

West Virginia Weatherization Field Standards And Best Practices

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Low-Income Weatherization Assistance Program**



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Priority List for Site-Built and Multi-family Structures

The Site-Built and Multi-family Priority List is representative of the most cost effective general measures in order of SIR. It allows the Auditor/Estimator and Crew Supervisor latitude to make energy efficiency related judgment calls while on the job. Measures should be installed in the order listed unless specific documented health and safety measures take precedence.

In Multi-family weatherization the Priority List only applies to dwellings that are 1-5 units that are individually heated or cooled, garden style apartments that are 3 stories or less. Buildings that do not meet this criterion must use the audit protocols specified in the Multi-family Unit Guidance document.

Structures that fall outside normal parameters in weatherization will require a NEAT audit to evaluate cost effectiveness of measures. Audits are also required to prove the cost effectiveness of windows and doors, HVAC efficiency and refrigerator replacements.

It is very important that all judgment calls are based on cost effectiveness considerations or verified with a NEAT audit with an SIR measure justification of greater than 1. A minimum of 10% all DOE funded single family dwellings must have a NEAT audit performed.

General Measures	Detailed Measures
Heating System Clean and Tune	<ul style="list-style-type: none"> • <u>Mandatory measure (unless system is being replaced).</u> • <u>Document all mandatory health and safety tests.</u>
Air Sealing	<ul style="list-style-type: none"> • <u>Mandatory measures.</u> • <u>Use blower door and zone pressure diagnostics to guide air sealing.</u> • <u>Ducts must be sealed as per duct diagnostic standards protocols. Seal ducts only if they are outside thermal envelope.</u> • <u>Home must be sealed at least to upper limit of the target range and any other significant or obvious air leaks.</u> • <u>Seal all major bypasses and key junctures.</u> • <u>Attics/ceilings must be sealed prior to installation of attic insulation.</u> • <u>Utilizing blower door guided diagnostics seal floors that are considered part of the thermal boundary.</u>
Duct Insulation	<ul style="list-style-type: none"> • <u>After sealing ducts outside the thermal envelope, insulate the same ducts.</u>
Attic Insulation	<ul style="list-style-type: none"> • <u>Mandatory measure: Insulate open attics to R-38 if existing insulation is R-0 to R-19.</u> • <u>If there is properly installed insulation of R20 or greater, additional insulation is not required.</u>

General Measures	Detailed Measures
	<ul style="list-style-type: none"> • <u>Mandatory measure: Dense pack Insulate knee walls or use R19 Fiberglass batt insulation.</u> • <u>Seal applicable key junctures in knee wall areas.</u> • <u>Existing attic insulation evaluation must be based on consistent coverage (R-value and depth). Any existing voids will decrease the overall R-value of the attic.</u>
Sidewall Insulation	<ul style="list-style-type: none"> • <u>Mandatory measure: Dense-pack wall cavities to R-13 or maximum structurally allowable.</u>
Floor Insulation	<ul style="list-style-type: none"> • <u>Mandatory measure when floor is considered the thermal boundary and no existing insulation.</u> • Insulate floors that define thermal boundary to R-19 (if none existing). • Do not insulate floors over conditioned areas.
Heating System Replacement	<ul style="list-style-type: none"> • Case-by-case consideration. Replacement justification must be documented. • A NEAT audit must be run to determine if SIR is greater than 1 on all units where justification is based on efficiency. • Must replace with 90+ high efficiency forced-air unit or highest efficiency possible space heater.
Baseload Measures	
DHW Insulation	<ul style="list-style-type: none"> • <u>Mandatory measure.</u> • Insulate tanks with less than R-11 existing insulation (unless added insulation will void manufacturer's warranty). • Insulate tanks to a minimum of R-8 tank wrap.
DHW Pipe Insulation	<ul style="list-style-type: none"> • <u>Insulate the first 6 feet of cold and hot water pipe.</u> • <u>Insulate all water pipes that are outside the thermal boundary.</u>
Refrigerator Replacement	<ul style="list-style-type: none"> • <u>Mandatory measure for DOE/DHHR if SIR is equal to or greater than 2.</u> • <u>Mandatory measure if paid by electric utility EEP and SIR greater than 1.5</u> • Optional measure if affordable for DOE/DHHR if SIR greater than 1.
CFLs	<ul style="list-style-type: none"> • <u>Replace if bulb is on more than 1 hour per day.</u>
Shower Heads	<ul style="list-style-type: none"> • <u>Replace, with client permission, if existing flow is greater than 3 gallons per minute.</u>
Health and Safety	
Heating System Replacement	<ul style="list-style-type: none"> • Case-by-case analysis. • Heating systems with non-repairable health and safety hazards can be replaced if warranted. Utility funds will pay for new system in some cases.
Water Heater Replacement	<ul style="list-style-type: none"> • Case-by-case analysis. • Non-repairable gas and electric water heaters can be replaced if warranted and funds allow. Utility funds will assist in payment in some cases. • Actively leaking water heaters can be replaced.

Priority List

General Measures	Detailed Measures
	<ul style="list-style-type: none"> Any replacement should be with highest efficiency or energy factor available and practical.
Combustion Appliance Measures	<ul style="list-style-type: none"> <u>Mandatory testing and documentation of tests in client file.</u> <u>Eliminate hazards that pose imminent danger to health and safety of occupants.</u>
Mechanical Ventilation	<ul style="list-style-type: none"> Ventilate in accordance with ASHRAE 62.2-2010 guidelines.
Repair Measures	
Incidental Repairs	<ul style="list-style-type: none"> If energy related materials are greater than \$250 of DOE/DHHR funds, NEAT audit must be run to show cumulative SIR is greater than 1 (not to exceed \$450).
Replacement Doors and Windows	<ul style="list-style-type: none"> Individual NEAT must be run to show measure SIR is greater than 1. Documentation to be part of client file. Door and window replacement cannot be done in lieu of any mandatory measures. Pre and post photo documentation must be part of client file.

Notes

- All mandatory measures are underlined.
- General measures are listed in order of priority based on SIR.
- Other measures (baseload, health and safety, repairs) are not listed in order of priority.
- All mandatory measures are expected to be done on all jobs. Thorough documentation must be provided if a mandatory measure is not performed.
- Recommended measures should be performed unless they are cost prohibitive. The reason for not performing the measure must be documented.
- Any variation from the priority list must be based on individual NEAT analysis.

1100 Priority List for Mobile Homes

Estimator/Auditor evaluations for Mobile Homes are similar in nature to site built structures. Different structural characteristics must be considered when evaluating for cost effectiveness. Different roof and belly configurations must be analyzed to assure the most appropriate installation techniques are prescribed.

Pre site evaluations should pay particular attention to documenting and evaluating existing insulation levels, attic cavity depths and construction types. Floor evaluations will also have the same considerations. Consistent insulation coverage without voids is important to note when evaluating measures to give crews direction on the Work Order.

The Mobile Home Priority List provides guidance to the Estimator/Auditor and Crew Supervisor to follow prescriptive measures that are based upon MHEA SIR justifications.

Mobile homes that fall outside normal parameters in manufactured housing will require a MHEA audit to evaluate cost effectiveness of measures. A minimum of 10% all DOE funded mobile home dwellings must have a MHEA audit performed. Audits are also required to prove the cost effectiveness of windows and doors, HVAC efficiency and Refrigerator replacements. SIR justifications must be greater than 1.

Measures should be installed in the order listed unless specific documented health and safety measures take precedence.

General Measures	Detailed Measures
Heating System Clean and tune	<ul style="list-style-type: none"> • <u>Mandatory measure (unless system is being replaced).</u> • <u>Document all mandatory health and safety tests.</u>
Air Sealing	<ul style="list-style-type: none"> • <u>Mandatory measure.</u> • <u>Use blower door and zone pressure diagnostics to guide air sealing.</u> • <u>Ducts must be sealed according to duct diagnostic standards.</u> • <u>Seal floors utilizing blower door guided diagnostics.</u> • <u>Home must be sealed to the upper limit of target range if cost effective.</u>
Ceiling Insulation*	<ul style="list-style-type: none"> • <u>Natural Gas Heat – Mandatory measure if existing insulation is 2” or less with 6” or greater bowstring depth.</u>

General Measures	Detailed Measures
	<ul style="list-style-type: none"> • <u>Electric, Oil or Propane Heat – Mandatory measure if existing insulation is 3.5 or less with 6” or greater bowstring depth.</u> • <u>Mandatory measure on flat roofs with a cavity depth of at least 3 inches with no existing insulation, regardless of fuel type. If cavity depth is less than 3 inches and/or there is existing insulation, do not insulate.</u> • <u>Mandatory on A frame construction (gable end blow) with 6” or less insulation, regardless of fuel type.</u>
Floor Insulation	<ul style="list-style-type: none"> • <u>Mandatory measure when there is 6” existing insulation or less or insulation with voids.</u> • <u>Mandatory measure with flat belly floors with 2” or less inches of existing insulation with no voids.</u> • Existing floor measures must be based on consistent coverage (R-value and depth). Inconsistent coverage (voids in belly insulation) requires the entire belly to be insulated.
Heating System Replacement	<ul style="list-style-type: none"> • Case-by-case consideration. Replacement justification must be documented. • If replacing, must replace with 90+ high efficiency forced air unit or highest efficiency possible for direct vent space heater.
Baseload Measures	
DHW Insulation	<ul style="list-style-type: none"> • <u>Mandatory measure on tanks with less than R-11 existing insulation (unless added insulation will void manufacturer’s warranty).</u> • <u>Insulate tanks to a minimum of R-8 tank wrap.</u>
DHW Pipe Insulation	<ul style="list-style-type: none"> • <u>Insulate the first 6 feet of cold and hot water pipe.</u> • <u>Insulate all water pipes that are outside the thermal boundary.</u>
Refrigerator Replacement	<ul style="list-style-type: none"> • <u>Mandatory measure for DOE/DHHR if SIR is equal to or greater than 2.</u> • <u>Mandatory measure if paid by electric utility EEP and SIR greater than 1.5.</u> • Optional measure if affordable for DOE/DHHR if SIR greater than 1.
CFLs	<ul style="list-style-type: none"> • <u>Mandatory measure if paid by electric utility EEP and bulb is on more than 1 hour per day.</u> • <u>Replace if bulb is on more than 1 hour per day.</u>
Shower Heads	<ul style="list-style-type: none"> • <u>Replace, with client permission, if existing flow is greater than 3 gallons per minute.</u>
Health and Safety Measures	
Heating System Replacement	<ul style="list-style-type: none"> • Case-by case analysis. • Heating systems with non-repairable health and safety hazards can be replaced if warranted. Utility funds will pay for new system in some cases.
Water Heater	<ul style="list-style-type: none"> • Case-by case analysis.

General Measures	Detailed Measures
Replacement	<ul style="list-style-type: none"> • Non-repairable gas and electric water heaters can be replaced if warranted and funds allow. Utility funds will assist in payment in some cases. • Actively leaking water heaters can be replaced. • Any replacement should be with highest efficiency or energy factor available and practical.
Combustion Appliance Measures	<ul style="list-style-type: none"> • Mandatory testing and documentation of tests on Residential Audit Tool. • Eliminate hazards that pose imminent danger to health and safety of occupants.
Mechanical Ventilation	<ul style="list-style-type: none"> • <u>Ventilate in accordance with ASHRAE 62.2-2010 guidelines.</u>
Repair Measures	
Incidental Repairs	<ul style="list-style-type: none"> • If energy related materials are greater than \$250 of DOE/DHHR funds, MHEA audit must be run to show cumulative SIR is greater than 1 (not to exceed \$450).
Heating System Replacement	<ul style="list-style-type: none"> • Electric furnace can be replaced if beyond reasonable repair using electric utility EEP funds. • Combustion furnace replacements are allowable to replace if repairs are not feasible or repairs cost more than 2/3 the cost of a replacement. (Not subject to individual MHEA run when over \$300.)
Replacement Doors and Windows	<ul style="list-style-type: none"> • Jalousie windows can be replaced when not repairable and when there is significant air leakage discovered by blower door tests. • Door and window replacement cannot be done in lieu of any mandatory measures. • Pre and post photo documentation must be part of client file.

Notes

- All mandatory measures are underlined.
- General measures numbers 1 – 4 are listed in order of priority based on SIR.
- Other Measures (baseload, health and safety, repairs) are not listed in order of priority.
- All mandatory measures are expected to be done on all jobs. Thorough documentation must be provided if a mandatory measure is not performed.
- Recommended measures should be performed unless they are cost prohibitive. The reason for not performing the measure must be documented.
- All Mobile Home ceilings should be tested with a 4” observation port towards the center of mobile home to determine cavity depth and existing insulation levels.
- Gable end blows are not permitted on Bow string constructed Mobile Homes.
- Allowable measures or case-by-case measures are at the discretion of the agency and should be based on costs and professional opinion. They cannot supplant mandatory measures without individual MHEA being run to justify.
- Any variation from the priority list must be based on individual MHEA analysis.