6.	Remove filter from furnace and clean lint trap on dryer.			
7.	Activate all exhaust fans.			
8.	Close the interior doors of all rooms <u>EXCEPT</u> for rooms with an exhaust fan or a central forced air system return.			
9.	Record CAZ measurement with CAZ door open. (When operating DG700, reset if on long).	Pa	Pa	
10.	Record CAZ measurement with CAZ door closed. (When operating DG700, reset if on long).	Pa	Pa	
11.	Take CAZ measurement with air handler on CAZ door open and record (Reset DG700 if on long).			
12.	Take CAZ measurement with air handler on CAZ door closed and record (Reset DG700 if on long).			
13.	Put house in worst case condition.			
14.	Test combustible appliances, testing smallest BTU first (be sure and test furnace temp rise).			
a.	Appliance 1: <i>General Note: Assess Spillage and CO at five minutes in cold vents and two minutes in warm vents or domestic water heaters.</i>	Spillage CO Draft: Optional	yes no ppm Pa	yes no ppm Pa
b.	Appliance 2: <i>General Note: Repeat test for each combustion appliance.</i>	Spillage CO Draft: Optional	yes no ppm Pa	yes no ppm Pa
c.	Appliance 3: <i>General Note: Repeat test for each combustion appliance.</i>	Spillage CO Draft: Optional	yes no ppm Pa	yes no ppm Pa
d.	If outside temp is over 90 degrees: Outside temp 10 to 90 degrees: (Temperature / 40) - 2.75 = Minimum draft If outside temp is under 10 degrees:		Min. Draft Min. Draft Min. Draft	-0.5 Pa. Pa. -2.5 Pa.
e.	In homes with gas, wood or pellet fireplaces: Appliances passed w/ blower door @300 Cfm Appliances passed at natural conditions Verified Co monitor(s) appropriately installed		yes no yes no yes no	yes no yes no yes no
15.	Fire all connected appliances simultaneously and test at the draft diverter of each appliance for spillage/draft/CO as above.	Spillage CO Draft: Optional	yes no ppm Pa	yes no ppm Pa
16.	If any test fails under worst case conditions, re-test with CAZ under natural conditions.			
17.	Return house to pre-test conditions following testing.			
18.	Print the results for all CO and draft testing.			

Notes:



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ACCEPTABLE DRAFT TEST RANGES

Outside Temperature (Degrees °F)	Minimum Draft Pressure Standard (Pa)
<10 degrees °F	-2.5
10 to 90 degrees °F	Temp. out divide by 40 minus 2.75
> 90 degrees °F	-0.5

CO Levels: Advice to Give, Actions to Take

Responding to Residential Carbon Monoxide Incidents: Guidelines for Fire and Other Emergency Response Personnel

0-9 ppm	Proceed with audit.
9-35 ppm	Check appliances and ventilate.
36-69 ppm	Shut off appliances and ventilate.
70+ ppm	Evacuate!

Daily Safety Test Out

Agency <input type="checkbox"/> BVCAP <input type="checkbox"/> CAPLSC <input type="checkbox"/> CAPMN <input type="checkbox"/> HFHO <input type="checkbox"/> CNCAP <input type="checkbox"/> NENCAP <input type="checkbox"/> NWCAP <input type="checkbox"/> SENCA	Tester Name: _____	Job Number: _____
Client Name: _____	Address: _____	Phone: _____
		Date: _____

TEST SET UP

	Day 1	Day 2	Day 3
Close the interior doors of all rooms EXCEPT for rooms with exhaust fan or a central forced air system return.	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
Turn on clothes dryer and all other exhaust fans. (Clean dryer lint trap and use a "no heat" setting) (Includes power attic ventilators) (Do not operate whole house exhaust fans)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes

CAZ DEPRESSURIZATION TEST

Gauge set up to measure CAZ WRT outside?	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
Technician: _____	_____	_____	_____
Date: _____	_____	_____	_____

	CAZ Door		CAZ Door		CAZ Door	
	Open	Closed	Open	Closed	Open	Closed
Furnace fan: Off	___ Pa	___ Pa	Off ___ Pa	___ Pa	Off ___ Pa	___ Pa
Furnace fan: On*	___ Pa	___ Pa	On ___ Pa	___ Pa	On ___ Pa	___ Pa

*Reposition doors as needed

RECREATE CONDITIONS WHICH CAUSED THE GREATEST NEGATIVE PRESSURE IN THE CAZ APPLIANCE TESTING

Water Heater: (Test the lowest Btu per hour input appliance first)

Fire the water heater	Day 1	Day 2	Day 3
Did spillage disappear within 2 minutes?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Furnace/boiler/space heater:

Furnace not tested — June/July/August

Fire the heating appliance	Day 1	Day 2	Day 3
Did spillage disappear within 2 minutes? (warm vent)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Did spillage disappear in 5 minutes? (cold vent)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Outdoor air temperature:	___ °F	___ °F	___ °F

Notes:

See Instructions and Specifications on Reverse Side

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“Worst Case Depressurization” Draft Testing

Important

DO NOT BREATHE SPILLING FLUE PRODUCTS!

Be safe! If the appliance does not establish a flow in the vent almost immediately, abort the test and follow the “Response to Failure” procedures. Do not wait for 2 minutes to see if the spillage disappears if the flow in the vent is in the wrong direction and into the room.

Response to Failure:

- 1) Disable portions of “Worst Case” set-up until the furnace or water heater functions properly.
- 2) Inform the client of what to do/not do with the house until permanent corrective action can be taken.
- 3) Notify your Wx Auditor/Supervisor that action is needed to repair problems with the home.

Emergency Condition

If “worst case” is completely undone and the appliances still do not function under “normal” operating conditions:

- **Do not operate the appliance until safety repairs are completed!**
- **Contact your supervisor.**

Specifications:

- A) Flow of flue products must be established to the exterior of the structure in the vent almost immediately.
- B) There should be no spillage within 2 minutes of operation.
- C) Operation of the furnace should not cause spillage or a reduction in draft pressure in any other appliance it shares combustion air with.
- C) Adequate draft pressure after 5 minutes is:

Outdoor Temperature	Minimum Draft Pressure	
	In. of Water Column	Pascals
Greater than 80 Degrees F.	-.005" w.c.	-1 Pa
Between 60 and 80 Degrees F.	-.008" w.c.	-2 Pa
Between 40 and 60 Degrees F.	-.012" w.c.	-3 Pa
Between 20 and 40 Degrees F.	-.016" w.c.	-4 Pa
Less than 20 Degrees F.	-.02" w.c.	-5 Pa

Client Name:			Job Number:
Street Address:	City:	Year of Home:	Date
NDEE Monitor:	Certified Renovator (RRP) Name / Firm Name:		Contact Number

HEALTH AND SAFETY TESTING

Did RRP Have Certification Documentation on Site? _____ Did RRP Provide on-site Training? _____

Who conducted lead-based paint testing? _____

Is RRP present at time of NDEE observation? _____ Can RRP be reach by phone? _____

Is RRP present during work set up? _____ During Clean-up? _____

Does RRP have proper records for work summary, training, and certifications? _____ Are signs posted? _____

Is ground cover needed and correct distance or retaining wall in place? _____

Were all proposed work areas swab tested? _____ Were pictures taken? _____

Note: Pictures should include:

- 1. Swab Test
- 2. PPE
- 3. Barricade and Signage
- 4. Indoor Containment
- 5. Outdoor Containment
- 6. Bagged With Gooseneck Trash
- 7. HEPA Vacuum and Dirty Diaper Test

Notes: _____

Areas of Lead Safe Work: _____

Additional Notes: _____

Checklist for Determination of Approval

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

CHECKLIST FOR WEATHERIZATION DETERMINATION FACTORS FOR APPROVALS

Make sure you have the following forms and documents before beginning a weatherization project.

- NA
- Signed Weatherization Application Form
 - Completed and Signed Basic Intake Form
 - Copy of Proof of Home Ownership (Deed, Taxes, or Mortgage Stub)
 - Copy of the Mobile Home Title
 - Home Information Survey (Client Questionnaire Form WX13)
 - Copy of Assistance Letter from Dept. of Health and Human Services (Energy Assistance or ADCX/TANF)
 - Completed Landlord Agreement/Permission
 - Income Verification
 - Most recent Social Security or SSI Letter
 - Last 3 months of pay stubs
 - Unemployment Compensation Letter
 - Copy of Social Security Award Letter (SSA, SSDI, or SSI) (For everyone in the household at the time of request)
 - Copy of Your Federal Tax Return (Self-Employment Verification Only)
 - Verification of Any Other Monthly Benefit Amounts (Example: VA pension, retirement/pensions, rental income, 401k, unemployment benefits etc.)
 - Zero Income Verification Form (WX16)

Note: Households with persons receiving either ADC (Aid to Dependent Children) or Supplemental Security Income (SSI) are automatically eligible for free weatherization.

- Completed U.S. Citizen Attestation Form WX15 (Required for all adults in the household)
- Copy of Most Recent Utility Bills With Account Numbers (Natural Gas & Electric)
- Historical (Section 106) Check
- Other: _____

SIGNATURES

Sign Here _____ Weatherization Representative _____ Date

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Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Inspector Name:	Date:	Job Number:
Client Name & Address:	City:	Phone Number:

INSPECTION REQUIREMENTS			
Question	Yes	No	Remarks
1. Does your home have broken glass in windows and doors?			
2. Does your home have foundation problems?			
3. Do you have a basement or a crawl space?			
4. Is the outside of your home free of debris so that a contractor could work on your home?			
5. Does your roof leak or is there physical damage to the inside from a roof leak?			
6. Is the access to windows, doors, attic etc. free on the inside of your home?			
7. Are you in the process of remodeling or do you plan on remodeling your home in the near future?			
8. Are any parts of your ceilings, walls or floors incomplete or in need of repairs?			
9. Do you have any broken or leaking water or sewer lines?			
10. Does water leak/stand in the basement or crawlspace?			
11. If mobile home, is the underbelly free of debris and/or standing water?			
12. Have you noticed mold/mildew growing on windows, walls or in corners?			
13. Do you use your attic for storage?			
14. Does your furnace work?			
15. Are any utilities turned off by the utility companies?			
16. Do you have pets in the house?			
17. Do you have any type of wood, pellet, corn stove, or fire place?			
18. Is the home listed for sale or do you have any knowledge of Federal, State, or Local program designation of your home for acquisition or clearance?			

BUILDING DETAILS			
19. Water heater: <input type="checkbox"/> Gas <input type="checkbox"/> Electric	24. Cooling system: <input type="checkbox"/> Central Air <input type="checkbox"/> Window A/C		
20. Cook stove: <input type="checkbox"/> Gas <input type="checkbox"/> Electric	25. If window air conditioning is used, how many do you have? <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4		
21. Do you have a: <input type="checkbox"/> Breaker <input type="checkbox"/> Fuse box	26. Is there a sump pit in your home? <input type="checkbox"/> YES <input type="checkbox"/> NO		
22. Heating system: <input type="checkbox"/> Forced Air <input type="checkbox"/> Steam <input type="checkbox"/> Water Boiler <input type="checkbox"/> Vented Console <input type="checkbox"/> Wall Furnace <input type="checkbox"/> Wood Stove <input type="checkbox"/> Electric Baseboard <input type="checkbox"/> Unvented Heater	27. Does your home have an active radon mitigation system installed? <input type="checkbox"/> YES <input type="checkbox"/> NO		
23. <input type="checkbox"/> I understand that the decisions concerning material type and quantity shall be the responsibility of the Agency providing the service. The determination for the type of work to be implemented on your home is solely based on the completion of an inspection and an energy audit that assesses how much money can be saved with implementation and work provides a cost-effective savings-to-investment ratio (SIR).			

SIGNATURES

Sign Here _____ Date _____

Client Signature

_____ Date _____

Weatherization Representative

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Landlord-Tenant Agreement/Permission Form

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Client Phone Number: _____

Landlord Name: _____ Landlord Phone Number: _____

PROVISIONS FOR LANDLORD/PROPERTY OWNER PERMISSION

Please Print

I, _____ hereby certify that I am the owner/authorized agent, herein referred to as "owner" for the property listed above:

Physical Address _____ City _____ Zip Code _____

Landlord/Property Owner: _____ Email _____

I hereby give permission to allow [Agency Name] _____ (hereafter known as the "Agency") to perform weatherization services according to the U.S. Department of Energy regulations and in conjunction with the current Nebraska state weatherization plan.

I also agree to the following provisions:

1. I will NOT increase the rent as a result of the improvements made by the weatherization of the home.
2. I will NOT evict or remove the tenant from the dwelling for a period of one (1) year after the final approved inspection of the property, so as long as he/she complies with all ongoing obligations and responsibilities owed to the landlord.
3. I (Owner) have no intention and knowledge of Federal, State, or Local Programs designation of my home for acquisition or clearance.
4. I have owned this property for _____ years/months and to the best of my knowledge the unit has not been weatherized for a previous tenant.
5. I will allow agency, state, or federal officials to inspect the rental property listed above.
6. I agree to allow my home to be photographed for pre-weatherization and post-weatherization documentation.
7. I will agree to any procedures necessary to insulate the sidewalls.
8. The property legal description or mobile home serial number of the rental property is:

Property Section:	Township:	Range:
Mobile Home Year:	Model:	VIN/SERIAL#:

PROVISIONS FOR LANDLORD/PROPERTY OWNER PERMISSION

I understand to weatherize a dwelling unit which is designated for acquisition or clearance by a Federal, State, or Local Program within 12 months from the date weatherization of the dwelling would be scheduled to be completed is not allowed under Federal Regulations 10 CFR 440.18(f)(1).

Yes No

I furthermore do hereby give permission for the property to be weatherized according to the Department of Energy (DOE) standards and regulations and for the inspection of the home and the work performed by the Agency Weatherization Program. As part of this service, all units will receive a heating system efficiency inspection. The weatherization services and the heating system efficiency inspection will be performed at no cost to the owner/landlord or tenant in single unit dwellings. In the case of heating plant repairs, the Agency Weatherization Program share will not exceed \$400.00. If the repairs do not exceed \$400.00, and the replacement of the unit is not shown as cost-effective on the energy audit, the Agency Weatherization Program will repair the heating plant. Should the repairs exceed \$400.00 the Agency Weatherization Program will contact the owner or authorized agent to have the heating plant replaced. The Agency Weatherization Program will contribute \$1,500.00 toward the required replacement, if installed to meet the Nebraska Energy Weatherization Assistance Program specifications. If deficiencies are found with the water heater, and the replacement of the unit is not shown as cost-effective on the energy audit, the

owner shall repair or replace the water heater. The Weatherization Program may contribute a maximum of \$500.00 if Weatherization Program installation requirements are met. The weatherization of the unit will not commence until such time as the furnace and/or water heater have been made safe and operable. Weatherization work on rental units may be a shared responsibility of the owner/landlord and the Agency Weatherization Program.

Additionally, I have received information regarding the findings of U.S. Department of Energy's national field study of indoor air quality in homes treated under the Weatherization Assistance Program and I understand and agree to the implementation of the precautionary measures that may be completed in the home to reduce the possibility of exacerbating any potential radon issues.

Yes No

Weatherization materials may include, but are not limited to, the following items: insulation, caulking, glazing, weather stripping, door sweeps, thresholds, primary doors and primary windows, pipe wrap, water heater blankets, venting, minor repairs, and glass replacement. The decisions concerning material type and quantity shall be the responsibility of the Agency providing the service. The determination for the type of work to be implemented on your home is solely based on the completion of an inspection and energy audit that accesses how much energy can be saved with implementation and which work provides a cost-effective savings-to-investment ratio (SIR).

SIGNATURES

Sign Here	Authorized Owner/Agent	Date
	Tenant	Date
	Agency Representative	Date

United States Citizenship Attestation Form

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

CERTIFICATION OF CITIZENSHIP

For the purpose of complying with Neb. Rev. Stat. §§ 4-108 through 4-114, I hereby attest as follows:

I am a citizen of the United States.

— OR —

I am a qualified alien under the federal *Immigration and Nationality Act*. In addition to this Form, I have included a current and legible copy of the front and back of one or more of the available USCIS forms, (listed below), required for verification.

1. I-327 (Reentry Permit)
2. I-551 (Permanent Resident Card)
3. I-571 (Refugee Travel Document)
4. I-766 (Employment Authorization Card)
5. Certificate of Citizenship
6. Naturalization Certificate
7. Machine Readable Immigrant Visa (with Temporary I-551 Language)
8. Temporary I-551 Stamp (**on passport or I-94**)
9. I-94 (Arrival/Departure Record)
10. Unexpired Foreign Passport (**must include an I-94**)
11. I-20 (Certificate of Eligibility for Nonimmigrant (F-1) Student Status)
12. DS2019 (Certificate of Eligibility for Exchange Visitor (J-1) Status)

Date of Birth _____ USCIS/Alien No. _____

Document Number _____ (ie. Certificate of Naturalization)

Card Number _____ (ie. Permanent Resident/Employment Authorization Card)

SIGNATURES

I hereby attest that my response and the information provided on this form and any related application for public benefits are true, complete, and accurate and I understand that this information may be used to verify my lawful presence in the United States.

Print Name First, _____ Middle, _____ Last _____

Sign Here Signature _____ Date _____

Zero Income Verification

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Applicant Name: _____ Social Security Number: _____

Address: _____ City: _____ Phone Number: _____

CERTIFICATION OF ZERO INCOME

(1) I HEREBY CERTIFY THAT I DO NOT RECEIVE INCOME FROM ANY OF THE FOLLOWING SOURCES:

- a. Wages and salaries from any type of employment (including commissions and fees)
- b. Income from the operation of a business (self-employment – Avon, Mary Kay, etc.)
- c. Rental income from real or personal property
- d. Interest or dividends from assets
- e. Social Security, annuities, insurance policies, retirement funds, pensions, disability or death benefits
- f. Unemployment benefits
- g. Net gambling or lottery winnings
- h. Alimony
- i. Educational grants and/or scholarships or veterans benefits available for subsistence after deducting expenses for tuition, fees, and books
- j. Regular monthly cash contributions from an outside source (ex-husband, father, mother, brother, sister, aunt, uncle, etc.) to assist with monthly debt

(2) In the past months when you say you have had minimal, or no income, how did you pay for rent, utilities and other necessities? _____

(3) Do you receive any contributions that are not explained above? Yes No
If yes, explain: _____

(4) Did you file a Federal Income Tax Return last year? Yes No

SIGNATURES

I hereby certify under penalty of perjury that the information provided above is accurate and complete to the best of my knowledge. I understand that providing false or misleading information under oath may subject me to criminal penalties. I fully understand what information is being requested and the ramifications of my not providing complete and truthful responses.

Print Name First, _____ Last _____

Sign Here Applicant Signature (zero income household member) _____ Date _____

Witness my hand and notarial seal on _____
Date _____

Sign Here Signature of Notary Public _____ Commission Expires _____

(This form must be completed by an individual 19 years or older who resides in the property)

This material was prepared with the support of the U.S. Department of Energy (DOE), Low Income Weatherization Assistance Program Grant. However, any opinions findings conclusions or recommendations expressed herein are those of the author and do not necessarily reflect the views of DOE.

Mechanical System Inspection/Clean & Tune

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Inspector Name: _____ Date: _____ Job Number: _____

Client Name & Address: _____ City: _____ Phone Number: _____

Ownership: <input type="checkbox"/> Renter <input type="checkbox"/> Owner	Building Type: <input type="checkbox"/> Frame <input type="checkbox"/> Mobile <input type="checkbox"/> Multifamily	Fuel Type: Heating: _____ Water Heating: _____	Heating System Type: <input type="checkbox"/> Forced Air <input type="checkbox"/> Gravity <input type="checkbox"/> Boiler <input type="checkbox"/> Vented <input type="checkbox"/> Un-vented <input type="checkbox"/> Wall <input type="checkbox"/> Floor <input type="checkbox"/> Heat Pump
Cooling System Type: <input type="checkbox"/> Central Air <input type="checkbox"/> Window <input type="checkbox"/> Heat Pump <input type="checkbox"/> None <input type="checkbox"/> A Coil <input type="checkbox"/> Sloped Coil		Water Heating Type: <input type="checkbox"/> Tank <input type="checkbox"/> Instantaneous <input type="checkbox"/> Heat Pump	

INSPECTION/EVALUATION REQUIREMENTS

Combustion Units Only

- Leakage testing of piping and controls
- Test heat exchanger for cracks and openings
- Inspect venting for pitch, size, blockage, corrosion
- Inspect heat exchanger for excessive corrosion
- Inspect burners and crossovers for blockage
- Determine pilot is burning properly
- Determine main burner ignition is satisfactory
- Test pilot safety devices
- Visually determine gas is burning properly
- If equipped, check main burner at low modulator
- Test for spillage at draft hood

Boilers Only (To be completed by a qualified technician)

- Recorded data plate information
- Correct nozzle sizes
- Fuel pressure readings
- Steady state efficiency (5.3003.2c)

Boilers Only (To be completed by a qualified technician)

- Smoke spot tests
- Net stack temps (5.3003.2e)
- Carbon dioxide and oxygen (5.3003.2f)
- Excess air (5.3003.2g)
- CO (5.3003.2h)
- Technician will provide printout for 5.3003.2c, 5.3003.2e, 5.3003.2f, 5.3003.2g and 5.3003.2h
- Inspect for water or combustion product leaks (if applicable)
- Determine water pumps are operational
- Test low water cutoff, feed control, etc.
- Determine the controls are operational

Furnaces and Console Heaters

- Determine the fan control is operational

All Heating Units (including Electric)

- Check fan and belt condition
- Inspect for exposed wiring and disconnect switch
- Check thermostat operation
- Check filter, filter rack and cover
- Check limit and fan control
- Install sticker (all repairs and Contractor Inspections)

Water Heaters

- Inspect for water or combustion product leaks (if applicable)
- Determine unit has pilot access door & draft hood (if applicable)

Air Conditioners

- Inspect central air conditioner coils inside and out
 - Not accessible
- Inspect wiring
- Inspect pipe insulation

FORCED AIR SYSTEM AIR FLOW EVALUATION – SWS 5.3003.3

Yes	No	N/A	Specification	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	External static pressure	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pressure drop across coiling coils	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pressure drop across filter	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Air flow measured at each register	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Supply wet bulb temperature	_____ °
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Supply dry bulb temperature	_____ °
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Return wet bulb temperature	_____ °
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Return dry bulb temperature	_____ °
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature rise between supply & return	Tested _____ ° Mfg. Req'd. _____ °

FORCED AIR SYSTEM ELECTRICAL SERVICE EVALUATION – SWS 5.3003.4

Yes	No	N/A	Specification	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Polarity of equipment tested/corrected	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Voltage/amperage in accordance with mfg. specs	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Voltage drop in accordance with mfg. specs/range	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grounding conforms with NFPA 70 National Electrical Code	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Blower amperage will not exceed mfg. full load amperage	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Compressor amperage will not exceed mfg. full load amperage	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Blower compartment safety switch operation verified	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Heat pump emergency heat circuit function verified	_____

REFRIGERANT LINE EVALUATION – SWS 5.3003.5

Yes	No	N/A	Specification	Notes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Insulated to a minimum R-4	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If exposed to sunlight, protected from UV degradation	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sized to meet manufacturer specifications	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Installed without kinks, crimps, or excessive bends	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Appropriately routed, supported and secured to prevent damage	_____

CLEAN AND TUNE REQUIREMENTS

All Units

- Lubricate all moving parts
- Clean and vacuum the return air and cabinet and filter rack
- Calibrate and adjust the thermostat, inspect wiring
- Clean or replace filter
- Adjust the conditioned airflow, high limit, fan control, fan on/fan off and temperature rise
- Adjust the belt tension or replace belt (if needed)

- Remove and clean the blower
- Check blower capacitor, fan relay and or contactts
- Clean air conditioner coil Not Accessible

All Units

- Seal thermostat wire penetration in frame homes
- Install sticker (all repairs and Contractor Inspections)

Combustion Units

- Clean flame sensor
- Clean and test heat exchanger – except boilers
- Check and adjust burners
- Clean the exhaust port and draft hood

Electric Units

- Repair or replace damaged wiring
- Test heating elements and sequencers

CARBON MONOXIDE TESTING AND ADJUSTMENT

Test and adjust each chamber for carbon monoxide		
	Pre-cleaning	Post-cleaning
Chamber 1	PPM	PPM
Chamber 2	PPM	PPM
Chamber 3	PPM	PPM
Chamber 4	PPM	PPM

HVAC CLIENT EDUCATION

Yes	No	N/A	Specification
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Basic operation of the equipment has been explained to the client (i.e. efficiency measures, design considerations differences from previous systems)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Proper operation and programming of the system controls for proper operation has been explained
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Indoor and outdoor shut-offs have been demonstrated
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location of combustion air inlets have been identified for the client as per NFPA 31, 54 & 58
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of the importance of not blocking combustion air inlets
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of the importance of cleaning dust and debris from return air grilles
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of proper placement of interior furnishings with respect to registers
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of the negative consequences of closing registers
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of the importance of leaving interior doors open as much as possible
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of the importance of proper filter selection and how to change the filter
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of the importance of keeping the outside units clear of debris, vegetation, decks and other blockages
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of the importance of routine professional equipment maintenance
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed that there will be no air bypass around the new filter and that the new forced air system will have a minimum MERV 6 filtration
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed of situations when a HVAC contractor should be contacted <ul style="list-style-type: none"> • Fuel Odors • Water draining from secondary drain line • Emergency heat indicator always on for a heat pump • System blowing cold air during heating season and vice versa • Icing of evaporator coils during heat pump cooling mode • Heat pump outside unit never defrosts • Unusual noises • Unusual odors
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been informed that carbon monoxide(s) alarm has been installed and the importance of maintenance
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Client has been provided with relevant manuals and warranties
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The labor warranty has been explained to the client

SIGNATURES

I certify that the work performed meets the requirements of the Nebraska Weatherization Assistance Program Installation Measures and Work Standards.

Agency or Company Name _____

Sign Here

Signature Heating/Plumbing Technician _____

Date _____

This material was prepared with the support of the U.S. Department of Energy (DOE), Low Income Weatherization Assistance Program Grant. However, any opinions findings conclusions or recommendations expressed herein are those of the author and do not necessarily reflect the views of DOE.

Mechanical System Repair/Replacement Bid

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Inspector Name: _____ Date: _____ Job Number: _____

Client Name & Address: _____ City: _____ Phone Number: _____

Ownership: Renter Owner
 Building Type: Frame Mobile Multifamily
 Fuel Type: _____ Heating: _____ Water Heating: _____
 Heating System Type: Forced Air Gravity Boiler Vented
 Un-vented Wall Floor Heat Pump
 Cooling System Type: Central Air Window Heat Pump None
 A Coil Sloped Coil
 Water Heating Type: Tank Instantaneous
 Heat Pump

HEATING/COOLING SYSTEM REPAIRS/REPLACEMENT

INSPECTION AND REPAIR ESTIMATE	QUANTITY	MATERIAL	LABOR
Heating System Replacement Unit		\$	\$
Flue Liner		\$	\$
Repairs Required (List repairs in detail)		\$	\$
.....		\$	\$
.....		\$	\$
Water Heater Replacement Unit.....		\$	\$
Cooling System Replacement Unit.....		\$	\$
Mechanical Ventilation.....		\$	\$
Subtotal Material and Labor		\$	\$
Tax		\$	\$
Total Materials and Labor		\$	\$

INSPECTION AND REPAIR ESTIMATE	QUANTITY	MATERIAL	LABOR
<input type="checkbox"/> 1st Inspection <input type="checkbox"/> 2nd Inspection		\$	\$
Tune and Clean		\$	\$
Repairs Required (List repairs in detail)		\$	\$
.....		\$	\$
.....		\$	\$
.....		\$	\$
Subtotal Material and Labor		\$	\$
Tax		\$	\$
Total Materials and Labor		\$	\$

REPLACEMENT HEATING PLANT - (MUST BE COMPLETED FOR PAYMENT)

Location: Non-Weatherized Outdoors
 BTU/Hr: Input: _____ Output: _____ How Sized: _____ AFUE: _____
 Manufacturer: _____ Model #: _____ Serial #: _____

REPLACEMENT AIR CONDITIONING UNIT - (MUST BE COMPLETED FOR PAYMENT)

Manufacturer: _____ Outdoor Unit Model #: _____ Indoor Unit Model #: _____ Serial #: _____ SEER/HSPF Rating: _____

REPLACEMENT WATER HEATING UNIT - (MUST BE COMPLETED FOR PAYMENT)

Manufacturer: _____ Model #: _____ Serial #: _____ EF Factor: _____

SIGNATURES

I certify that the work performed meets the requirements of the Nebraska Weatherization Assistance Program Installation Measures and Work Standards.

Agency or Company Name _____

Sign Here  _____
Signature Heating/Plumbing Technician

_____ Date

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Frame Home Energy Audit Data Collection

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Client Address: _____ City: _____ Zip Code: _____ Phone Number: _____ Previously Weatherized: _____ / _____ / _____

Auditor Name: _____ Date: _____ County: _____ Year Built: _____ Bedrooms: _____ Dwelling Type: Single Family Duplex Multi-Family <4
 Multi-Family >4 Shelter Other _____

No. of Stories: _____ No. of Occupants: _____ Funding Source: DOE LIHEAP Other _____ Type of Occupants: Senior Juvenile Disability _____ Ownership: Owner Renter Other _____

Contact Types:	Name	Type	Relationship	Phone Number	Email
1. Applicant					
2. Landlord/Owner 1					
3. Landlord/Owner 2					
4. Other					

HEALTH AND SAFETY

Pressure Diagnostic Measurements:
Blower Door Reading at 50 Pa:
Pre WX: _____ Initials: _____ Target CFM: _____
Post WX: _____ Initials: _____ Notes: _____

CAZ Testing Completed:
Verified Yes No
(If no, why): _____

Knob & Tube Wiring Present: Yes No
Location: _____

Pressure Differences:
Attic 01 PD: _____ Attic 02 PD: _____ Attic 03 PD: _____ Attic 04 PD: _____
Crawl/Basement 01 PD: _____ Crawl/Basement 02 PD: _____ Crawl/Basement 03 PD: _____
Kneewall 01 PD: _____ Kneewall 02: _____ Kneewall 03 PD: _____ Attached Garage: _____

Lead Safety Testing:
Doors: _____ Windows: _____ Walls: _____
Attic Accesses: _____ NA: _____

Breaker Box Present:
 Yes No
Fuse Sizes: _____

Carbon Monoxide Measurements:
Room with Heating System _____ ppm
Room with Water Heater _____ ppm
Living Area _____ ppm
Kitchen _____ ppm
Other _____ ppm

CO Monitor(s) Needed: Yes No
Location(s): _____

Smoke/Fire Detector(s) Needed:
 Yes No
Locations: _____

Solid Fuel Burning Units:
Solid Fuel Burning Stove/Fireplace Present
 Yes No Fuel Type _____
Properly Vented Yes No
Outside Combustion Air Provided
 Yes No

Additional Health and Safety Comments:

EXHAUST FANS AND VENTING

Location	Existing	Operational	Properly Vented	Fan CFM	Measured Fan Flow	Operable Window	Light
Bath 1	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bath 2	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bath 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Kitchen	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Dryer			<input type="checkbox"/> Yes <input type="checkbox"/> No				

Building Height _____ FT Addition Height _____ FT

Measured vertical distance between the lowest and highest above-grade points within the pressure envelope. This height should include the above-grade part of a basement if the basement is within the pressure envelope. Do not include an attic if it is not within the pressure envelope.

Additional Exhaust Fan and Venting Comments:

EXTERIOR WALLS

Type		Exterior Finish		Wall Square Footage	Exposure	Existing Insulation	
1 Balloon Fr.	4 Conc. Block	1 Wood	4 Brick/Stone	Total gross area of the exterior wall, including windows and doors	1 Outside	1 None	4 Rockwool
2 Platform Fr.	5 Adobe	2 Metal/Vinyl	5 Masonite		2 Buffered	2 Bin Cellulose	5 F.G. Batts
3 Masonry/Stone	6 Other	3 Stucco	6 Other		3 Attic	3 Bin Fiberglass	6 Other

Wall	Wall Type	Stud Size	Exterior Finish	Width x Height	Square Ft.	Orientation	Exposure	Existing Insulation	Existing R-Value
Wall 1				x					
Wall 2				x					
Wall 3				x					
Wall 4				x					
Wall 5				x					
Wall 6				x					
Wall 7				x					
Wall 8				x					
Wall 9				x					
Wall 10				x					
Wall 11				x					
Wall 12				x					
Wall 13				x					
Wall 14				x					
Wall 15				x					
Wall 16				x					
Wall 17				x					
Wall 18				x					

Additional Wall Information:

Wiring/Electrical Issues Yes No Water Leaks Present Yes No Asbestos Siding Likely Yes No
 Moisture Problems Evident Yes No Lead Based Paint Likely Yes No Other Concerns Yes No If Yes, what Concerns: _____

Additional Wall Inspection Comments:

WINDOWS

Type	Slider	Frame Type	Glazing	Int. Shade	Ext. Shade	Leakiness
1 Jalousie	1 Horizontal	1 Wood/Vinyl	1 Single Pane	1 Drapes	1 Low E Film	1 Very Tight
2 Slider	2 Vertical	2 Metal	2 Sngl. P. w/Storm	2 Blinds/Shades	2 Solar Screen	2 Tight
3 Fixed	3 Left-Right	3 Imp. Metal	3 Sngl. P. Bad/ Storm	3 Drapes w/ Shades	3 Awning	3 Medium
4 Door Window	4 Right-Left		4 Double Pane	4 None	4 Carport	4 Loose
5 Door Slider			5 Dbl. P. w/ Low E		5 Porch	5 Very Loose
6 Skylight					6 None	

Window	Wall Number	Type	Slider	Frame Type	Glazing	Interior Shade	Exterior Shade	% of Shade	Leakiness	Width	Height
Window 01											
Window 02											
Window 03											
Window 04											
Window 05											
Window 06											
Window 07											
Window 08											
Window 09											
Window 10											
Window 11											
Window 12											
Window 13											
Window 14											
Window 15											
Window 16											
Window 17											
Window 18											
Window 19											
Window 20											

Additional Window Inspection Comments:

DOORS

Type	Storm Door	Number	Swing	Lockset	Air Seal	Threshold	Strike	Hinge
1 H-Core 2 S-Core 3 Insulated Steel 4 Single Sliding Glass 5 Double Sliding Glass	1 Adequate 2 Deteriorated 3 None	Number of doors with the same description on this wall	1 Right Hand 2 Left Hand	1 Deadbolt 2 Knob 3 Combo	1 Jamb Up 2 Q-Lon 3 Sweep 4 V-Seal	1. ¾" Oak 2. 1" Oak 3. 1" Bumper 4. 1x5/8" Bumper 5. ½" Bumper 6. ¾" Bumper	1 Regular 2 Large	1 Regular 2 NRP

Door	Wall Direction	Door Type	Storm Door	Number	Swing	Lockset/Air Seal	Threshold/Hinge	Strike/Viewer	Width	Height	Thickness
Door 01						/	/	/			
Door 02						/	/	/			
Door 03						/	/	/			
Door 04						/	/	/			

Additional Door Inspection Comments:

ATTICS

Unfinished							Finished						
Attic Type		Joist Space		Type		Material	Area Type		Floor Type		Type		Material
1 Unfloored 2 Floored 3 Cath/Flat		1 16 in. 2 18 in. 3 24 in.		1 Batts 2 Blown 3 Other 4 None		1 Fiberglass 2 Rockwool 3 Cellulose	1 Outer Joist 2 Collar Beam 3 Kneewall 4 Roof Rafter		1 Unfloored 2 Floored		1 Batts 2 Blown 3 Other 4 None		1 Fiberglass 2 Rockwool 3 Cellulose
Attic Code	Attic Type	Joist Space	Area	Type	Material	Depth	Attic Code	Area Type	Floor	Area	Type	Material	Depth
UFA 01							FA 01						
UFA 02							FA 02						
UFA 03							FA 03						
UFA 04							FA 04						
UFA 05							FA 05						
UFA 06							FA 06						
UFA 07							FA 07						

Attic Access								Ventilation			
Attic Code	Dimensions	Material Type	Material Thick.	Insul. Required		WS Required		Exist. NFI		Required NFI	
	X			Yes	No	Yes	No				
	X			Yes	No	Yes	No				
	X			Yes	No	Yes	No				
	X			Yes	No	Yes	No				
	X			Yes	No	Yes	No				
	X			Yes	No	Yes	No				
	X			Yes	No	Yes	No				

Additional Attic Inspection Information/Details:

- | | | | | | |
|-----------------------------|------------------------------|-----------------------------|--------------------------------|------------------------------|-----------------------------|
| Recessed Can Lights Present | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Chimney/Flue Shielding Present | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Wiring/Electrical Issues | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Adequate Ventilation | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Existing Baffles | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Any Inaccessible Attics | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Water Leaks Present | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Moisture Problems Evident | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Exhaust Fan Venting Present | <input type="checkbox"/> Yes | <input type="checkbox"/> No | Vermiculite Present | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Other Concerns | <input type="checkbox"/> Yes | <input type="checkbox"/> No | | | |

Additional Attic Inspection Comments:

FOUNDATIONS

Foundation Type	Foundation Data		Exist Barrier		Floor Area Data		Sill Box Data		Found. Wall Data	
	Code	Type	Yes/No	Cond.	Area (sq.ft.)	Ex. R-Value	Joist Size	Perm. to Insul.	Height (ft.)	
1 Conditioned	Fnd 01								Ht. Exp. (%)	
2 Unconditioned	Fnd 02								Perim. (ft.)	
3 Vented	Fnd 03								Ex. R-Value	
4 Unintentionally Cond.	Fnd 04									
5 Uninsulated Slab	Fnd 05									
6 Insulated Slab	Fnd 06									
7 Exposed Floor										

Additional Foundation Inspection Information/Details:

Wiring/Electrical Issues Yes No Water Leaks Present Yes No
 Moisture Problems Evident Yes No Vapor Barrier Needed Yes No
 Plumbing Leaks Present Yes No Other Concerns Yes No

Additional Foundation Inspection Comments:

HEATING SYSTEM DETAILS

Equipment Type		Fuel Type		Equipment Location			Input Heating Units		Condition							
1 Gravity Furnace	6 Heat Pump	1 Natural Gas	5 Oil	1 Heated Space	2 Uncond. Space	3 Unintentionally Heated	1 No Input	2 kBTU/hr	3 Gals/hr	4 Lbs/hr	5 COM	1 Good	2 Fair	3 Poor (working)	4 Not Working	5 None
2 Forced Air Furnace	7 V-Space Heater	2 Electricity	6 Propane													
3 Fix. Elec. Resistance	8 UnV-Space Heater	3 Wood	7 Coal													
4 Portable Electric	9 V-Wall Furnace	4 Kerosene	8 Other													
5 Hot Water Boiler	10 UnV-Wall Furnace															

System Code	Type	Fuel	% Supply	Location	Sq. Ft.	Watts	Amps	Volts	Efficiency	Yr. Purchased	Manufacturer	Model #
Htng. Syst. 01												
Htng. Syst. 02												
Htng. Syst. 03												
Htng. Syst. 04												

Additional Heating System Inspection Information/Details:

Burner Condition Heating System ___ Good Fair Poor Heating System ___ Good Fair Poor
 Pilot Condition Heating System ___ Good Fair Poor Heating System ___ Good Fair Poor
 Elect. Serv. Switch Condition Heating System ___ Good Fair Poor Heating System ___ Good Fair Poor
 Exist. Smart Thermo. Yes No Gas Furnace Drip Leg Present Yes No
 Exist. Comb. Air Yes No Pilot Light Yes No
 Other Concerns Yes No

Additional Heating System Inspection Comments:

COOLING SYSTEM DETAILS

Equipment Type	Condition
1 Central	1 Good
2 Window	2 Fair
3 Heat Pump	3 Poor (working)
4 Evaporative Cooler	4 Not Working

System Code	AC Type	% Supply	Area Cooled (sq. ft.)	Size (kBTU/hr.)	SEER	Yr. Purchased	Manufacturer	Model Number	Serial Number
AC. Syst. 01									
AC. Syst. 02									
AC. Syst. 03									
AC. Syst. 04									

Additional Cooling System Inspection Comments:

UNINSULATED SUPPLY DUCT DETAILS

Duct Type (Rect./Rnd.)	Length (ft.)	Location	Width (if Rect.)	Height (if Rect.)	Diameter if Rnd. (In.)

Additional Ducting System Inspection Comments:

WATER HEATING SYSTEM DETAILS

Fuel Type	Equipment Location	Input Units	Insulation Type	Shower Heads	
1 Natural Gas	1 Heated Space	1 kBTU	1 Fiberglass	No. of Shower Heads	
2 Electricity	2 Uncond. Space	2 kW	2 Polyurethane	Min/Day	
3 Propane	3 Unintentional Heated			Avg. GPM	

System Code	Fuel Type	Equip. Location	Rated Input	Gallons	Manufacturer	Model Number	Serial Number	Ex. Tank Insulation Type	Ex. Pipe Insulation Type
Wtr. Htr. 01									
Wtr. Htr. 02									

Additional Water Heating System Information/Details:

Water Heater Condition Wtr. Htr. 01 Good Fair Poor Wtr. Htr. 02 Good Fair Poor
 Burner Condition Wtr. Htr. 01 Good Fair Poor Wtr. Htr. 02 Good Fair Poor
 Leaking Problems Evident Yes No Drip Leg Present Yes No
 Pipe Insulation Required Yes No Other Concerns Yes No

Additional Water Heating System Inspection Comments:

REFRIGERATOR DETAILS

Manufacturer _____ **Style** Top Freezer **Defrost** Automatic **Location** Heated **Size** _____
 Bottom Freezer Manual Unconditioned
 Side-By-Side Partial Automatic Unintentionally Conditioned
Model Number _____ Single Door Other _____
 Single Door w/ Freezer
 Other _____

Available Space Dimensions **Label/Database Annual Consumption** **Metered Consumption**
 Height (in) _____ kWh/yr Age Door Seal Condition Metering Minutes _____ Manual Defrost
 Width (in) _____ Less than 5 years Good Meter Reading (kWh) _____ Includes Defrost Cycle
 Depth (in) _____ 5 to 9 years Fair – Some Wear Temperature (°F) _____
 10-14 years Poor – Gaps visible
 15 + years

Additional Refrigerator Inspection Comments:

LIGHTING SYSTEM DETAILS

Room	Location	Lamp Type
1 Family	5 Dining	1 Ceiling 4 Wall
2 Kitchen	6 Bedroom	2 Floor 5 Closet
3 Living	7 Bathroom	3 Table 6 Other
4 Rec	8 Utility	

Light Code	Room	Location	Lamp Type	Quantity	Size (watts)	Usage (hr/day)	Comments
LT01							
LT02							
LT03							
LT04							
LT05							
LT06							
LT07							
LT08							
LT09							
LT10							

Additional Lighting System Inspection Comments:

SITE DIAGRAM

A large, empty grid area for drawing a site diagram. The grid consists of 30 columns and 30 rows of small squares, providing a structured space for technical drawing.

Continued on Page 7

WALL ELEVATIONS

Front: Facing _____

Rear: Facing _____

Left: Facing _____

Right: Facing _____

Mobile Home Energy Audit Data Collection

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCAP

Client Name: _____ Job Number: _____

Client Address: _____ City: _____ Zip Code: _____ Phone Number: _____

Auditor Name: _____ Audit Date: _____ County: _____ Year Built: _____ Previously Weatherized: _____ / _____ / _____

Number of Occupants: _____ Number of Bedrooms: _____ Funding Source: DOE LIHEAP Other _____ Type of Occupants: Senior Disabled Juvenile Ownership: Owner Renter Other _____

Contact Types:	Name	Type	Relationship	Phone Number	Email
1 Applicant					
2 Landlord/Owner 1					
3 Landlord/Owner 2					
4 Other					

HEALTH AND SAFETY

Pressure Diagnostic Measurements:
Blower Door Reading at 50 Pa:
Pre WX: _____ Initials: _____ Target CFM: _____
Post WX: _____ Initials: _____ Notes: _____

CAZ Testing Completed:
Verified Yes No
(If no, why): _____

Aluminum Wiring Present:
Yes No
Location: _____

Carbon Monoxide Measurements:

Room with Heating System _____ ppm	CO Monitor(s) Needed: <input type="checkbox"/> Yes <input type="checkbox"/> No Location(s): _____ _____ _____	Smoke/Fire Detector(s) Needed: <input type="checkbox"/> Yes <input type="checkbox"/> No Locations: _____ _____ _____	Solid Fuel Burning Units: Solid Fuel Burning Stove/Fireplace Present <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Fuel Type _____ Properly Vented <input type="checkbox"/> Yes <input type="checkbox"/> No Outside Combustion Air Provided <input type="checkbox"/> Yes <input type="checkbox"/> No
Room with Water Heater _____ ppm			
Living Area _____ ppm			
Kitchen _____ ppm			
Other _____ ppm			

Additional Health and Safety Comments:

EXHAUST FANS AND VENTING

Location	Existing	Operational	Properly Vented	Fan CFM	Measured Fan Flow	Operable Window	Light
Bath 1	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bath 2	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bath 3	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Kitchen	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Dryer			<input type="checkbox"/> Yes <input type="checkbox"/> No				

Building Height _____ FT Addition Height _____ FT
Measured vertical distance between the lowest and highest above-grade points within the pressure envelope. This height should include the above-grade part of a basement if the basement is within the pressure envelope. Do not include an attic if it is not within the pressure envelope.

Additional Exhaust Fan and Venting Comments:

SHELL INFORMATION

Shielding	Leakiness	Long Wall Orientation	Shell Size	Stud Size	Wall Ventilation	Insulation Type/Thickness	Outdoor WHCloset
Well	Tight	North/South	Width	2x2 2x4	Vented	Batt/Blanket	Yes No
Normal	Medium	East/West	Length	2x3 2x6	Not Vented	Loose Fill	
Exposed	Loose					Foam Core	

SHELL INFORMATION (CONT.)

Additional Wall Information:

Wiring/Electrical Issues Yes No Water Leaks Present Yes No Other Concerns Yes No
 Moisture Problems Evident Yes No Lead Based Paint Likely Yes No If Yes, what Concerns: _____

Additional Wall Inspection Comments:

WINDOWS						
Type	Slider	Frame Type	Glazing	Interior Shade	Exterior Shade	Leakiness
1 Jalousie 2 Awning 3 Slider 4 Fixed 5 Door Window 6 Sliding Glass Door 7 Skylight	1 Horizontal 2 Vertical 3 Left-Right 4 Right-Left	1 Wood/Vinyl 2 Metal 3 Imp. Metal	1 Single Pane 2 Single w/Glass Storm 3 Single w/Plastic Storm 4 Double Pane 5 Double w/Glass Storm 6 Double w/Plastic Storm	1 Drapes 2 Blinds/Shades 3 Drapes w/ Shades 4 None	1 Low E Film 2 Solar Screen 3 Awning 4 Carport 5 Porch 6 None	1 Very Tight 2 Tight 3 Medium 4 Loose 5 Very Loose

Window	Wall Direction				Type	Slider	Frame	Glazing	Interior Shade	Exterior Shade	% of Shade	Leakiness	Width	Height
	N	S	E	W										
Window 01														
Window 02														
Window 03														
Window 04														
Window 05														
Window 06														
Window 07														
Window 08														
Window 09														
Window 10														
Window 11														
Window 12														
Window 13														
Window 14														
Window 15														
Window 16														

Additional Window Inspection Comments:

DOORS								
Type	Storm Door	Number	Swing	Lockset	Air Seal	Threshold	Strike	Hinge
1. H-Core 2. S-Core 3. Insulated Steel 4. Standard Mobile Home Door 5. Single Sliding Glass 6. Double Sliding Glass	1. Yes 2. No	Number of doors with the same description on this wall	1. Right Hand 2. Left Hand	1. Deadbolt 2. Knob 3. Combo	1. Jamb Up 2. Q-Lon 3. Sweep 4. V-Seal	1. 3/4" Oak 2. 1" Oak 3. 1" Bumper 4. 1x5/8" Bumper 5. 1/2" Bumper 6. 3/4" Bumper	1. Regular 2. Large	1. Regular 2. NRP

Door	Wall Direction	Door Type	Storm Door	Number	Swing	Lockset/Air Seal	Threshold/Hinge	Strike/Viewer	Width	Height	Thickness
Door 01						/	/	/			
Door 02						/	/	/			
Door 03						/	/	/			
Door 04						/	/	/			

Additional Door Inspection Comments:

CEILING

Roof Type	Roof Color	Existing Insulation	Height at Center
Bowstring Flat Pitched	Reflective Shaded Normal	Batts/Blanket _____ in. Loose Fill _____ in. Foam Core _____ in.	Cathedral %

Additional Ceiling Inspection Information/Details:

Recessed Can Lights Present Yes No
 Wiring/Electrical Issues Yes No
 Moisture Problems Evident Yes No
 Chimney/Flue Shielding Present Yes No
 Water Leaks Present Yes No
 Other Concerns Yes No

Additional Ceiling Inspection Comments:

FLOORS

Floor Joist Direction		Is there a Skirt?		Floor Wing Description		Batt Insulation Location	
Lengthwise	Widthwise	Yes	No	Joist Size (in)		1 Attached to Flooring	
				Loose Insul (in)		2 Between Joist	
				Location		3 Attached Under Joist	
						4 Draped Below Joist	
						5 None	
Belly Configuration		Belly Condition		Floor Belly Center Description		Maximum Depth of Belly Cavity: _____ Inches	
Square		Good		Joist Size (in)			
Rounded		Average		Loose Insul (in)			
Flat		Poor		Location			

Additional Floor Inspection Information/Details:

Wiring/Electrical Issues Yes No
 Moisture Problems Evident Yes No
 Plumbing Leaks Present Yes No
 Water Leaks Present Yes No
 Vapor Barrier Needed Yes No
 Other Concerns Yes No

Additional Floor Inspection Comments:

MOBILE HOME ADDITION INFORMATION

Wall Configuration	Long Wall Orientation	Stud Size		Wall Ventilation	Insulation Type/Thickness	Addition Interior Wall	
Maximum Wall Height at Interior Wall	North/South	2x2	2x4	Vented	Batt/Blanket	Maximum Height	
Maximum Wall Height at Room Center	East/West	2x3	2x6	Not Vented	Loose Fill	Minimum Height	
All Addition The Same Height					Foam Core		

Additional Mobile Home Addition Information/Details:

Wiring/Electrical Issues Yes No
 Water Leaks Present Yes No
 Moisture Problems Evident Yes No
 Lead Base Paint Likely Yes No
 Other Concerns Yes No

Additional Mobile Home Addition Comments:

MOBILE HOME ADDITION WINDOWS

Type	Slider	Frame Type	Glazing	Interior Shade	Exterior Shade	Leakiness	Number of Same
1 Jalousie 2 Slider 3 Fixed 4 Door Window 5 Door Slider 6 Skylight	1 Horizontal 2 Vertical 3 Left-Right 4 Right-Left	1 Wood/Vinyl 2 Metal 3 Imp. Metal	1 Single Pane 2 Sngl. P. w/Storm 3 Sngl. P. Bad/ Storm 4 Double Pane 5 Dbl. P. w/ Low E	1 Drapes 2 Blinds/Shades 3 Drapes w/ Shades 4 None	1 Low E Film 2 Solar Screen 3 Awning 4 Carport 5 Porch 6 None	1 Very Tight 2 Tight 3 Medium 4 Loose 5 Very Loose	Number of windows with the same description on this wall

Window	Wall Direction	Type	Slider	Frame	Glazing	Interior Shade	Exterior Shade	% Shade	Leakiness	Number of Same	Width	Height
Window 01												
Window 02												
Window 03												
Window 04												

Additional Window Inspection Comments:

MOBILE HOME ADDITION DOORS

Type	Storm Door	Number	Swing	Lockset	Air Seal	Threshold	Strike	Hinge
1 H-Core 2 NRP 2 S-Core 3 Insulated Steel 4 Sing. Sliding Glass 5 Double Sliding Glass	1 Adequate 2 Deteriorated 3 None	Number of windows with the same description on this wall	1 Right Hand 2 Left Hand	1 Deadbolt 2 Knob 3 Combo	1 Jamb Up 2 Q-Lon 3 Sweep 4 V-Seal	1 ¼ Oak 2 1 Oak 3 1 Bumper 4 1x5/8 Bumper 5 ½ Bumper 6 ¾ Bumper	1 Regular 2 Large	1 Regular 2 NRP

Door	Wall Direction	Door Type	Storm Door	Number	Swing	Lockset/Air Seal	Threshold/Hinge	Strike/Viewer	Width	Height	Thickness
Door 01						/	/	/			
Door 02						/	/	/			
Door 03						/	/	/			
Door 04						/	/	/			

Additional Door Inspection Comments:

MOBILE HOME ADDITION CEILING

Joist Size	Roof Color	Existing Insulation	Insulation Depth
	<input type="checkbox"/> Reflective <input type="checkbox"/> Shaded <input type="checkbox"/> Normal	<input type="checkbox"/> Batts/Blanket <input type="checkbox"/> Loose Fill <input type="checkbox"/> Foam Core	

Additional Ceiling Inspection Information/Details:

- Recessed Can Lights Present Yes No
 Wiring/Electrical Issues Yes No
 Moisture Problems Evident Yes No
 Chimney/Flue Shielding Present Yes No
 Water Leaks Present Yes No
 Other Concerns Yes No

Additional Ceiling Inspection Comments:

MOBILE HOME ADDITION FLOOR

Floor Type	Floor Length	Joist Size	Addition Floor Batt	Existing Insulation
<input type="checkbox"/> Craw Space <input type="checkbox"/> Slab on Grade <input type="checkbox"/> Exposed Floor			1 Attached to Floor 2 Between Joists 3 Attach Under Joist 4 None	Type Depth (in) 1 Batt/Blanket 2 Loose Fill 3 Foam Core

Additional Floor Inspection Information/Details:

- Wiring/Electrical Issues Yes No
 Moisture Problems Evident Yes No
 Plumbing Leaks Present Yes No
 Water Leaks Present Yes No
 Vapor Barrier Needed Yes No
 Other Concerns Yes No

Additional Floor Inspection Comments:

HEATING SYSTEM DETAILS

Equipment Type	Fuel Type	Equipment Location	Input Heating Units	Condition	
1 Gravity Furnace 2 Forced Air Furnace 3 Fix. Elec. Resistance 4 Portable Electric 5 Hot Water Boiler	6 Heat Pump 7 V-Space Heater 8 UnV-Space Heater 9 V-Wall Furnace 10 UnV-Wall Furnace	1 Natural Gas 2 Electricity 3 Wood 4 Kerosene	5 Oil 6 Propane 7 Coal 8 Other	1 Heated Space 2 Uncond. Space 3 Unintentionally Heated	1 No Input 2 kBTU/hr 3 Gals/hr 4 Lbs/hr 5 COM

System Code	Type	Fuel	% Supply	Loc.	Sq. Ft.	Watts	Amps	Volts	Efficiency	Yr. Purch.	Manufacturer	Model No.
Htng. Syst. 01												
Htng. Syst. 02												
Htng. Syst. 03												

Additional Heating System Inspection Information/Details:

- Duct Location Floor Ceiling None
 Duct Insulation Location Above Duct Below Duct Around Duct or Ductboard No Insulation
 Burner Condition Heating System ___ Good Fair Poor Heating System ___ Good Fair Poor
 Pilot Condition Heating System ___ Good Fair Poor Heating System ___ Good Fair Poor
 Elect. Serv. Switch Condition Heating System ___ Good Fair Poor Heating System ___ Good Fair Poor
 Exist. Smart Thermo. Yes No Gas Furnace Drip Leg Present Yes No
 Exist. Comb. Air Yes No Pilot Light Yes No
 Other Concerns Yes No

Additional Heating System Inspection Comments:

COOLING SYSTEM DETAILS

Equipment Type				Condition			
1 Central Air	2 Window Air	3 Heat Pump	4 Evaporative Cooler	1 Good	2 Fair	3 Poor (working)	4 Not Working

System Code	AC Type	% Supply	Area Cooled (sq. ft.)	Size (kBtu/hr.)	SEER	Yr. Purch.	Manufacturer	Model Number	Serial Number
AC. Syst. 01									
AC. Syst. 02									
AC. Syst. 03									
AC. Syst. 04									

Additional Cooling System Inspection Comments:

REFRIGERATOR DETAILS

Manufacturer _____	Style <input type="checkbox"/> Top Freezer <input type="checkbox"/> Bottom Freezer <input type="checkbox"/> Side-By-Side <input type="checkbox"/> Single Door <input type="checkbox"/> Single Door w/ Freezer <input type="checkbox"/> Other _____	Defrost <input type="checkbox"/> Automatic <input type="checkbox"/> Manual <input type="checkbox"/> Partial Automatic <input type="checkbox"/> Other _____	Location <input type="checkbox"/> Heated <input type="checkbox"/> Unconditioned <input type="checkbox"/> Unintentionally Conditioned	Size _____
Model Number _____	Available Space Dimensions Height (in) _____ Width (in) _____ Depth (in) _____	Label/Database Annual Consumption kWh/yr _____ Age _____ <input type="checkbox"/> Less than 5 years <input type="checkbox"/> 5 to 9 years <input type="checkbox"/> 10-14 years <input type="checkbox"/> 15 + years	Metered Consumption Metering Minutes _____ Manual Defrost _____ Meter Reading (kWh) _____ Includes Defrost Cycle _____ Temperature (°F) _____	Door Seal Condition <input type="checkbox"/> Good <input type="checkbox"/> Fair – Some Wear <input type="checkbox"/> Poor – Gaps visible

Additional Refrigerator Inspection Comments:

PRESSURE PAN TESTING

Duct Pressure Pan Measurements With Home at -50 Pascals				Duct Pressure Pan Measurements Without Blower Door Operating			
Duct No.	Duct Location/Description	Pre-sealing	Post-sealing	Duct No.	Duct Location/Description	Pre-sealing	Post-sealing
1				1			
2				2			
3				3			
4				4			
5				5			
6				6			
7				7			
8				8			
9				9			
10				10			
11				11			
12				12			

Supply PA	Before Duct Sealing	After Duct Sealing	Average
-----------	---------------------	--------------------	---------

Measure with pressure pan and air handler on, average the pressure of the registers closest to and farthest from the air handler.

Additional Pressure Pan Testing Comments:

WATER HEATING SYSTEM DETAILS

Fuel Type	Equipment Location	Input Units	Insulation Type	Shower Heads	
1 Natural Gas 2 Electricity 3 Propane	1 Heated Space 2 Uncond. Space 3 Unintentional Heated	1 kBtu 2 kW	1 Fiberglass 2 Polyurethane	No. of Shower Heads	
				Min/Day	
				Avg. GPM	

System Code	Fuel Type	Equip. Location	Rated Input	Gallons	Manufacturer	Model Number	Serial Number	Ex. Tank Insulation Type	Ex. Pipe Insulation Type
Wtr. Htr. 01									
Wtr. Htr. 02									

Additional Water Heating System Information/Details:

Verified the Existing Unit is Approved for Use in Mobile Homes Yes No
 Water Heater Condition Wtr. Htr. 01 Good Fair Poor Wtr. Htr. 02 Good Fair Poor
 Burner Condition Wtr. Htr. 01 Good Fair Poor Wtr. Htr. 02 Good Fair Poor
 Leaking Problems Evident Yes No Drip Leg Present Yes No
 Pipe Insulation Required Yes No Other Concerns Yes No

Additional Water Heating System Inspection Comments:

LIGHTING SYSTEM DETAILS

Room		Location		Lamp Type
1 Family	5 Dining	1 Ceiling	4 Wall	1 Standard
2 Kitchen	6 Bedroom	2 Floor	5 Closet	2 Floor
3 Living	7 Bathroom	3 Table	6 Other	3 Other
4 Rec	8 Utility			

Light Code	Room	Location	Lamp Type	Quantity	Size (watts)	Usage (hr/day)	Comments
LT01							
LT02							
LT03							
LT04							
LT05							
LT06							
LT07							
LT08							
LT09							
LT10							

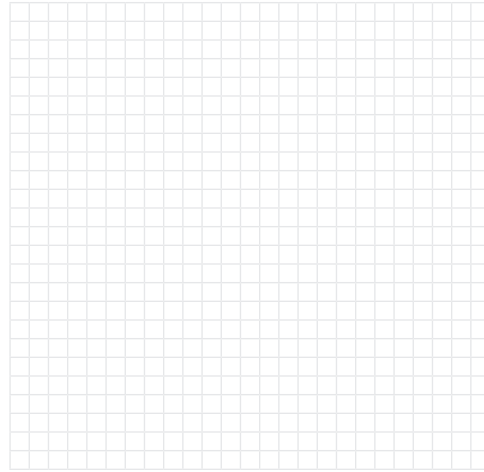
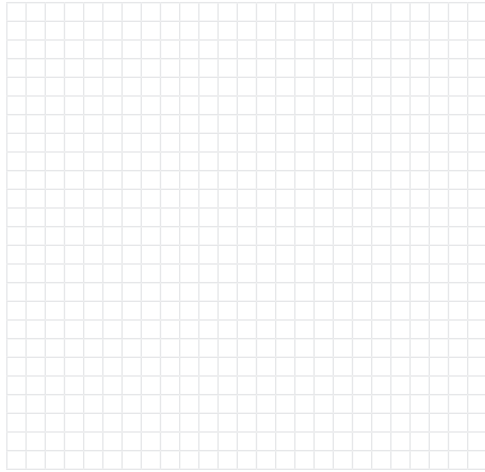
Additional Lighting System Inspection Comments:

SITE DIAGRAM

A large, empty grid area for drawing a site diagram. The grid consists of 30 columns and 30 rows of small squares, providing a space for technical drawing or site planning.

Continued on Page 8

WALL ELEVATIONS

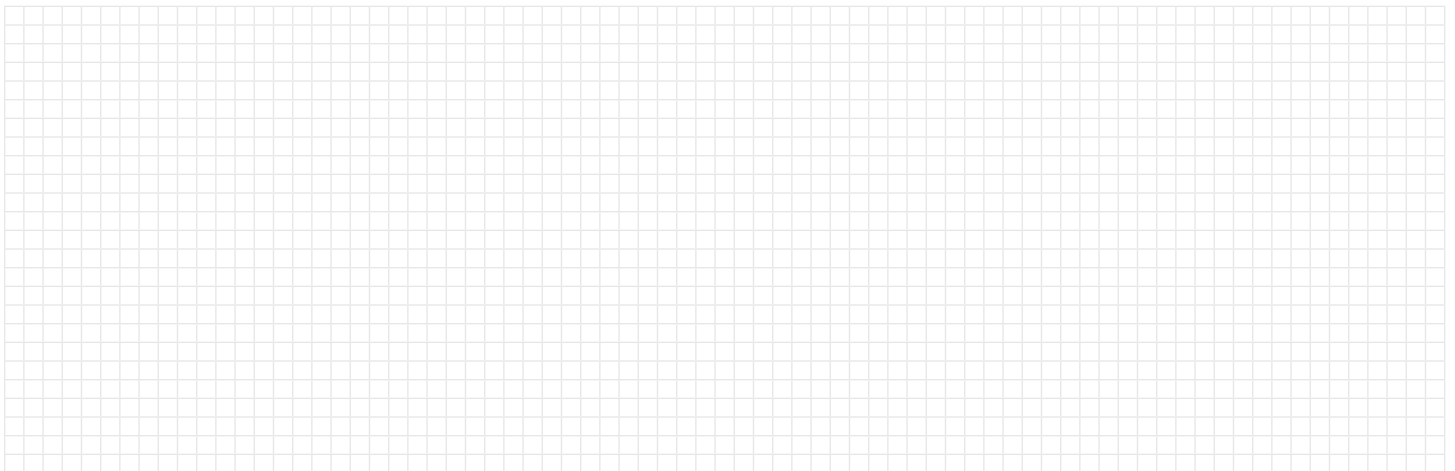


Front: Facing _____

Rear: Facing _____



Left: Facing _____



Right: Facing _____

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ City: _____ Phone Number: _____

Contractor: _____ Crew: _____

HOMEOWNER/TENANT STATEMENT

- I hereby certify that I am the occupant of the above house or apartment, and that the property needed the weatherization measures which were performed.
- I further certify that the work was completed to my satisfaction and that all materials were (to the best of my knowledge) installed on the dwelling listed above during the course of the weatherization work.
- I understand that I have no legal obligations to pay for the materials used in weatherizing my dwelling and that no legally enforceable debt is hereby created.

CLIENT COMMENTS

Client satisfied with weatherization work completed? Yes No
 Crews attitude satisfactory? Yes No
 Contractor attitude satisfactory? Yes No
 A carbon monoxide detector was installed in my home. Yes No
 The crew installed _____ light bulbs.

Household Member Name: _____ Date: _____

The work has been completed to my satisfaction. After the signing of this form, I understand no further work will be performed, and that the Nebraska Weatherization Assistance Program and/or the Nebraska Department of Environment and Energy will not be responsible for any modifications made to the completed work.

Comments:

HAZARDOUS MATERIALS GENERATED/HANDLED IN YOUR HOME


Wastes are classified as "hazardous" if they have certain dangerous properties (for instance, if they are flammable, corrosive, or toxic). Any hazardous waste materials generated during the course of the weatherization of your home have been disposed of according to applicable local laws, regulations and/or Federal guidelines.

The following hazardous wastes issues/items were addressed during weatherization of your home:

- Asbestos - ACM Product: _____
- Lead Based Paint
- Mercury Containing Lamps
- Mercury Containing Thermostat
- Standing Fuel Oil, Diesel, etc.
- PCB Light Ballasts
- Refrigerants
- Other: _____

SIGNATURE

I hereby certify that I have informed the above-named client the hazardous waste materials checked above have been properly disposed of.


Sign Here  _____ Date _____
Weatherization Representative

This material was prepared with the support of the U.S. Department of Energy (DOE), Low Income Weatherization Assistance Program Grant. However, any opinions findings conclusions or recommendations expressed herein are those of the author and do not necessarily reflect the views of DOE.

COMPLETE REVERSE SIDE

ELECTRIC SPACE HEATER WAIVER

I have been fully informed of the hazards associated with the use of electric space heaters and I hereby **DECLINE** to allow the removal of any electric space heaters from my home.

Sign Here  _____ Date _____
Owner/Tenant Signature

SIGNATURES

Sign Here  _____ Date _____
Owner/Tenant Signature

Sign Here  _____ Date _____
Owner/Tenant Signature

Sign Here  _____ Date _____
Final Inspector Signature

Utility Consumption Information Release

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

COMMUNITY ACTION PARTNERSHIP CONTACT INFORMATION

Household Applicant: _____

Location Address: _____ City: _____ County: _____

UTILITY COMPANY INFORMATION

I certify that I am the owner/tenant of the property at:

Location Address

and I hereby authorize the following utilities to release information regarding my fuel bills, both past and future, to:

Community Action Agency Name

the Nebraska Department of Environment and Energy (NDEE) and the U.S. Department of Energy (DOE).

Natural Gas Company/Supplier: _____	Account Number: _____
Electric Company/Supplier: _____	Account Number: _____
Propane/Fuel Oil Company/Supplier: _____	Account Number: _____

Attach a copy of your latest fuel bill for each company/supplier listed above.

SIGNATURES

I understand that all information related to this application is confidential and will only be used to provide data for the above named agencies and no information obtained through this release will be made public in such a manner that the dwelling or occupants can be identified.

Household Applicant Name: _____

Utility Account Holder Name: _____

Household Applicant's Signature: ► _____ Date _____

Utility Account Holder's Signature: ► _____ Date _____

This material was prepared with the support of DOE, Low Income Weatherization Assistance Program Grant. However, any opinions findings conclusions or recommendations expressed herein are those of the author and do not necessarily reflect the views of DOE.

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name:	Vendor Name:
Contact Name:	File Number:
Address:	Address:
City State Zip:	City State Zip:
Phone Number:	Phone Number:

The Nebraska Weatherization Assistance Program will provide you with a new refrigerator in exchange for a low efficiency refrigerator that is currently in use in your house. The refrigerator to be removed must meet certain requirements for energy consumption, and will be metered by the auditor prior to offering a new appliance. Your old refrigerator will be removed from your home and appropriately disposed of. The new refrigerator will be provided at no charge. You will be responsible for removing all food from your old refrigerator and transferring them to the new refrigerator.

The auditor is responsible for assuring the replacement refrigerator will fit into the space available and will be delivered with the door hinged on the proper side.

REFRIGERATOR INFORMATION		
	Existing Refrigerator	Replacement Refrigerator
Brand:		
Model:		
Configuration:	<input type="checkbox"/> Top Freezer <input type="checkbox"/> Bottom Freezer <input type="checkbox"/> No Freezer <input type="checkbox"/> Side-by-Side	<input type="checkbox"/> Top Freezer <input type="checkbox"/> Bottom Freezer <input type="checkbox"/> No Freezer <input type="checkbox"/> Side-by-Side
Energy Use/Rating		
Fresh Food Volume (Cu. Ft.)		
Freezer Volume (Cu. Ft.)		
Total Volume (Cu. Ft.)		
Defrost	<input type="checkbox"/> Auto <input type="checkbox"/> Partial Auto <input type="checkbox"/> Manual	<input type="checkbox"/> Auto <input type="checkbox"/> Partial Auto <input type="checkbox"/> Manual
Color	<input type="checkbox"/> Tan/Almond <input type="checkbox"/> White <input type="checkbox"/> Other	<input type="checkbox"/> Tan/Almond <input type="checkbox"/> White <input type="checkbox"/> Other
Height x Width x Depth		
Door Hinge	<input type="checkbox"/> Left <input type="checkbox"/> Right	<input type="checkbox"/> Left <input type="checkbox"/> Right
Ice Maker	<input type="checkbox"/> Inside Door <input type="checkbox"/> None	<input type="checkbox"/> Inside Door <input type="checkbox"/> None

SIGNATURE

- I accept the Weatherization Program's offer to replace and remove the above refrigerator.
- I refuse the Weatherization Program's offer to replace and remove the above refrigerator.

Sign Here _____ Client Signature _____ Date

Sign Here _____ Weatherization Representative Signature _____ Date

This material was prepared with the support of the U.S. Department of Energy (DOE), Low Income Weatherization Assistance Program Grant. However, any opinions findings conclusions or recommendations expressed herein are those of the author and do not necessarily reflect the views of DOE.

LIHEAP Heating and Cooling Repair or Replacement Program

Agency: BVCAP CAPLSC CAPMN CNCAP HFHO NENCAP NWCAP SENCA

Client Name: _____ Job Number: _____

Address: _____ Phone Number: _____

Existing Heating/Cooling Equipment Information

Building Type: Frame Mobile
 Fuel Type: Nat. Gas Propane Electric Fuel Oil Other
 Heating System Type: Forced Air Gravity Boiler Vented Un-vented Wall Floor Heat Pump
 Cooling System Type: Central Air Window Heat Pump None A-Coil Sloped Coil
 Manufacturer: _____ Model#: _____ Serial Number: _____

Homeowner Certification Statements

I hereby certify that I am the owner and occupant of the above house, and that the property requires emergency furnace and/or air conditioner repair or replacement under the Nebraska Weatherization Assistance - LIHEAP Emergency Furnace/Air Conditioner Repair/Replacement Program.

I understand that I have no legal obligations to pay for the materials/equipment installed in my home and that no legally enforceable debt is hereby created.

I have been informed that my home is eligible for Weatherization services and of the benefits associated with Weatherization, and I hereby **DECLINE** to allow the Weatherization of my home. _____
 Initials N/A

Sign Here _____
 Owner Signature: _____ Date: _____

Checklist for Emergency Furnace/Air Conditioner Repair/Replacement Approvals

- | N/A | Yes | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Signed Emergency Furnace/AC Repair/Replacement Homeowner Certification Statement |
| <input type="checkbox"/> | <input type="checkbox"/> | Copy of Proof of Ownership (Deed, Taxes, or Mortgage Stub) |
| <input type="checkbox"/> | <input type="checkbox"/> | Copy of Mobile Home Title |
| <input type="checkbox"/> | <input type="checkbox"/> | Completed U.S. Citizen Attestation Form WX15 (Required for all adults in the household) |
| <input type="checkbox"/> | <input type="checkbox"/> | Copy of System "Red Tag" or HVAC Bid Indicating Emergency Replacement is Required |
| <input type="checkbox"/> | <input type="checkbox"/> | Agency Documentation Indicating Emergency Replacement is Required |
| <input type="checkbox"/> | <input type="checkbox"/> | Income Verification <ul style="list-style-type: none"> • Most recent Social Security of SSI Letter • Last 3 Months of Pay Stub • Unemployment Compensation Letter • Copy of Your Federal Tax Return (Self-Employment Verification Only) • Verification of Any Other Monthly Benefits Amounts (Example: VA Pension, Retirement/Pensions, Rental Income, 401K, Unemployment Benefits, Etc.) • Zero Income Verification Form (WX16) • Verification of receipt of Energy Assistance payments under the Low Income Home Energy Assistance Program of 1981 during the same program year that the LIHEAP-ERRA application assistance is received. |
| <input type="checkbox"/> | <input type="checkbox"/> | Additional AC replacement documentation requirements for permanent resident(s) in the home: <ul style="list-style-type: none"> • A child under six years of age who receives ADC, • A person 70 years of age or older, or, • Has a severe illness or condition which is aggravated by extreme heat as verified by a medical statement signed by a licensed healthcare provider. |

Sign Here _____
 Weatherization Representative Signature Date

Client Completion Comments


Client satisfied with work completed? Yes No
Contractor's attitude satisfactory? Yes No
Agency representative's attitude satisfactory? Yes No


Household Member's Name: _____

Comments: _____

Signatures

The work has been completed to my satisfaction. After signing this form, I understand no further work will be performed unless additional work is required by the Nebraska Department of Environment and Energy.

Sign Here  _____
Owner Signature _____
Date

Sign Here  _____
Final Inspector Signature _____
Date

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LIHEAP Heating and Cooling Repair or Replacement Bid Form

Client Name: _____ Job Number: _____
 Address: _____ City: _____ Phone Number: _____

Existing Heating/Cooling Equipment Information

Building Type: Frame Mobile
 Fuel Type: Nat. Gas Propane Electric Fuel Oil Other
 Heating System Type: Forced Air Gravity Boiler Vented Un-vented Wall Floor Heat Pump
 Cooling System Type: Central Air Window Heat Pump None A-Coil Sloped Coil
 Manufacturer: _____ Model Number: _____ Serial Number: _____

Heating/Cooling System Repairs/Replacement

Equipment Repair or Replace Description	Quantity	Material	Labor
Heating System Replacement Unit.....	_____	\$ _____	\$ _____
Flue Liner.....	_____	\$ _____	\$ _____
Repairs Required (List in Detail).....	_____	\$ _____	\$ _____
.....	_____	\$ _____	\$ _____
.....	_____	\$ _____	\$ _____
.....	_____	\$ _____	\$ _____
Cooling System Replacement Unit.....	_____	\$ _____	\$ _____
Repairs Required (List in Detail).....	_____	\$ _____	\$ _____
.....	_____	\$ _____	\$ _____
.....	_____	\$ _____	\$ _____
.....	_____	\$ _____	\$ _____
Subtotal Materials and Labor.....	_____	\$ _____	\$ _____
Tax.....	_____	\$ _____	\$ _____
Total Materials and Labor.....	_____	\$ _____	\$ _____

Replacement Heating Equipment (Must be Completed for Payment)

Fuel Type: Non-Weatherized Propane
 BTU/Hr: _____ Input: _____ Output: _____
 How Sized: _____ AFUE: _____
 Manufacturer: _____ Model Number: _____ Serial Number: _____


Replacement Cooling Equipment (Must be Completed for Payment)

Manufacturer: _____ Outdoor Unit Model Number: _____ Indoor Unit Model Number: _____ SEER/HSPF Rating: _____

Installation Completion Information

I certify that the equipment provided and the work performed meets the requirements of the Nebraska Weatherization Assistance Program.

Company Name _____

Sign Here  _____ Heating Technician Signature _____ Date _____

I certify that the work performed meets the requirements of the Nebraska Weatherization Assistance Program.

Sign Here  _____ Weatherization Representative Signature _____ Date _____

State of Nebraska Weatherization Assistance Program
**LIHEAP Heating and Cooling Repair or Replacement
Quality Control Inspection Form**

Client Information and Emergency Certification

Agency: <input type="checkbox"/> BVCAP <input type="checkbox"/> CAPLSC <input type="checkbox"/> CAPMN <input type="checkbox"/> CNCAP <input type="checkbox"/> HFHO <input type="checkbox"/> NENCAP <input type="checkbox"/> NWCAP <input type="checkbox"/> SENCA	Inspector Name:	Job Number:
Client Name:	Address:	Phone:
		Date:
NDEE QCI:	Sub-Grantee QCI:	Primary Fuel Type: <input type="checkbox"/> Nat. Gas <input type="checkbox"/> Propane <input type="checkbox"/> Electric <input type="checkbox"/> Fuel Oil <input type="checkbox"/> Other

Heating System Emergency Verification Provided by:

Redtag Confirmation: _____
 Qualified Heating Technician: _____
 Subgrantee Personnel: _____
 Other: _____

Cooling System Emergency Verification Provided by:

Child <6 Confirmation: _____
 Person >70 Confirmation: _____
 Signed Medical Statement Confirmation: _____
 Other: _____

Health and Testing

Post-Replacement Health and Safety Testing:

Primary Heat: CAZ Draft CO Notes: _____
 Water Heater: CAZ Draft CO Notes: _____
 Other: CAZ Draft CO Notes: _____

On-Site Work Assessment

Heating System Replacement

- Yes, work appears to have been performed to manufacturers' standards and state guidelines.
- Yes, work appears to have been performed to standards, but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards/guidelines.
Explain: _____

Cooling System Tune and Clean

- Yes, work appears to have been performed to specified standards.
- Yes, work appears to have been performed to standards, but does not reflect good workmanship.
Explain: _____
- Yes, some work was performed but NOT ALL work meets specified standards.
Explain: _____

Comments: _____

Signature

Quality Control Inspector Name (Print): _____

Sign Here  _____ Date _____